Lower Owens River Project
2020 Annual Report

February 2021

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Authored by:

The Los Angeles Department of Water and Power
http://www.ladwp.com/LORP

Inyo County Water Department
http://www.inyowater.org/projects/lorp/

EXECUTIVE SUMMARY

The 2020 Lower Owens River Project (LORP) Annual Report contains the results from the fourteenth year of monitoring for the LORP. Monitoring results contained in this report include hydrologic monitoring, monitoring of range conditions throughout the project area, saltcedar and weed management. Also included in this report are a summary of adaptive management activities implemented in 2020 as a result of the 2019 LORP Evaluation Report contained in last year's annual report.

Hydrologic Monitoring

The hydrologic monitoring section describes flow conditions in the LORP regarding attainment with the 2007 Stipulation & Order flow and reporting requirements and 1991 Environmental Impact Report (EIR) goals. For the 2019-20 water year LADWP was compliant with all the 2007 Stipulation & Order flow and reporting requirements. The mean flow to the Delta Habitat Area (DHA) was 6.4 cfs, within the required 6-9 cfs annual flow. The agreement to manage wetted acreage in the Blackrock Waterfowl Management Area (BWMA) by setting constant flows by seasons continued, with a goal of 370 acres. The Fall 2020 acreage measurement was not taken due to poor air quality resulting from wildfires. The seasonal habitat flow ramping reached a peak release of 117 cfs and covered five days, before ramping down over another five days. This section also describes flow measurement issues and includes commentary on flow losses and gains through the different reaches of the Lower Owens River.

Land Management

The 2020 LORP land management monitoring efforts continued with monitoring utilization across all leases and range trend monitoring on the Thibaut and Islands leases inside the LORP management area. All irrigated pastures were evaluated in 2019, pastures which scored <80% were revisited in 2020. Despite the extremely dry spring and summer, plant trends on most Range Trend plots appeared to be fairly stable. Pasture utilization for leases within the LORP was within allowable levels of use established for both riparian (up to 40%) and upland (up to 65%) areas. LADWP and CalFire successfully conducted a prescribed burn on 93 acres in the southern Winterton Unit in preparation for flooding this winter as part of the BWMA.

LORP Saltcedar Treatment

Inyo County administered the Saltcedar Control Program for City lands in the Owens Valley since 1997 through funding from LADWP under the Inyo-Los Angeles Water Agreement and Wildlife Conservation grants. In 2017, with the retirement of the

Saltcedar Program Manager and cessation of grant funding in 2016, Inyo County suspended their saltcedar program. As a consequence, LADWP initiated a saltcedar control program to manage the species on City property including the LORP area.

In 2019-20 LADWP treated 1,144 acres of saltcedar in the LORP area, including:

- Lower Owens River immediately east of treated spreading basins (355 treated acres)
- Spreading basins south of Blackrock Ditch (789 treated acres)

LADWP will continue to treat saltcedar re-sprouts in these areas in 2020-2021 and will continue further treatment in the Blackrock area if feasible.

LORP Weed Report

In recent years significant increases in perennial pepperweed (*Lepidium latifolium)* populations were detected along the Owens River and in the Blackrock Waterfowl Management Area. Increases in net acreage of known sites, as well as dozens of new infestations were also observed.

To gain control over these observed increases in pepperweed LADWP weed eradication crews canvassed a total of 4,207 acres within the LORP project boundaries treating pepperweed. Within this area a coordinated effort with the Inyo County Agricultural Office weed crew to twice treat large populations along the eastern side of the Owens River was completed. In addition, LADWP weed eradication crew also twice treated pepperweed in and around the Winterton Blackrock Waterfowl Management Area. Treatments in both areas were conducted in early spring and late summer.

The Owens River and Blackrock Waterfowl Management Area will continue to be prioritized treatment locations during the upcoming 2022 season.

2020 LORP Adaptive Management Actions

Following the 2019 LORP Evaluation, LADWP and the County identified a series of adaptive management actions to further improve the project. During the 2020-2021 fiscal year, LADWP and the County are working on the following:

- Implementation of a five-year interim flow regime in the Delta Habitat Area and related monitoring,
- Development of a Blackrock Waterfowl Management Area Interim Management and Monitoring Plan (BWMA Plan),
- Revision of Indicator Species & Avian Habitat Models
- Conducting a tamarisk beetle study,

- Conducting a tree recruitment assessment,
- Conducting migratory bird surveys on river, and
- Conducting a noxious species survey and treatment.

Results from these efforts will be summarized in subsequent LORP Reports.

MOU Consultants' LORP Adaptive Management Recommendations

Recommendation #1 – Land Management - Grazing
The MOU Consultants recommend that the City maintain all current grazing strategies and forage utilization standards. Present strategies and standards would remain in effect until any proposed increases are well tested, evaluated, and justified. Strategies and standards would be evaluated for riverine-riparian environmental compatibility and fish-wildlife impacts. If testing and evaluations support changes, then these changes should then successfully pass through the Adaptive Management process, so all MOU Parties have input.

Recommendation #2 – Active Management Potential
The MOU Consultants recommend the MOU Parties approach, study, implement, and apply LORP active intervention very cautiously. Active intervention projects should only be attempted after solid justification, economic feasibility, and potential for significant success are demonstrated. All active management projects should pass the Adaptive Management process for approval.

Recommendation #3 – Water Volume and Flow Control Structures
The 2019 MOU Consultants recommendation for the Scientific Team to evaluate the possibility of using water volume and flow control structures to improve environmental conditions in the Lower Owens River still stands.

Recommendation #4 – Annual Report Contents
The MOU Consultants recommend that the County and the City, in future Annual Reports cover less compliance and grazing information. Instead, use this time and space to better identify what Adaptive Management needs should be implemented to better attain 1997 MOU goals.

Recommendation #5 - 2021 Preliminary Active Intervention Workshop
The MOU Consultants recommend the MOU Parties sponsor a "Active Management Needs Evaluation Workshop" in 2021.

Recommendation #6 – Fire the LORP MOU Consultants
The MOU Consultants recommend that the MOU Parties fire the MOU Consultants.

1.0 INTRODUCTION

The Lower Owens River Project (LORP) is a large-scale habitat restoration project in Inyo County, California being implemented through a joint effort by the Los Angeles Department of Water and Power (LADWP) and Inyo County (County). The LORP was identified in a *1991 Environmental Impact Report* (EIR) as mitigation for impacts related to groundwater pumping by LADWP from 1970 to 1990. The description of the project was augmented in a *1997 Memorandum of Understanding* (MOU), signed by LADWP, the County, California Department of Fish and Game (CDFG), California State Lands Commission (SLC), Sierra Club, and the Owens Valley Committee. The MOU specifies the goal of the LORP, timeframe for development and implementation, and specific actions. It also provides certain minimum requirements for the LORP related to flows, locations of facilities, and habitat and species to be addressed.

The overall goal of the LORP, as stated in the MOU, is as follows:

> "The goal of the LORP is the establishment of a healthy, functioning Lower Owens River riverine-riparian ecosystem, and the establishment of healthy, functioning ecosystems in the other physical features of the LORP, for the benefit of biodiversity and Threatened and Endangered Species, while providing for the continuation of sustainable uses including recreation, livestock grazing, agriculture and other activities."

LORP implementation included release of water from the Los Angeles Aqueduct (LAA) to the Lower Owens River, flooding of up to approximately 500 acres depending on the water year forecast in the Blackrock Waterfowl Management Area (BWMA), maintenance of several Off-River Lakes and Ponds, modifications to land management practices, and construction of new facilities including a pumpback station to capture a portion of the water released to the river.

The LORP was evaluated under CEQA resulting in the completion of an EIR in 2004.

1.1 Monitoring and Reporting Responsibility

Section 2.10.4 of the Final LORP EIR states that the County and LADWP will prepare an annual report that includes data, analysis, and recommendations and that monitoring of the LORP will be conducted annually by the Inyo County Water Department (ICWD), LADWP and the MOU consultants, Mr. Mark Hill and Dr. William Platts, following the methods and schedules described in Section 4 of the *Lower Owens River Monitoring Adaptive Management and Reporting Plan* (MAMP, Ecosystem Sciences 2008).

Specific reporting procedures are also described under each monitoring method in the MAMP. The MOU also requires that the County and LADWP provide annual reports describing the environmental conditions of the LORP including monitoring data, the results of analyses, and recommendations regarding the need to modify project actions as recommended by the MOU consultants. This LORP Annual Report describes monitoring data, analysis, and recommendations for the LORP based on data collected during the 2020 field season (March-October). The development of the LORP Annual Report is a collaborative effort between the ICWD, LADWP, and the MOU consultants. Personnel from these entities participated in different sections of the report writing, data collection, and analysis.

The 2007 Stipulation & Order also requires a draft of the annual report be provided to the public and representatives of the Parties identified in the MOU. The 2007 Stipulation & Order states in Section L:

> "LADWP and the County will release to the public and to the representatives of the Parties identified in the MOU a draft of the annual report described in Section 2.10.4 of the Final LORP EIR. The County and LADWP shall conduct a public meeting on the information contained in the draft report. The draft report will be released at least 15 calendar days in advance of the meeting. The public and the Parties will have the opportunity to offer comments on the draft report at the meeting and to submit written comments within a 15 calendar day period following the meeting. Following consideration of the comments submitted the Technical Group will conduct the meeting described in Section 2.10.4 of the Final LORP EIR."

Generally, LADWP is the lead author for a majority of the document and is responsible for overall layout and content management. In 2020, LADWP wrote Sections 1.0 Introduction; 2.0 Hydrologic Monitoring; 3.0 Land Management, and 4.0 LORP Saltcedar Treatment. LADWP, Inyo County Water Department (ICWD), and the Inyo/Mono Counties Agricultural Commissioner's Office authored Section 5.0 LORP Weed Report. LADWP and ICWD coauthored Section 6.0 LORP 2020 Adaptive Management. The MOU Consultants drafted additional Adaptive Management Recommendations in Section 7.0.

The annual report will be available to download from the LADWP website link: http://www.ladwp.com/LORP.

This document fulfills the reporting requirements for the LORP Annual Report for 2020.

2.0 HYDROLOGIC MONITORING

2.1 River Flows

On July 12, 2007, a Court Stipulation & Order was issued requiring LADWP to meet specific flow requirements for the LORP. The flow requirements are listed below:

1. Minimum of 40 cubic feet per second (cfs) released from the Intake at all times.
2. None of the in-river measuring stations have a 15-day running average of less than 35 cfs.
3. The mean daily flow at each of the in-river measuring stations must equal or exceed 40 cfs on 3 individual days out of every 15 days.
4. The 15-day running average of the in-river flow measuring stations is no less than 40 cfs.

On July 14, 2009, 6 of the 10 original temporary in-river measuring stations were taken out of service, while the Below LORP Intake, Mazourka Canyon Road, Reinhackle Springs, and Pumpback Stations remained in service.

The flow data graphs show that LADWP was in compliance with the Stipulation & Order, from October 2019 through September 2020, for the 4 in-river stations (see Hydrologic Appendix 2).

2.1.1 Web Posting Requirements

The Stipulation & Order also outlined web posting requirements for the LORP data. LADWP has met all the posting requirements for the daily reports, monthly reports, and real time data.

Daily reports listing the flows for the LORP, Blackrock Waterfowl Management Area (BWMA) wetted acreage, and Off-River Lakes and Ponds depths are posted each day on the Web at <http://www.ladwp.com> under About Us → Los Angeles Aqueduct → LA Aqueduct Conditions Reports → LORP Flow Reports and click on the 'List of LORP Flow Reports' link to access a list of PDFs summarizing the most current daily reports.

Monthly reports summarizing each month and listing all of the raw data for the month are posted to the Web at <http://www.ladwp.com> under About Us → Los Angeles Aqueduct → LA Aqueduct Conditions Reports → LORP Monthly Reports.

Real time data showing flows at Below LORP Intake, Owens River at Mazourka Canyon Road, Owens River at Reinhackle Springs, and Pumpback Station are posted to the Web at <http://www.ladwp.com> under About Us → Los Angeles Aqueduct → LA

Aqueduct Conditions Reports → Real Time Data and click on the 'Lower Owens River Project' link.

2.2 Measurement Issues

LORP in-river flows are measured using Sontek SW acoustic flow meters. Both of the Sontek SW meters located in the main channel of the LORP are mounted on the bottom of concrete sections. These devices are highly accurate and final records for the LORP generally fall within normal water measurement standards of +/- 5%.

The Sontek meters measurement accuracy is affected by factors that influence river stage and flow velocity, including vegetation growth and sediment build up. In order to account for these environmental changes, LADWP manually meters flows at all of the stations along the LORP to check the accuracy of the Sontek meters at least once per month. Each time current metering is performed, a 'shift' is applied to the station to take into account the difference in flow determined by the current metering. If a fundamental change in the flow curve is observed then a new index is created from the current metering data and downloaded to the meter. To maintain flow measurement accuracy, all of the meters on the LORP are calibrated at least once per month following the 2007 Stipulation & Order.

A commentary on each station along the LORP follows:

<u>Below LORP Intake</u>

Measurement Device: Langemann Gate

The Langemann Gate regulates and records the flow rate at the Intake. This has had very good accuracy and reliability as long as the gate does not become submerged (submergence may be possible at higher flows such as when the seasonal habitat flows are released). Because of this infrequent submergence of the Langemann Gate, a WaterLOG H-350XL was installed as a back up to measure flow and is not affected by the high seasonal habitat releases. After a few years of attempting to apply a rating curve to the level measured by the bubbler, it has been determined that the large fluctuations in stage as conditions in the river channel go through seasonal cycles are too large and unpredictable to sustain an accurate measurement using the bubbler. As such, the bubbler has been abandoned and LADWP will no longer use the bubbler as a backup device to measure flow at the Intake.

LORP at Mazourka Canyon Road

Measurement Devices: Sontek SW Meter

The station utilizes a single Sontek SW flow meter in a concrete measuring section and flow measurement accuracy has been excellent.

LORP at Reinhackle Springs

Measurement Device: Sontek SW Meter

The station utilizes a single Sontek SW flow meter in a concrete measuring section and measurement accuracy has been excellent.

LORP at Pumpback Station

Measurement Devices: Pumpback Station Discharge Meter, Langemann Gate, Weir

Flow at the Pumpback Station is calculated by adding the Pumpback Station flow, Langemann Gate Release to Delta flow, and Weir to Delta flow. In most flow conditions these stations have proven to be accurate. However, during the higher flows, the Weir and/or the Langemann Gate can become submerged, thus lowering the measuring accuracy of the submerged device.

2.3 Flows to the Delta

Based upon a review of the flow to Brine Pool and flow to Delta data, and after filtering out unintended spillage at the Pumpback Station to average a flow of 6 to 9 cfs, the flows to the Delta were set to the following approximate schedule (per the LORP Environmental Impact Report (EIR), section 2.4):

- October 1 to November 30 4 cfs
- December 1 to February 28 3 cfs
- March 1 to April 30 4 cfs
- May 1 to September 30 7.5 cfs

Additionally, pulse flows were scheduled to be released to the Delta (LORP EIR, section 2.4):

- Period 1: March-April 10 days at 25 cfs
- Period 2: June-July 10 days at 20 cfs
- Period 3: September 10 days at 25 cfs
- Period 4: November-December 5 days at 30 cfs

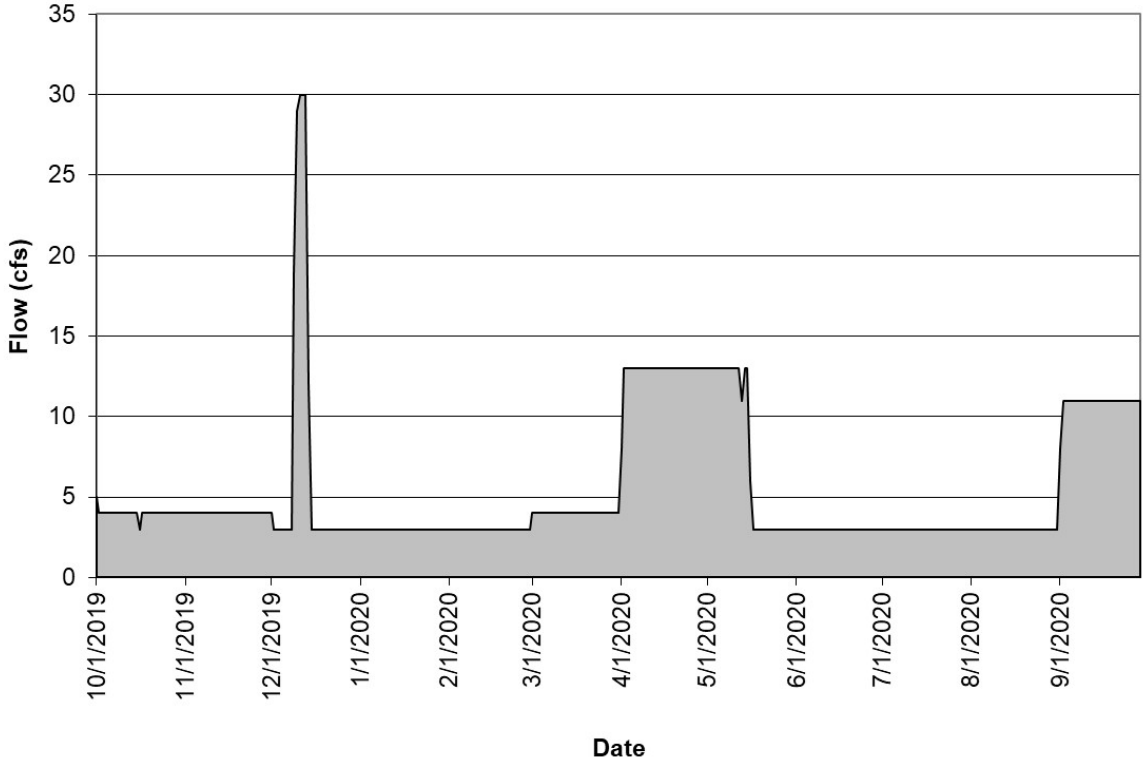
The Period 4 pulse flow was released starting on 12/9/2019.

Through adaptive management efforts, a new Delta flow schedule was implemented in April 2020 for a 5 year trial period. This interim schedule incorporates base and pulse flows into one schedule:

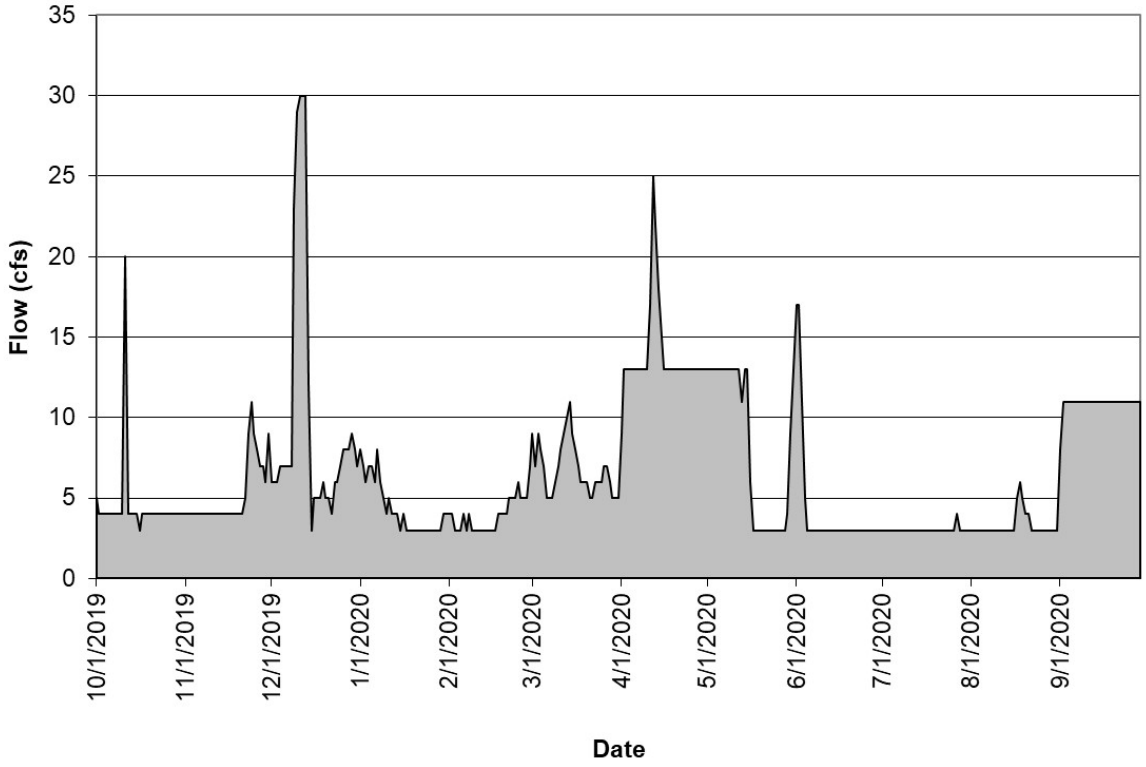
- October 1 to October 15 11 cfs
- October 16 to October 31 8 cfs
- November 1 to November 30 7 cfs
- December 1 to February 28 6 cfs
- March 1 to March 31 10 cfs
- April 1 to May 15 13 cfs
- May 16 to August 31 3 cfs
- September 1 to September 30 11 cfs

The releases to the Delta for the 2019-20 water year resulted in an average flow of 6.6 cfs to the Delta. Excluding the Seasonal Habitat Flow, the daily average release to the Delta for the 2019-20 water year was 6.4 cfs. A total volume of 151 acre-feet was released to the Delta over a 7 day period following the Seasonal Habitat Flow, of which 109 acre-feet flowed over the weir.

Unintended flows are released to the Delta when rainstorms cause river flows to exceed the maximum allowed flowrate of the Pumpback Station or when pump outages occur at the Pumpback Station. Flows over the weir are generally unintended flows and flows over the Langemann Gate are scheduled flows.



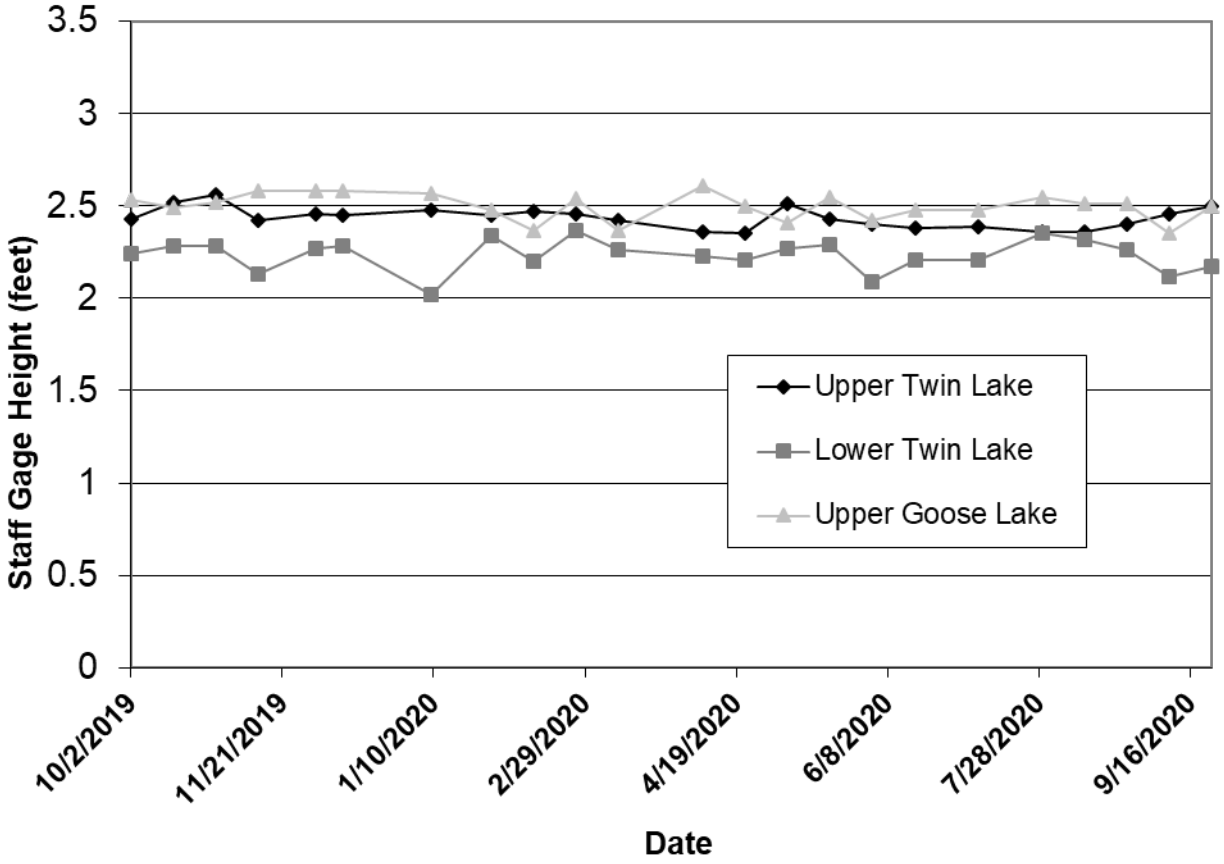
Hydrologic Figure 1. Langemann Release to Delta



Hydrologic Figure 2. Langemann and Weir Release to Delta

Off-River Lakes and Ponds

The BWMA and Off-River Lakes and Ponds Hydrologic Data Reporting Plan requires that Upper Twin Lake, Lower Twin Lake, and Goose Lake be maintained between 1.5 and 3.0 feet on their respective staff gauges, and that Billy Lake be maintained full (i.e., at an elevation that maintains outflow from the lake). All of the staff gages measured between 2.0 and 3.0 feet stage height for the 2019-20 water year (Hydrologic Figure 3).



Hydrologic Figure 3. Off-River Lakes and Ponds Staff Gages

Billy Lake

Due to the topography of Billy Lake in relation to the Billy Lake Return station, whenever the Billy Lake Return station is showing flow, Billy Lake is full. LADWP maintains Billy Lake by monitoring the Billy Lake Return station, which had a minimum daily average flow of 0.7 cfs for the year (see Hydrologic Table 1, and Hydrologic Appendix 2).

Hydrologic Table 1. LORP Flows – Water Year 2019-20

Station Name	Average Flow (cfs)	Maximum Flow (cfs)	Minimum Flow (cfs)
Below River Intake	57	109	42
Blackrock Return Ditch	1.1	1.7	0.8
Goose Lake Return	0	0	0
Billy Lake Return	1.1	2.2	0.7
Mazourka Canyon Road	53	89	37
Locust Ditch Return	0	4	0
Georges Ditch Return	0	5	0
Reinhackle Springs	52	82	37
Alabama Gates Return	0	0	0
At Pumpback Station	49	73	38
Pump Station	43	48	22
Langemann Gate to Delta	5	30	3
Weir to Delta	1	16	0

Thibaut Pond

Thibaut Pond is contained completely within the Thibaut Unit of the BWMA. Each day the Thibaut Pond acreage is posted to the web in the LORP daily reports.

2.4 Blackrock Waterfowl Management Area

Flows for the BWMA are set based upon previous data relationships between inflows to an area and the resulting wetted acreage measurements during each of the four seasons based on evapotranspiration (ET) rates.

The seasons are defined as:

Spring	April 16 – May 31
Summer	June 1 – August 15
Fall	August 16 – October 15
Winter	October 16 – April 15

Up until the end of the 2012-13 Runoff Year, wetted acreage measurements were collected eight times per year, once in the middle of each season and once at the end of each season. Starting with the 2013-14 Runoff Year, only the middle of each season measurements have been collected. The end-of-season measurements were discontinued because they added very little information compared to the middle-of-season measurements and required extensive manpower for taking the measurement. The measurements are performed by using GPS and walking the perimeter of the wetted edges of the waterfowl area.

Hydrologic Table 2. BWMA Wetted Acreage

Winterton Unit

ET Season	Read Date	Wetted Acreage	Average Inflow
Spring 19'	5/9/2019	156	3.6
Summer 19'	n/a	500+	10.9
Fall 19'	September 2019	500+	1.6
Winter 19'-20'	1/17/2020	233	1.9
Spring 20'	5/19/2020	191	3.1
Summer 20'	July 2020	244	4.7
Fall 20'	n/a	n/a	2.9

Thibaut Unit

ET Season	Read Date	Wetted Acreage	Average Inflow
Spring 19'	5/9/2019	57	3.4
Summer 19'	n/a	500+	4.9
Fall 19'	September 2019	500+	1.7
Winter 19'-20'	1/17/2020	141	0.9
Spring 20'	n/a	n/a	n/a
Summer 20'	n/a	n/a	n/a
Fall 20'	n/a	n/a	n/a

Drew Unit

ET Season	Read Date	Wetted Acreage	Average Inflow
Spring 19'	5/9/2020	295	3.7
Summer 19'	n/a	500+	4.5
Fall 19'	September 2019	500+	2.8
Winter 19'-20'	1/17/2020	250	1.5
Spring 20'	5/12/2020	284	3.2
Summer 20'	July 2020	252	3.7
Fall 20'	n/a	n/a	3.5

Waggoner Unit

ET Season	Read Date	Wetted Acreage	Average Inflow
Spring 19'	n/a	n/a	n/a
Summer 19'	n/a	n/a	n/a
Fall 19'	n/a	n/a	n/a
Winter 19'-20'	n/a	n/a	n/a
Spring 20'	n/a	n/a	n/a
Summer 20'	n/a	n/a	n/a
Fall 20'	n/a	n/a	n/a

Notes:
Measurements before 4/1/20 count towards the 2019-20 runoff year acreage goal.
Measurements after 4/1/20 count towards the 2020-21 runoff year acreage goal.
Thibaut wetted acreage does not include the 28 acres of the Thibaut Pond area.
Wetted acreage measurements were not conducted in Summer 2019 due to the significant flows being released to the BWMA and the 500+ wetted acres measured during Spring 2019.
Poor air quality prevented Inyo County from completing wetted acreage surveys for the Fall 2020 season.

2.5 Blackrock Waterfowl Management Area Results for April 2019 to March 2020

The runoff forecast for the 2019-20 runoff year was greater than 100%, therefore the waterfowl acreage goal for this year was 500 acres.

On April 16, flow Drew Unit was set to 3.7 cfs, Winterton Unit was set to 3.4 cfs, and Thibaut Unit was set to 3.5 cfs for the Spring season.

On May 9, a wetted acreage survey for the Spring season was completed. Drew Unit measured 295 acres, Winterton Unit measured 156 acres, and Thibaut Unit measured 57 acres, totaling 508 acres.

On June 1, flow rates for the summer season were set. Flow to Winterton Unit was reduced from 3.4 cfs to 3.0 cfs. Flows to Thibaut and Drew Units remained at 3.5 cfs and 3.7 cfs respectively.

Above average runoff necessitated water spreading activities that resulted in excess inflows to the BWMA, which eliminated the need for a wetted acreage survey during the Summer season.

On August 16, flow rates for the fall season were set. Flow to Winterton Unit remained at 3.0 cfs, Thibaut Unit was reduced from 3.5 cfs to 1.8 cfs, and Drew Unit was reduced from 3.7 cfs to 3.3 cfs.

In September, Inyo County performed a wetted acreage survey via remote sensing for the Fall season. Drew Unit measured 253 acres, Winterton Unit measured 238 acres, and Thibaut Unit measured 176 acres, totaling 667 acres.

On October 16, flow rates for the winter season were set. Flow to Winterton Unit was reduced from 3.0 cfs to 0.9 cfs, Thibaut Unit was reduced from 1.8 cfs to 1.1 cfs, and Drew Unit was reduced from 3.3 cfs to 1.2 cfs.

On January 17, a wetted acreage survey for the Winter season was completed. Drew Unit measured 250 acres, Winterton Unit measured 233 acres, and Thibaut Unit measured 141 acres, totaling 624 acres.

On March 15, flow to Thibaut Pond was shut off.

As every wetted acreage survey measured over 500 acres, the average wetted acreage for the 2019-2020 runoff year exceeded the 500 acre goal.

2.6 Blackrock Waterfowl Management Area Results for April 2020 to September 2020

The runoff forecast for runoff year 2020-21 was 74%, therefore the waterfowl acreage goal was 370 acres.

On April 16, flow to Drew Unit was set to 4.3 cfs and Winterton Unit was set to 4.8 cfs for the Spring season.

On May 12 and May 19, wetted acreage surveys for the Spring season were completed. Drew Unit measured 284 acres and Winterton Unit measured 181 acres, totaling 465 acres.

On June 1, Drew Unit was kept at 4.3 cfs and Winteron Unit was set to 4.2 cfs for the Summer season.

In July, Inyo County performed a wetted acreage survey via remote sensing for the Summer season. Drew Unit measured 252 acres, and Winterton Unit measured 244 acres, totaling 496 acres.

On August 16, flow rates for the Fall season were set. Flow to Drew Unit was reduced from 4.3 cfs to 3.8 cfs. Flow to Winterton Unit was reduced from 4.2 cfs to 3.2 cfs.

Poor air quality prevented Inyo County from completing wetted acreage surveys for the Fall 2020 season.

2.7 Assessment of River Flow Gains and Losses

This section describes river flow gains and losses for all reaches in the Lower Owens River from the LORP Intake to the Pumpback Station during the period of October 2019 to September 2020. The reaches referred to in this report indicate areas of river between specified permanent gaging stations. This analysis is an attempt at understanding flow losses and gains in the Lower Owens River so that estimates of future water requirements can be made.

2.8 River Flow Loss or Gain by Month and Year

Flow losses or gains can vary over time as presented in the table below (see Hydrologic Table 3). ET rates fall sharply during late fall - winter and increase dramatically during the spring - summer plant growing seasons. Thus, the river can lose water to ET during certain periods of the year and maintain or gain water during other periods of the year. December through March are winter periods with low ET that result in gains from increased flows from water stored in the shallow aquifer where groundwater levels are higher than adjacent river levels. Other incoming winter water sources such as local intermittent runoff from precipitation also result in flow increases.

Hydrologic Table 3. Average Monthly River Flow Losses/Gains From the Intake to the Pumpback Station during the 2019-20 Water Year

	Month	Flow (cfs)	Acre-Feet-Per-Day
2019	OCT	-4	-8
	NOV	+4	+8
	DEC	+7	+15
2020	JAN	+5	+11
	FEB	+5	+10
	MAR	+8	+15
	APR	+9	+18
	MAY	-19	-38
	JUN	-32	-63
	JUL	-48	-95
	AUG	-31	-62
	SEP	-27	-53
	AVG MONTH	**-10 cfs**	**-20 AcFt**

For the entire river, the overall gain or loss is calculated by subtracting Pumpback Station outflow from inflows at the Intake and augmentation spillgates. Inflows from the Intake were 41,419 acre-feet, inflows from augmentation spillgates were 1,975 acre-feet, and outflows from the Pumpback Station were 35,893 acre-feet. This yields a loss of 7,501 acre-feet for the year, a daily average of approximately 10.4 cfs between the Intake and the Pumpback Station. Water loss during the 2019-20 water year represents about 17% of the total released flow from the Intake and augmentation spillgates into the river channel.

2.9 Flow Loss or Gain by River Reach during the Winter Period

From December 2019 to March 2020, an average flow of 43 cfs was released into the Lower Owens River from the Intake. An additional 3 cfs was provided from augmentation ditches, for a total accumulated release of 46 cfs. The average flow reaching the Pumpback Station was 52 cfs, an increase of 6 cfs during the period. During the winter, ET is low and any “make water” coming into the river is additive. Part of the “make water” was likely stored during earlier periods in subsurface aquifers and may also be a result of higher winter season precipitation.

The river reach from the Intake to the Mazourka Canyon Road gaging station lost an average of 1 cfs, Mazourka Canyon Road to the Reinhackle gaging station gained 1 cfs, and Reinhackle to the Pumpback Station gained 7 cfs (see Hydrologic Table 4). A water “gaining” reach, during harsh winter conditions, can benefit an ecosystem in many ways. Incoming water, especially if it is subsurface, tends to: increase winter river water temperatures, reduces icing effects, increases dissolved oxygen when water surface ice is melted by increasing the re-aeration rate, and adds nutrients.

Hydrologic Table 4. Winter Flow Losses/Gains, December 2019 to March 2020

Recording Station	Average Flow (cfs)	Gain or Loss (cfs)	Accumulative (cfs)
Intake	43	N/A	N/A
Mazourka	45	-1	-1
Reinhackle	46	+1	-0
Pumpback	52	+7	+6

Note: All numbers are rounded to the nearest whole value.
Calculations include augmentation and return flows in appropriate reaches, see Appendix 2 for all flows.

2.10 Flow Loss or Gain by River Reach during the Summer Period

During the summer period of June 2020 to September 2020, all river reaches lost water. An average flow of 78 cfs was released into the Lower Owens River from the Intake. An additional 2 cfs was provided from augmentation locations throughout the Lower Owens River. The effects of ET are evident from the high total flow loss (-35 cfs) between the Intake and the Pumpback Station. The largest flow losses occurred at the Reinhackle to Pumpback Station reach (-15 cfs) (see Hydrologic Table 5).

Hydrologic Table 5. Summer Flow Losses/Gains, June 2020 to September 2020

Recording Station	Average Flow (cfs)	Gain or Loss (cfs)	Accumulative (cfs)
Intake	78	N/A	N/A
Mazourka	67	-14	-14
Reinhackle	61	-6	-20
Pumpback	46	-15	-35

Note: All numbers are rounded to the nearest whole value.
Calculations include augmentation and return flows in appropriate reaches, see Appendix 2 for all flows.

2.11 Seasonal Habitat Flow

The runoff forecast for runoff year 2019-20 was 74%, and a Seasonal Habitat Flow was released from the LORP Intake beginning on May 16, 2020. Flows from the LORP Intake were ramped up to a peak of 117 cfs over a period of five days, before ramping down over another five days (see Hydrologic Table 6). As flow changes are typically made at 8am, the daily average flow will reflect the flow rate both before and after the flow change is made.

Hydrologic Table 6. 2019-20 Seasonal Habitat Flow Schedule

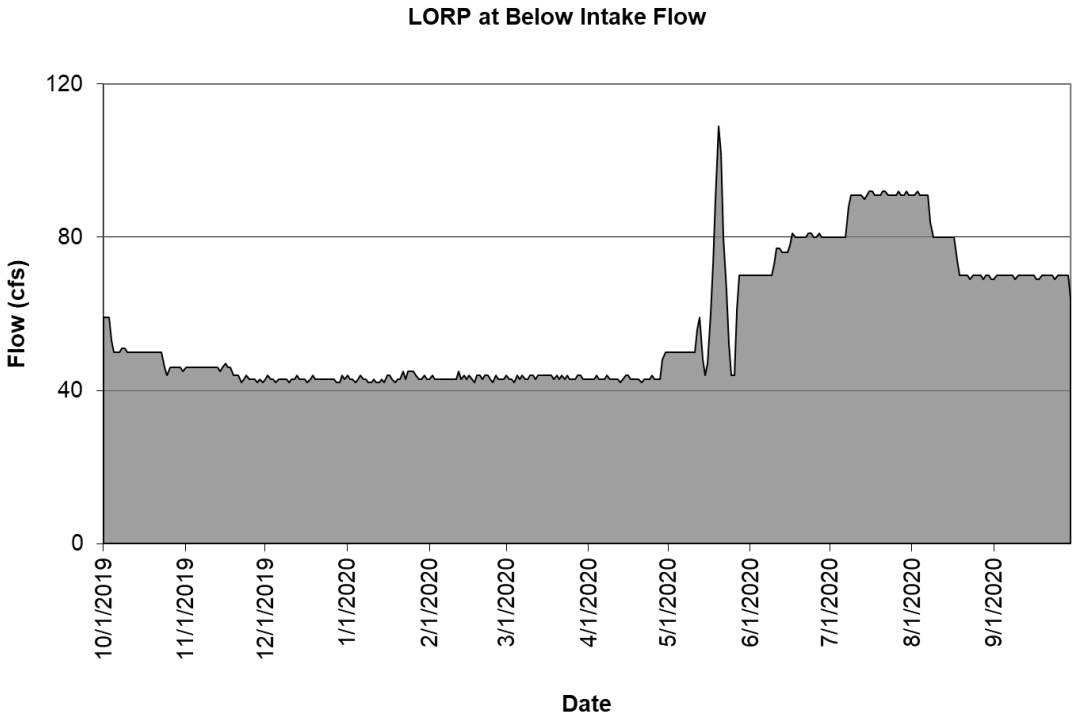
Date	Begin Flow	Change To
Saturday, May 16, 2020	43	50
Sunday, May 17, 2020	50	63
Monday, May 18, 2020	63	78
Tuesday, May 19, 2020	78	98
Wednesday, May 20, 2020	98	117
Thursday, May 21, 2020	117	94
Friday, May 22, 2020	94	75
Saturday, May 23, 2020	75	60
Sunday, May 24, 2020	60	48
Monday, May 25, 2020	48	43

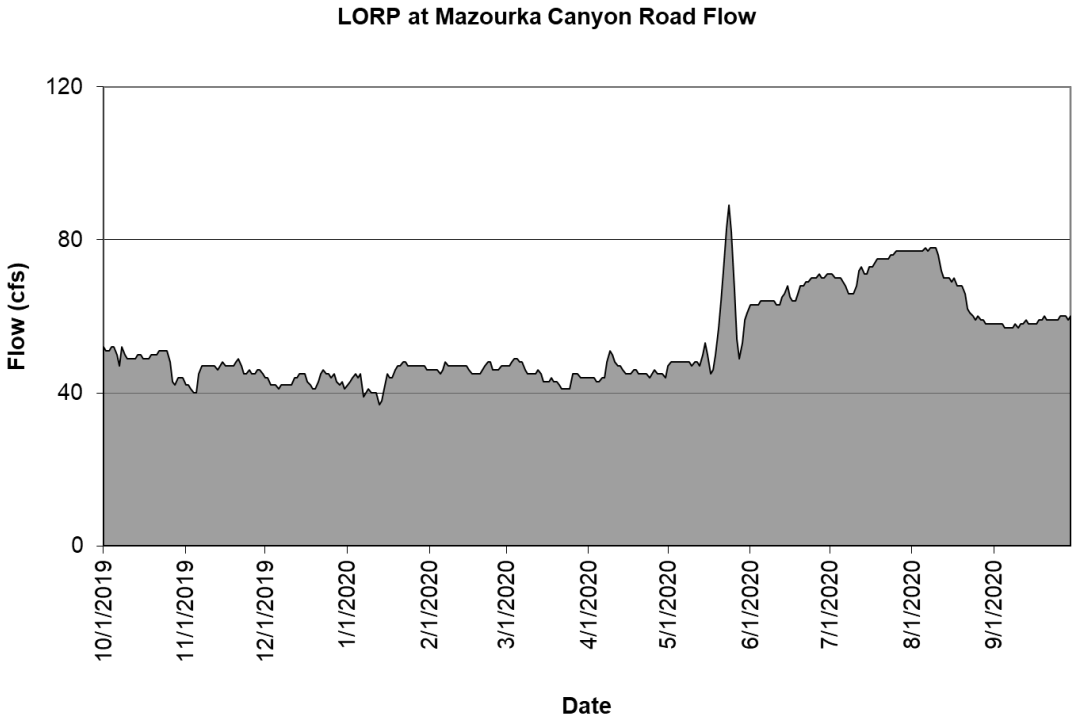
Note: Flow changes were completed at 8:00am each day.

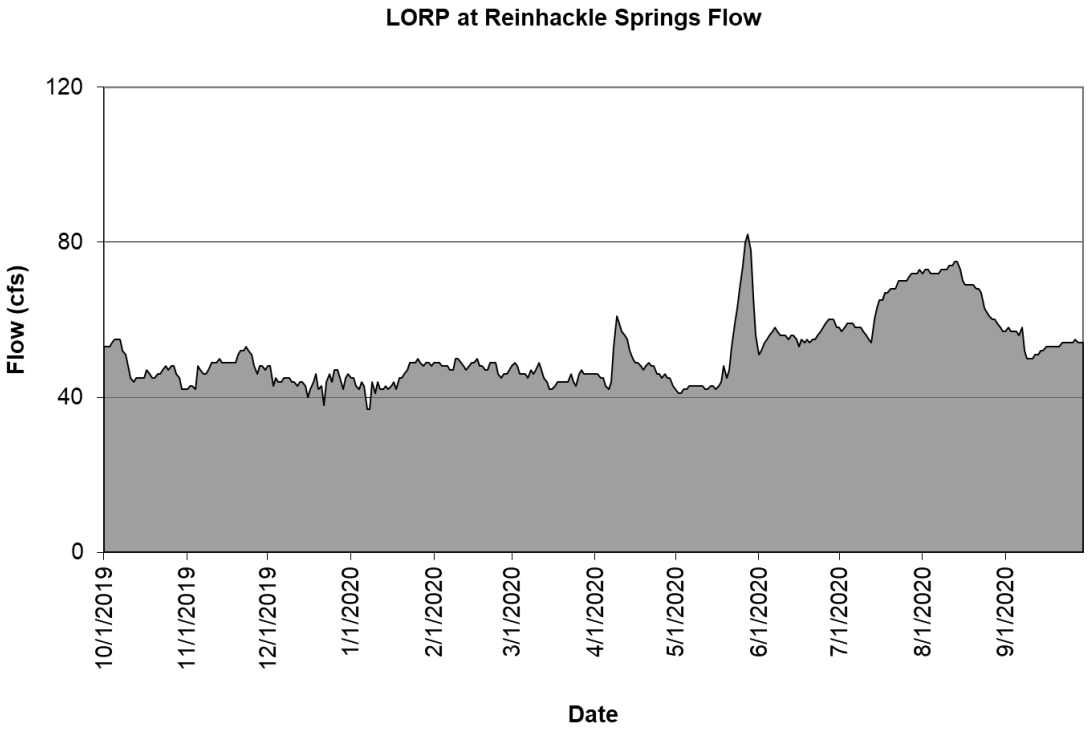
Daily flow rates from the LORP Intake are provided in Appendix 2.

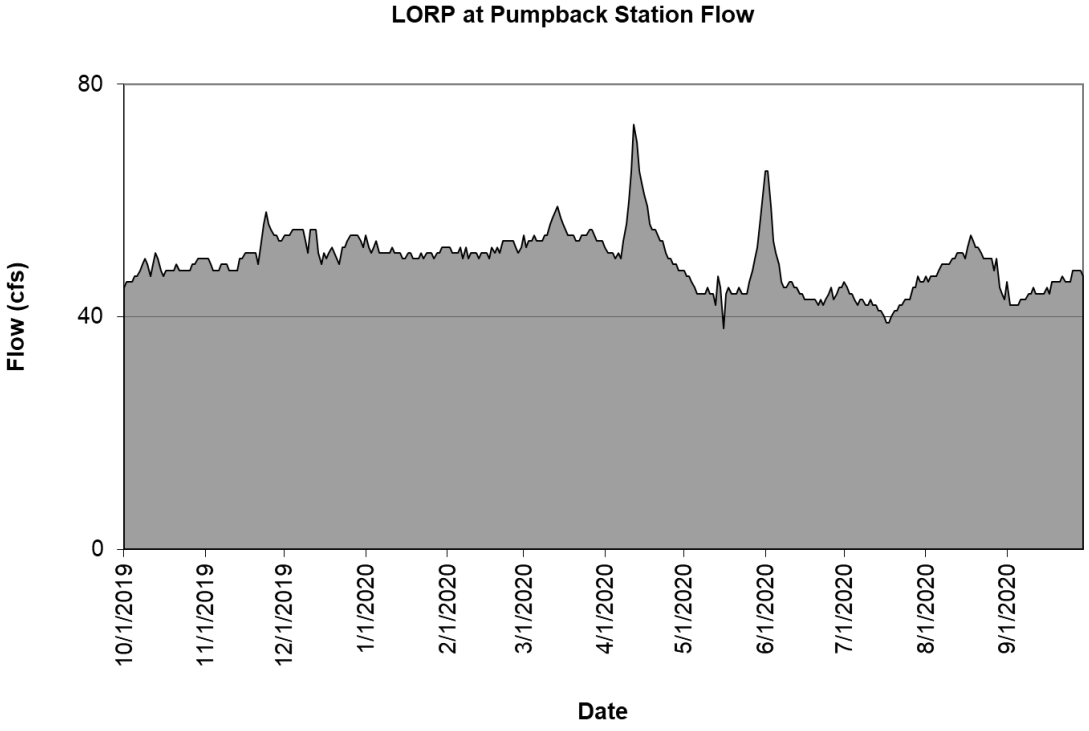
2.12 Appendices

Appendix 1. Hydrologic Monitoring Graphs






LORP at Reinhackle Springs Flow
120
80
40
0
Flow (cfs)
10/1/2019
11/1/2019
12/1/2019
1/1/2020
2/1/2020
3/1/2020
4/1/2020
5/1/2020
6/1/2020
7/1/2020
8/1/2020
9/1/2020
Date


LORP at Pumpback Station Flow
80
40
0
Flow (cfs)
10/1/2019
11/1/2019
12/1/2019
1/1/2020
2/1/2020
3/1/2020
4/1/2020
5/1/2020
6/1/2020
7/1/2020
8/1/2020
9/1/2020
Date

Appendix 2. River Flow Tables

Flow Gaging Station / Date	Below River Intake	Blackrock Ditch Return	Goose Lake Return	Billy Lake Return	Mazourka Canyon Road	Locust Ditch Return	Georges Ditch Return	Reinhackle Springs	Alabama Gates Return	At Pumpback Station	Pump Station	Langeman n Gate to Delta	Weir to Delta	In Channel Average Flow
10/1/2019	59.0	1.2	0.0	1.0	52.0	0.0	0.1	53.0	0.0	45.0	40.0	5.0	0.0	52.3
10/2/2019	59.0	1.3	0.0	1.0	51.0	0.0	0.1	53.0	0.0	46.0	42.0	4.0	0.0	52.3
10/3/2019	59.0	1.2	0.0	1.2	51.0	0.0	0.1	53.0	0.0	46.0	42.0	4.0	0.0	52.3
10/4/2019	53.0	1.0	0.0	1.3	52.0	0.0	0.1	54.0	0.0	46.0	42.0	4.0	0.0	51.3
10/5/2019	50.0	1.0	0.0	1.3	52.0	0.0	0.1	55.0	0.0	47.0	43.0	4.0	0.0	51.0
10/6/2019	50.0	1.0	0.0	1.2	50.0	0.0	0.1	55.0	0.0	47.0	43.0	4.0	0.0	50.5
10/7/2019	50.0	0.9	0.0	1.2	47.0	0.0	0.1	55.0	0.0	48.0	44.0	4.0	0.0	50.0
10/8/2019	51.0	0.8	0.0	1.1	52.0	0.0	0.1	52.0	0.0	49.0	45.0	4.0	0.0	51.0
10/9/2019	51.0	0.9	0.0	1.1	50.0	0.0	0.1	51.0	0.0	50.0	46.0	4.0	0.0	50.5
10/10/2019	50.0	1.2	0.0	1.0	49.0	0.0	0.1	48.0	0.0	49.0	45.0	4.0	0.0	49.0
10/11/2019	50.0	1.2	0.0	1.0	49.0	0.0	0.1	45.0	0.0	47.0	27.0	4.0	16.0	47.8
10/12/2019	50.0	1.2	0.0	1.0	49.0	0.0	0.1	44.0	0.0	49.0	45.0	4.0	0.0	48.0
10/13/2019	50.0	1.1	0.0	0.9	49.0	0.0	0.1	45.0	0.0	51.0	47.0	4.0	0.0	48.8
10/14/2019	50.0	1.2	0.0	0.9	50.0	0.0	0.1	45.0	0.0	50.0	46.0	4.0	0.0	48.8
10/15/2019	50.0	1.4	0.0	1.0	50.0	0.0	0.1	45.0	0.0	48.0	44.0	4.0	0.0	48.3
10/16/2019	50.0	1.3	0.0	1.0	49.0	0.0	0.1	45.0	0.0	47.0	44.0	3.0	0.0	47.8
10/17/2019	50.0	1.3	0.0	1.1	49.0	0.0	0.1	47.0	0.0	48.0	44.0	4.0	0.0	48.5
10/18/2019	50.0	1.3	0.0	1.1	49.0	0.0	0.1	46.0	0.0	48.0	44.0	4.0	0.0	48.3
10/19/2019	50.0	1.2	0.0	1.1	50.0	0.0	0.1	45.0	0.0	48.0	44.0	4.0	0.0	48.3
10/20/2019	50.0	1.1	0.0	1.1	50.0	0.0	0.1	45.0	0.0	48.0	44.0	4.0	0.0	48.3
10/21/2019	50.0	1.2	0.0	1.1	50.0	0.0	0.1	46.0	0.0	49.0	45.0	4.0	0.0	48.8
10/22/2019	50.0	1.7	0.0	1.0	51.0	0.0	0.1	46.0	0.0	48.0	44.0	4.0	0.0	48.8
10/23/2019	50.0	1.6	0.0	1.2	51.0	0.0	0.1	47.0	0.0	48.0	44.0	4.0	0.0	49.0
10/24/2019	46.0	1.2	0.0	1.2	51.0	0.0	0.1	48.0	0.0	48.0	44.0	4.0	0.0	48.3
10/25/2019	44.0	1.1	0.0	1.0	51.0	0.0	0.1	47.0	0.0	48.0	44.0	4.0	0.0	47.5
10/26/2019	46.0	1.1	0.0	1.2	48.0	0.0	0.1	48.0	0.0	48.0	44.0	4.0	0.0	47.5
10/27/2019	46.0	1.0	0.0	1.1	43.0	0.0	0.1	48.0	0.0	49.0	45.0	4.0	0.0	46.5
10/28/2019	46.0	1.2	0.0	1.0	42.0	0.0	0.1	46.0	0.0	49.0	45.0	4.0	0.0	45.8
10/29/2019	46.0	1.4	0.0	0.9	44.0	0.0	0.1	45.0	0.0	50.0	46.0	4.0	0.0	46.3
10/30/2019	46.0	1.2	0.0	1.0	44.0	0.0	0.1	42.0	0.0	50.0	46.0	4.0	0.0	45.5
10/31/2019	45.0	1.2	0.0	1.0	44.0	0.0	0.1	42.0	0.0	50.0	46.0	4.0	0.0	45.3
Notes:	These measurements are not on the main channel of the Owens River, therefore highlighted columns are not included in average calculations.													

Flow Gaging Station / Date	Below River Intake	Blackrock Ditch Return	Goose Lake Return	Billy Lake Return	Mazourka Canyon Road	Locust Ditch Return	Georges Ditch Return	Reinhackle Springs	Alabama Gates Return	At Pumpback Station	Pump Station	Langeman n Gate to Delta	Weir to Delta	In Channel Average Flow
11/1/2019	46.0	1.1	0.0	1.1	42.0	0.0	0.1	42.0	0.0	50.0	46.0	4.0	0.0	45.0
11/2/2019	46.0	1.0	0.0	1.0	42.0	0.0	0.1	43.0	0.0	50.0	46.0	4.0	0.0	45.3
11/3/2019	46.0	1.0	0.0	0.9	41.0	0.0	0.1	43.0	0.0	49.0	45.0	4.0	0.0	44.8
11/4/2019	46.0	1.1	0.0	0.7	40.0	0.0	0.1	42.0	0.0	48.0	44.0	4.0	0.0	44.0
11/5/2019	46.0	1.1	0.0	0.9	40.0	0.0	0.1	48.0	0.0	48.0	44.0	4.0	0.0	45.5
11/6/2019	46.0	1.1	0.0	1.1	45.0	0.0	0.1	47.0	0.0	48.0	44.0	4.0	0.0	46.5
11/7/2019	46.0	1.2	0.0	1.2	47.0	0.0	0.1	46.0	0.0	49.0	45.0	4.0	0.0	47.0
11/8/2019	46.0	1.2	0.0	1.2	47.0	0.0	0.1	46.0	0.0	49.0	45.0	4.0	0.0	47.0
11/9/2019	46.0	1.1	0.0	1.2	47.0	0.0	0.1	47.0	0.0	49.0	45.0	4.0	0.0	47.3
11/10/2019	46.0	0.9	0.0	1.1	47.0	0.0	0.1	49.0	0.0	48.0	44.0	4.0	0.0	47.5
11/11/2019	46.0	1.0	0.0	1.0	47.0	0.0	0.1	49.0	0.0	48.0	44.0	4.0	0.0	47.5
11/12/2019	46.0	1.3	0.0	1.0	47.0	0.0	0.1	49.0	0.0	48.0	44.0	4.0	0.0	47.5
11/13/2019	46.0	1.2	0.0	1.0	46.0	0.0	0.1	50.0	0.0	48.0	44.0	4.0	0.0	47.5
11/14/2019	45.0	1.2	0.0	1.0	47.0	0.0	0.1	49.0	0.0	50.0	46.0	4.0	0.0	47.8
11/15/2019	46.0	1.2	0.0	1.0	48.0	0.0	0.0	49.0	0.0	50.0	46.0	4.0	0.0	48.3
11/16/2019	47.0	1.2	0.0	1.0	47.0	0.0	0.1	49.0	0.0	51.0	47.0	4.0	0.0	48.5
11/17/2019	46.0	1.2	0.0	1.1	47.0	0.0	0.1	49.0	0.0	51.0	47.0	4.0	0.0	48.3
11/18/2019	46.0	1.2	0.0	1.1	47.0	0.0	0.0	49.0	0.0	51.0	47.0	4.0	0.0	48.3
11/19/2019	44.0	1.1	0.0	1.2	47.0	0.0	0.0	49.0	0.0	51.0	47.0	4.0	0.0	47.8
11/20/2019	44.0	1.1	0.0	1.3	48.0	0.0	0.1	51.0	0.0	51.0	47.0	4.0	0.0	48.5
11/21/2019	44.0	1.1	0.0	1.4	49.0	0.0	0.1	52.0	0.0	49.0	45.0	4.0	0.0	48.5
11/22/2019	42.0	1.1	0.0	1.4	47.0	0.0	0.0	52.0	0.0	52.0	47.0	4.0	1.0	48.3
11/23/2019	43.0	1.1	0.0	1.4	45.0	0.0	0.0	53.0	0.0	56.0	47.0	4.0	5.0	49.3
11/24/2019	44.0	1.1	0.0	1.3	45.0	0.0	0.0	52.0	0.0	58.0	47.0	4.0	7.0	49.8
11/25/2019	43.0	1.0	0.0	1.1	46.0	0.0	0.1	51.0	0.0	56.0	47.0	4.0	5.0	49.0
11/26/2019	43.0	1.0	0.0	1.0	45.0	0.0	0.1	48.0	0.0	55.0	47.0	4.0	4.0	47.8
11/27/2019	43.0	1.0	0.0	1.0	45.0	0.0	0.1	46.0	0.0	54.0	47.0	4.0	3.0	47.0
11/28/2019	42.0	1.0	0.0	1.0	46.0	0.0	0.1	48.0	0.0	54.0	47.0	4.0	3.0	47.5
11/29/2019	43.0	1.0	0.0	1.0	46.0	0.0	0.1	48.0	0.0	53.0	47.0	4.0	2.0	47.5
11/30/2019	42.0	1.1	0.0	1.0	45.0	0.0	0.1	47.0	0.0	53.0	44.0	4.0	5.0	46.8

Notes: These measurements are not on the main channel of the Owens River, therefore highlighted columns are not included in average calculations.

Flow Gaging Station / Date	Below River Intake	Blackrock Ditch Return	Goose Lake Return	Billy Lake Return	Mazourka Canyon Road	Locust Ditch Return	Georges Ditch Return	Reinhackle Springs	Alabama Gates Return	At Pumpback Station	Pump Station	Langeman n Gate to Delta	Weir to Delta	In Channel Average Flow
12/1/2019	43.0	1.2	0.0	1.0	44.0	0.0	0.1	48.0	0.0	54.0	48.0	4.0	2.0	47.3
12/2/2019	44.0	1.2	0.0	1.0	44.0	0.0	0.1	48.0	0.0	54.0	48.0	3.0	3.0	47.5
12/3/2019	43.0	1.2	0.0	1.0	42.0	0.0	0.0	43.0	0.0	54.0	48.0	3.0	3.0	45.5
12/4/2019	43.0	1.2	0.0	1.0	42.0	0.0	0.0	45.0	0.0	55.0	48.0	3.0	4.0	46.3
12/5/2019	42.0	1.1	0.0	1.0	42.0	0.0	0.0	44.0	0.0	55.0	48.0	3.0	4.0	45.8
12/6/2019	43.0	1.2	0.0	1.0	41.0	0.0	0.0	44.0	0.0	55.0	48.0	3.0	4.0	45.8
12/7/2019	43.0	1.2	0.0	1.0	42.0	0.0	0.0	45.0	0.0	55.0	48.0	3.0	4.0	46.3
12/8/2019	43.0	1.2	0.0	1.0	42.0	0.0	0.0	45.0	0.0	55.0	48.0	3.0	4.0	46.3
12/9/2019	43.0	1.2	0.0	1.0	42.0	0.0	0.0	45.0	0.0	53.0	30.0	19.0	4.0	45.8
12/10/2019	42.0	1.2	0.0	1.0	42.0	0.0	0.0	44.0	0.0	51.0	22.0	29.0	0.0	44.8
12/11/2019	43.0	1.2	0.0	1.0	42.0	0.0	0.0	44.0	0.0	55.0	25.0	30.0	0.0	46.0
12/12/2019	43.0	1.3	0.0	1.0	44.0	0.0	0.0	43.0	0.0	55.0	25.0	30.0	0.0	46.3
12/13/2019	44.0	1.4	0.0	0.9	44.0	0.0	0.0	44.0	0.0	55.0	25.0	30.0	0.0	46.8
12/14/2019	43.0	1.4	0.0	0.9	45.0	0.0	0.0	44.0	0.0	51.0	39.0	12.0	0.0	45.8
12/15/2019	43.0	1.3	0.0	0.9	45.0	0.0	0.0	43.0	0.0	49.0	46.0	3.0	0.0	45.0
12/16/2019	43.0	1.3	0.0	0.9	45.0	0.0	0.0	40.0	0.0	51.0	46.0	3.0	2.0	44.8
12/17/2019	42.0	1.3	0.0	1.0	43.0	0.0	0.0	42.0	0.0	50.0	45.0	3.0	2.0	44.3
12/18/2019	43.0	1.3	0.0	1.0	42.0	0.0	0.0	44.0	0.0	51.0	46.0	3.0	2.0	45.0
12/19/2019	44.0	1.2	0.0	1.2	41.0	0.0	0.0	46.0	0.0	52.0	46.0	3.0	3.0	45.8
12/20/2019	43.0	0.9	0.0	1.3	41.0	0.0	0.1	42.0	0.0	51.0	46.0	3.0	2.0	44.3
12/21/2019	43.0	1.2	0.0	1.4	43.0	0.0	0.1	43.0	0.0	50.0	45.0	3.0	2.0	44.8
12/22/2019	43.0	1.2	0.0	2.2	45.0	0.0	0.1	38.0	0.0	49.0	45.0	3.0	1.0	43.8
12/23/2019	43.0	1.2	0.0	1.9	46.0	0.0	0.1	44.0	0.0	52.0	46.0	3.0	3.0	46.3
12/24/2019	43.0	1.1	0.0	1.4	45.0	0.0	0.0	46.0	0.0	52.0	46.0	3.0	3.0	46.5
12/25/2019	43.0	1.0	0.0	1.4	45.0	0.0	0.0	44.0	0.0	53.0	46.0	3.0	4.0	46.3
12/26/2019	43.0	1.0	0.0	1.4	44.0	0.0	0.0	47.0	0.0	54.0	46.0	3.0	5.0	47.0
12/27/2019	43.0	1.0	0.0	1.4	45.0	0.0	0.0	47.0	0.0	54.0	46.0	3.0	5.0	47.3
12/28/2019	42.0	0.9	0.0	1.9	43.0	0.0	0.0	45.0	0.0	54.0	46.0	3.0	5.0	46.0
12/29/2019	42.0	1.0	0.0	1.4	42.0	0.0	0.0	42.0	0.0	54.0	45.0	3.0	6.0	45.0
12/30/2019	44.0	1.2	0.0	1.4	43.0	0.0	0.0	45.0	0.0	53.0	45.0	3.0	5.0	46.3
12/31/2019	43.0	1.2	0.0	1.4	41.0	0.0	0.0	46.0	0.0	52.0	45.0	3.0	4.0	45.5
Notes:	These measurements are not on the main channel of the Owens River, therefore highlighted columns are not included in average calculations.													

Flow Gaging Station / Date	Below River Intake	Blackrock Ditch Return	Goose Lake Return	Billy Lake Return	Mazourka Canyon Road	Locust Ditch Return	Georges Ditch Return	Reinhackle Springs	Alabama Gates Return	At Pumpback Station	Pump Station	Langeman n Gate to Delta	Weir to Delta	In Channel Average Flow
1/1/2020	44.0	1.2	0.0	1.4	42.0	0.0	0.0	45.0	0.0	54.0	46.0	3.0	5.0	46.3
1/2/2020	43.0	1.2	0.0	1.4	43.0	0.0	0.0	45.0	0.0	52.0	45.0	3.0	4.0	45.8
1/3/2020	43.0	1.2	0.0	1.4	44.0	0.0	0.1	43.0	0.0	51.0	45.0	3.0	3.0	45.3
1/4/2020	42.0	1.2	0.0	1.4	45.0	0.0	0.1	42.0	0.0	52.0	45.0	3.0	4.0	45.3
1/5/2020	43.0	1.2	0.0	1.4	44.0	0.0	0.1	44.0	0.0	53.0	46.0	3.0	4.0	46.0
1/6/2020	44.0	1.3	0.0	1.3	45.0	0.0	0.1	43.0	0.0	51.0	45.0	3.0	3.0	45.8
1/7/2020	43.0	1.4	0.0	1.3	39.0	0.0	0.2	37.0	0.0	51.0	43.0	3.0	5.0	42.5
1/8/2020	43.0	1.3	0.0	1.2	40.0	0.0	0.1	37.0	0.0	51.0	45.0	3.0	3.0	42.8
1/9/2020	42.0	1.3	0.0	1.1	41.0	0.0	0.1	44.0	0.0	51.0	46.0	3.0	2.0	44.5
1/10/2020	42.0	1.2	0.0	1.1	40.0	0.0	0.1	41.0	0.0	51.0	47.0	3.0	1.0	43.5
1/11/2020	43.0	1.2	0.0	1.2	40.0	0.0	0.1	44.0	0.0	52.0	47.0	3.0	2.0	44.8
1/12/2020	42.0	1.0	0.0	1.3	40.0	0.0	0.1	42.0	0.0	51.0	47.0	3.0	1.0	43.8
1/13/2020	42.0	1.0	0.0	1.3	37.0	0.0	0.1	42.0	0.0	51.0	47.0	3.0	1.0	43.0
1/14/2020	43.0	1.0	0.0	1.4	38.0	0.0	0.1	43.0	0.0	51.0	47.0	3.0	1.0	43.8
1/15/2020	42.0	1.2	0.0	1.4	41.0	0.0	0.1	42.0	0.0	50.0	47.0	3.0	0.0	43.8
1/16/2020	44.0	1.2	0.0	1.2	45.0	0.0	0.0	43.0	0.0	50.0	46.0	3.0	1.0	45.5
1/17/2020	44.0	1.2	0.0	1.1	44.0	0.0	0.0	44.0	0.0	51.0	48.0	3.0	0.0	45.8
1/18/2020	43.0	1.0	0.0	1.1	44.0	0.0	0.0	42.0	0.0	51.0	48.0	3.0	0.0	45.0
1/19/2020	42.0	1.0	0.0	1.0	46.0	0.0	0.1	45.0	0.0	50.0	47.0	3.0	0.0	45.8
1/20/2020	43.0	1.0	0.0	1.1	47.0	0.0	0.2	45.0	0.0	50.0	47.0	3.0	0.0	46.3
1/21/2020	43.0	1.0	0.0	1.1	47.0	0.0	0.2	46.0	0.0	50.0	47.0	3.0	0.0	46.5
1/22/2020	45.0	1.0	0.0	1.1	48.0	0.0	0.4	47.0	0.0	51.0	48.0	3.0	0.0	47.8
1/23/2020	43.0	1.0	0.0	1.0	48.0	0.0	0.3	49.0	0.0	50.0	47.0	3.0	0.0	47.5
1/24/2020	45.0	1.0	0.0	1.0	47.0	0.0	0.3	49.0	0.0	51.0	48.0	3.0	0.0	48.0
1/25/2020	45.0	1.0	0.0	0.9	47.0	0.0	0.5	49.0	0.0	51.0	48.0	3.0	0.0	48.0
1/26/2020	45.0	1.0	0.0	1.0	47.0	0.0	0.5	50.0	0.0	51.0	48.0	3.0	0.0	48.3
1/27/2020	44.0	1.1	0.0	1.2	47.0	0.0	0.5	49.0	0.0	50.0	47.0	3.0	0.0	47.5
1/28/2020	43.0	1.3	0.0	1.2	47.0	0.0	0.6	48.0	0.0	51.0	48.0	3.0	0.0	47.3
1/29/2020	43.0	1.2	0.0	1.1	47.0	0.0	0.6	49.0	0.0	51.0	48.0	3.0	0.0	47.5
1/30/2020	44.0	1.2	0.0	1.1	47.0	0.0	0.5	49.0	0.0	52.0	48.0	3.0	1.0	48.0
1/31/2020	43.0	1.2	0.0	1.0	46.0	0.0	0.6	48.0	0.0	52.0	48.0	3.0	1.0	47.3
Notes:	These measurements are not on the main channel of the Owens River, therefore highlighted columns are not included in average calculations.													

Flow Gaging Station / Date	Below River Intake	Blackrock Ditch Return	Goose Lake Return	Billy Lake Return	Mazourka Canyon Road	Locust Ditch Return	Georges Ditch Return	Reinhackle Springs	Alabama Gates Return	At Pumpback Station	Pump Station	Langeman n Gate to Delta	Weir to Delta	In Channel Average Flow
2/1/2020	43.0	1.1	0.0	0.9	46.0	0.0	0.6	49.0	0.0	52.0	48.0	3.0	1.0	47.5
2/2/2020	44.0	1.1	0.0	0.9	46.0	0.0	0.8	49.0	0.0	52.0	48.0	3.0	1.0	47.8
2/3/2020	43.0	1.1	0.0	1.0	46.0	0.0	0.7	49.0	0.0	51.0	48.0	3.0	0.0	47.3
2/4/2020	43.0	1.1	0.0	1.1	46.0	0.0	0.6	48.0	0.0	51.0	48.0	3.0	0.0	47.0
2/5/2020	43.0	1.1	0.0	1.2	45.0	0.0	0.7	48.0	0.0	51.0	48.0	3.0	0.0	46.8
2/6/2020	43.0	1.2	0.0	1.2	46.0	0.0	0.7	48.0	0.0	52.0	48.0	3.0	1.0	47.3
2/7/2020	43.0	1.3	0.0	1.3	48.0	0.0	0.7	47.0	0.0	50.0	47.0	3.0	0.0	47.0
2/8/2020	43.0	1.3	0.0	1.3	47.0	0.0	0.7	47.0	0.0	52.0	48.0	3.0	1.0	47.3
2/9/2020	43.0	1.3	0.0	1.4	47.0	0.0	0.6	50.0	0.0	50.0	47.0	3.0	0.0	47.5
2/10/2020	43.0	1.2	0.0	1.4	47.0	0.0	0.6	50.0	0.0	51.0	48.0	3.0	0.0	47.8
2/11/2020	43.0	1.0	0.0	1.4	47.0	0.0	0.6	49.0	0.0	51.0	48.0	3.0	0.0	47.5
2/12/2020	45.0	1.0	0.0	1.3	47.0	0.0	0.6	48.0	0.0	51.0	48.0	3.0	0.0	47.8
2/13/2020	43.0	1.0	0.0	1.2	47.0	0.0	0.7	47.0	0.0	50.0	47.0	3.0	0.0	46.8
2/14/2020	44.0	1.1	0.0	1.2	47.0	0.0	0.7	48.0	0.0	51.0	48.0	3.0	0.0	47.5
2/15/2020	43.0	1.1	0.0	1.2	47.0	0.0	0.7	49.0	0.0	51.0	48.0	3.0	0.0	47.5
2/16/2020	44.0	1.2	0.0	1.2	46.0	0.0	0.7	49.0	0.0	51.0	48.0	3.0	0.0	47.5
2/17/2020	43.0	1.4	0.0	1.2	45.0	0.0	0.7	50.0	0.0	50.0	47.0	3.0	0.0	47.0
2/18/2020	42.0	1.2	0.0	1.2	45.0	0.0	0.6	48.0	0.0	52.0	48.0	3.0	1.0	46.8
2/19/2020	44.0	1.1	0.0	1.2	45.0	0.0	0.6	48.0	0.0	51.0	47.0	3.0	1.0	47.0
2/20/2020	44.0	1.2	0.0	1.2	45.0	0.0	0.6	47.0	0.0	52.0	48.0	3.0	1.0	47.0
2/21/2020	43.0	1.2	0.0	1.3	46.0	0.0	0.6	47.0	0.0	51.0	47.0	3.0	1.0	46.8
2/22/2020	44.0	1.2	0.0	1.3	47.0	0.0	0.7	49.0	0.0	53.0	48.0	3.0	2.0	48.3
2/23/2020	44.0	1.2	0.0	1.4	48.0	0.0	0.6	49.0	0.0	53.0	48.0	3.0	2.0	48.5
2/24/2020	43.0	1.1	0.0	1.4	48.0	0.0	0.6	49.0	0.0	53.0	48.0	3.0	2.0	48.3
2/25/2020	42.0	1.1	0.0	1.4	46.0	0.0	0.6	46.0	0.0	53.0	47.0	3.0	3.0	46.8
2/26/2020	44.0	1.1	0.0	1.3	46.0	0.0	0.5	45.0	0.0	53.0	48.0	3.0	2.0	47.0
2/27/2020	43.0	1.1	0.0	1.3	46.0	0.0	0.4	46.0	0.0	52.0	47.0	3.0	2.0	46.8
2/28/2020	43.0	1.1	0.0	1.2	47.0	0.0	0.4	46.0	0.0	51.0	46.0	3.0	2.0	46.8
2/29/2020	43.0	1.0	0.0	1.1	47.0	0.0	0.7	47.0	0.0	52.0	45.0	3.0	4.0	47.3
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3/1/2020	44.0	0.9	0.0	1.1	47.0	0.0	0.7	48.0	0.0	54.0	45.0	4.0	5.0	48.3
3/2/2020	43.0	1.0	0.0	1.1	47.0	0.0	0.6	49.0	0.0	52.0	45.0	4.0	3.0	47.8
3/3/2020	43.0	1.2	0.0	1.1	48.0	0.0	0.6	48.0	0.0	53.0	44.0	4.0	5.0	48.0
3/4/2020	42.0	1.2	0.0	1.2	49.0	0.0	0.6	46.0	0.0	53.0	45.0	4.0	4.0	47.5
3/5/2020	44.0	1.2	0.0	1.2	49.0	0.0	0.6	46.0	0.0	54.0	47.0	4.0	3.0	48.3
3/6/2020	43.0	1.2	0.0	1.2	48.0	0.0	0.5	46.0	0.0	53.0	48.0	4.0	1.0	47.5
3/7/2020	44.0	1.2	0.0	1.1	48.0	0.0	0.5	45.0	0.0	53.0	48.0	4.0	1.0	47.5
3/8/2020	43.0	1.1	0.0	1.1	46.0	0.0	0.5	47.0	0.0	53.0	48.0	4.0	1.0	47.3
3/9/2020	43.0	1.1	0.0	1.1	45.0	0.0	0.4	46.0	0.0	54.0	48.0	4.0	2.0	47.0
3/10/2020	44.0	1.2	0.0	1.0	45.0	0.0	0.4	47.0	0.0	54.0	47.0	4.0	3.0	47.5
3/11/2020	44.0	1.2	0.0	1.0	45.0	0.0	0.6	49.0	0.0	56.0	48.0	4.0	4.0	48.5
3/12/2020	43.0	1.2	0.0	1.0	45.0	0.0	0.6	47.0	0.0	57.0	48.0	4.0	5.0	48.0
3/13/2020	44.0	1.0	0.0	0.9	46.0	0.0	0.7	45.0	0.0	58.0	48.0	4.0	6.0	48.3
3/14/2020	44.0	1.0	0.0	1.0	45.0	0.0	0.7	44.0	0.0	59.0	48.0	4.0	7.0	48.0
3/15/2020	44.0	1.2	0.0	1.0	43.0	0.0	1.6	42.0	0.0	57.0	48.0	4.0	5.0	46.5
3/16/2020	44.0	1.2	0.0	1.0	43.0	0.0	1.9	42.0	0.0	56.0	48.0	4.0	4.0	46.3
3/17/2020	44.0	1.2	0.0	1.1	43.0	0.0	1.9	43.0	0.0	55.0	48.0	4.0	3.0	46.3
3/18/2020	44.0	1.1	0.0	1.1	44.0	0.0	2.0	44.0	0.0	54.0	48.0	4.0	2.0	46.5
3/19/2020	43.0	1.1	0.0	1.1	43.0	0.0	2.0	44.0	0.0	54.0	48.0	4.0	2.0	46.0
3/20/2020	44.0	1.0	0.0	1.1	43.0	0.0	1.9	44.0	0.0	54.0	48.0	4.0	2.0	46.3
3/21/2020	43.0	1.1	0.0	1.1	42.0	0.0	2.0	44.0	0.0	53.0	48.0	4.0	1.0	45.5
3/22/2020	44.0	1.1	0.0	1.1	41.0	0.0	2.6	44.0	0.0	53.0	48.0	4.0	1.0	45.5
3/23/2020	43.0	1.2	0.0	1.1	41.0	0.0	2.3	46.0	0.0	54.0	48.0	4.0	2.0	46.0
3/24/2020	44.0	1.2	0.0	1.1	41.0	0.0	1.9	44.0	0.0	54.0	48.0	4.0	2.0	45.8
3/25/2020	43.0	1.2	0.0	1.2	41.0	0.0	0.8	43.0	0.0	54.0	48.0	4.0	2.0	45.3
3/26/2020	43.0	1.1	0.0	1.2	45.0	0.0	0.7	46.0	0.0	55.0	48.0	4.0	3.0	47.3
3/27/2020	43.0	1.0	0.0	1.2	45.0	0.0	0.6	47.0	0.0	55.0	48.0	4.0	3.0	47.5
3/28/2020	44.0	1.2	0.0	1.1	45.0	0.0	0.6	46.0	0.0	54.0	48.0	4.0	2.0	47.3
3/29/2020	44.0	1.3	0.0	1.1	44.0	0.0	0.5	46.0	0.0	53.0	48.0	4.0	1.0	46.8
3/30/2020	43.0	1.1	0.0	1.1	44.0	0.0	0.5	46.0	0.0	53.0	48.0	4.0	1.0	46.5
3/31/2020	43.0	1.1	0.0	1.1	44.0	0.0	0.4	46.0	0.0	53.0	48.0	4.0	1.0	46.5
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4/1/2020	43.0	1.1	0.0	1.1	44.0	0.0	0.4	46.0	0.0	52.0	43.0	8.0	1.0	46.3
4/2/2020	43.0	1.0	0.0	1.1	44.0	0.0	0.4	46.0	0.0	51.0	38.0	13.0	0.0	46.0
4/3/2020	43.0	0.9	0.0	1.0	44.0	0.0	0.4	45.0	0.0	51.0	38.0	13.0	0.0	45.8
4/4/2020	44.0	0.9	0.0	1.0	43.0	0.0	0.3	45.0	0.0	51.0	38.0	13.0	0.0	45.8
4/5/2020	43.0	0.9	0.0	1.0	43.0	0.0	0.3	43.0	0.0	50.0	37.0	13.0	0.0	44.8
4/6/2020	43.0	0.8	0.0	0.9	44.0	0.0	0.3	42.0	0.0	51.0	38.0	13.0	0.0	45.0
4/7/2020	43.0	0.8	0.0	1.0	44.0	0.0	0.2	44.0	0.0	50.0	37.0	13.0	0.0	45.3
4/8/2020	44.0	1.1	0.0	1.2	48.0	0.0	0.5	53.0	0.0	53.0	40.0	13.0	0.0	49.5
4/9/2020	43.0	1.0	0.0	1.3	51.0	0.3	1.6	61.0	0.0	56.0	43.0	13.0	0.0	52.8
4/10/2020	43.0	1.0	0.0	1.2	50.0	0.6	1.7	59.0	0.0	60.0	47.0	13.0	0.0	53.0
4/11/2020	43.0	1.0	0.0	1.3	48.0	0.3	0.8	57.0	0.0	65.0	48.0	13.0	4.0	53.3
4/12/2020	43.0	1.1	0.0	1.2	47.0	0.1	0.5	56.0	0.0	73.0	48.0	13.0	12.0	54.8
4/13/2020	42.0	1.1	0.0	1.3	47.0	0.0	0.5	55.0	0.0	70.0	48.0	13.0	9.0	53.5
4/14/2020	43.0	1.2	0.0	1.3	46.0	0.0	0.5	52.0	0.0	65.0	47.0	13.0	5.0	51.5
4/15/2020	44.0	1.1	0.0	1.3	45.0	0.0	0.6	50.0	0.0	63.0	48.0	13.0	2.0	50.5
4/16/2020	44.0	1.0	0.0	1.2	45.0	0.0	0.5	49.0	0.0	61.0	48.0	13.0	0.0	49.8
4/17/2020	43.0	1.0	0.0	1.2	45.0	0.0	0.8	49.0	0.0	59.0	46.0	13.0	0.0	49.0
4/18/2020	43.0	1.1	0.0	1.2	46.0	0.0	0.3	48.0	0.0	56.0	43.0	13.0	0.0	48.3
4/19/2020	43.0	1.1	0.0	1.2	46.0	0.0	0.2	47.0	0.0	55.0	42.0	13.0	0.0	47.8
4/20/2020	43.0	1.0	0.0	1.2	45.0	0.0	0.8	48.0	0.0	55.0	42.0	13.0	0.0	47.8
4/21/2020	42.0	0.9	0.0	1.1	45.0	0.0	0.3	49.0	0.0	54.0	41.0	13.0	0.0	47.5
4/22/2020	43.0	1.0	0.0	1.0	45.0	0.0	0.4	48.0	0.0	53.0	40.0	13.0	0.0	47.3
4/23/2020	43.0	0.9	0.0	1.0	45.0	0.0	0.3	48.0	0.0	53.0	40.0	13.0	0.0	47.3
4/24/2020	43.0	1.2	0.0	1.1	44.0	0.0	0.3	46.0	0.0	51.0	38.0	13.0	0.0	46.0
4/25/2020	44.0	1.3	0.0	1.1	45.0	0.0	0.3	46.0	0.0	50.0	37.0	13.0	0.0	46.3
4/26/2020	43.0	1.0	0.0	1.2	46.0	0.0	0.5	45.0	0.0	50.0	37.0	13.0	0.0	46.0
4/27/2020	43.0	1.1	0.0	1.2	45.0	0.0	0.4	46.0	0.0	49.0	36.0	13.0	0.0	45.8
4/28/2020	43.0	1.1	0.0	1.2	45.0	0.0	0.3	45.0	0.0	49.0	36.0	13.0	0.0	45.5
4/29/2020	48.0	1.1	0.0	1.2	45.0	0.0	0.3	45.0	0.0	48.0	35.0	13.0	0.0	46.5
4/30/2020	50.0	1.1	0.0	1.2	44.0	0.0	0.3	43.0	0.0	48.0	35.0	13.0	0.0	46.3

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5/1/2020	50.0	1.1	0.0	1.2	47.0	0.0	0.2	42.0	0.0	48.0	35.0	13.0	0.0	46.8
5/2/2020	50.0	1.1	0.0	1.2	48.0	0.0	0.2	41.0	0.0	47.0	34.0	13.0	0.0	46.5
5/3/2020	50.0	1.0	0.0	1.2	48.0	0.0	0.2	41.0	0.0	47.0	34.0	13.0	0.0	46.5
5/4/2020	50.0	1.1	0.0	1.1	48.0	0.0	0.9	42.0	0.0	46.0	33.0	13.0	0.0	46.5
5/5/2020	50.0	1.1	0.0	1.1	48.0	0.0	0.2	42.0	0.0	45.0	32.0	13.0	0.0	46.3
5/6/2020	50.0	1.1	0.0	1.1	48.0	0.0	0.3	43.0	0.0	44.0	31.0	13.0	0.0	46.3
5/7/2020	50.0	0.9	0.0	1.1	48.0	0.0	0.2	43.0	0.0	44.0	31.0	13.0	0.0	46.3
5/8/2020	50.0	1.0	0.0	1.1	48.0	0.0	0.6	43.0	0.0	44.0	31.0	13.0	0.0	46.3
5/9/2020	50.0	1.2	0.0	1.1	48.0	0.0	0.3	43.0	0.0	44.0	31.0	13.0	0.0	46.3
5/10/2020	50.0	1.2	0.0	1.2	47.0	0.0	0.2	43.0	0.0	45.0	32.0	13.0	0.0	46.3
5/11/2020	50.0	1.1	0.0	1.2	48.0	0.0	0.2	43.0	0.0	44.0	31.0	13.0	0.0	46.3
5/12/2020	56.0	1.0	0.0	1.3	48.0	0.0	0.2	42.0	0.0	44.0	31.0	13.0	0.0	47.5
5/13/2020	59.0	1.1	0.0	1.3	47.0	0.0	0.2	42.0	0.0	42.0	31.0	11.0	0.0	47.5
5/14/2020	48.0	1.0	0.0	1.3	50.0	0.0	0.1	43.0	0.0	47.0	34.0	13.0	0.0	47.0
5/15/2020	44.0	1.0	0.0	1.2	53.0	0.0	0.1	43.0	0.0	45.0	32.0	13.0	0.0	46.3
5/16/2020	47.0	0.9	0.0	1.2	50.0	0.0	0.1	42.0	0.0	38.0	32.0	6.0	0.0	44.3
5/17/2020	60.0	0.9	0.0	1.2	45.0	0.0	0.1	43.0	0.0	44.0	41.0	3.0	0.0	48.0
5/18/2020	73.0	0.9	0.0	1.1	46.0	0.0	0.1	44.0	0.0	45.0	42.0	3.0	0.0	52.0
5/19/2020	90.0	0.9	0.0	1.1	50.0	0.0	0.2	48.0	0.0	44.0	41.0	3.0	0.0	58.0
5/20/2020	109.0	0.9	0.0	1.1	57.0	2.5	1.8	45.0	0.0	44.0	41.0	3.0	0.0	63.8
5/21/2020	102.0	1.0	0.0	1.1	64.0	3.5	4.3	47.0	0.0	44.0	41.0	3.0	0.0	64.3
5/22/2020	80.0	1.1	0.0	1.1	72.0	3.5	4.9	53.0	0.0	45.0	42.0	3.0	0.0	62.5
5/23/2020	66.0	1.2	0.0	1.1	83.0	3.5	4.9	59.0	0.0	44.0	41.0	3.0	0.0	63.0
5/24/2020	52.0	1.1	0.0	1.2	89.0	3.6	4.9	63.0	0.0	44.0	41.0	3.0	0.0	62.0
5/25/2020	44.0	1.1	0.0	1.2	82.0	3.6	5.0	68.0	0.0	44.0	41.0	3.0	0.0	59.5
5/26/2020	44.0	1.1	0.0	1.2	67.0	3.5	5.0	74.0	0.0	46.0	43.0	3.0	0.0	57.8
5/27/2020	61.0	1.0	0.0	1.2	54.0	3.6	5.0	80.0	0.0	48.0	45.0	3.0	0.0	60.8
5/28/2020	70.0	1.1	0.0	1.2	49.0	3.6	5.0	82.0	0.0	50.0	47.0	3.0	0.0	62.8
5/29/2020	70.0	1.0	0.0	1.2	53.0	3.6	5.0	78.0	0.0	52.0	48.0	3.0	1.0	63.3
5/30/2020	70.0	0.9	0.0	1.1	59.0	2.3	4.2	66.0	0.0	57.0	48.0	3.0	6.0	63.0
5/31/2020	70.0	0.9	0.0	1.0	61.0	0.0	0.6	56.0	0.0	61.0	48.0	3.0	10.0	62.0
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Flow Gaging Station / Date	Below River Intake	Blackrock Ditch Return	Goose Lake Return	Billy Lake Return	Mazourka Canyon Road	Locust Ditch Return	Georges Ditch Return	Reinhackle Springs	Alabama Gates Return	At Pumpback Station	Pump Station	Langeman n Gate to Delta	Weir to Delta	In Channel Average Flow
6/1/2020	70.0	0.9	0.0	1.0	63.0	0.0	1.1	51.0	0.0	65.0	48.0	3.0	14.0	62.3
6/2/2020	70.0	0.9	0.0	1.1	63.0	0.0	1.0	52.0	0.0	65.0	48.0	3.0	14.0	62.5
6/3/2020	70.0	0.9	0.0	1.1	63.0	0.0	0.8	54.0	0.0	59.0	48.0	3.0	8.0	61.5
6/4/2020	70.0	1.0	0.0	1.1	63.0	0.0	0.6	55.0	0.0	53.0	48.0	3.0	2.0	60.3
6/5/2020	70.0	1.0	0.0	1.1	64.0	0.0	0.5	56.0	0.0	51.0	48.0	3.0	0.0	60.3
6/6/2020	70.0	1.1	0.0	1.1	64.0	0.0	0.3	57.0	0.0	49.0	46.0	3.0	0.0	60.0
6/7/2020	70.0	1.1	0.0	1.1	64.0	0.0	0.2	58.0	0.0	46.0	43.0	3.0	0.0	59.5
6/8/2020	70.0	1.1	0.0	1.1	64.0	0.1	0.1	57.0	0.0	45.0	42.0	3.0	0.0	59.0
6/9/2020	70.0	1.1	0.0	1.0	64.0	0.0	0.1	56.0	0.0	45.0	42.0	3.0	0.0	58.8
6/10/2020	73.0	1.1	0.0	1.0	64.0	0.0	0.3	56.0	0.0	46.0	43.0	3.0	0.0	59.8
6/11/2020	77.0	1.0	0.0	1.1	63.0	0.0	0.2	56.0	0.0	46.0	43.0	3.0	0.0	60.5
6/12/2020	77.0	1.0	0.0	1.1	63.0	0.0	0.1	55.0	0.0	45.0	42.0	3.0	0.0	60.0
6/13/2020	76.0	1.0	0.0	1.1	65.0	0.0	0.1	56.0	0.0	45.0	42.0	3.0	0.0	60.5
6/14/2020	76.0	1.0	0.0	1.1	66.0	0.0	0.1	56.0	0.0	44.0	41.0	3.0	0.0	60.5
6/15/2020	76.0	1.0	0.0	1.1	68.0	0.0	0.6	55.0	0.0	44.0	41.0	3.0	0.0	60.8
6/16/2020	78.0	0.9	0.0	1.0	65.0	0.0	0.5	53.0	0.0	43.0	40.0	3.0	0.0	59.8
6/17/2020	81.0	0.9	0.0	1.0	64.0	0.0	0.3	55.0	0.0	43.0	40.0	3.0	0.0	60.8
6/18/2020	80.0	1.1	0.0	1.0	64.0	0.0	0.2	54.0	0.0	43.0	40.0	3.0	0.0	60.3
6/19/2020	80.0	1.4	0.0	0.9	66.0	0.0	0.2	55.0	0.0	43.0	40.0	3.0	0.0	61.0
6/20/2020	80.0	1.3	0.0	0.9	68.0	0.0	0.2	54.0	0.0	43.0	40.0	3.0	0.0	61.3
6/21/2020	80.0	1.1	0.0	1.0	68.0	0.0	0.2	55.0	0.0	42.0	39.0	3.0	0.0	61.3
6/22/2020	80.0	1.2	0.0	1.0	69.0	0.0	0.2	55.0	0.0	43.0	40.0	3.0	0.0	61.8
6/23/2020	81.0	1.2	0.0	1.0	69.0	0.0	0.1	56.0	0.0	42.0	39.0	3.0	0.0	62.0
6/24/2020	81.0	1.2	0.0	1.0	70.0	0.0	0.1	57.0	0.0	43.0	40.0	3.0	0.0	62.8
6/25/2020	80.0	1.2	0.0	1.0	70.0	0.0	0.1	58.0	0.0	44.0	41.0	3.0	0.0	63.0
6/26/2020	80.0	1.1	0.0	0.9	70.0	0.0	0.0	59.0	0.0	45.0	42.0	3.0	0.0	63.5
6/27/2020	81.0	1.0	0.0	1.0	71.0	0.0	0.0	60.0	0.0	43.0	40.0	3.0	0.0	63.8
6/28/2020	80.0	1.0	0.0	1.0	70.0	0.0	0.0	60.0	0.0	44.0	41.0	3.0	0.0	63.5
6/29/2020	80.0	1.1	0.0	0.9	70.0	0.0	0.0	60.0	0.0	45.0	42.0	3.0	0.0	63.8
6/30/2020	80.0	1.3	0.0	0.9	71.0	0.0	0.0	58.0	0.0	45.0	42.0	3.0	0.0	63.5

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7/1/2020	80.0	1.2	0.0	1.0	71.0	0.0	0.0	58.0	0.0	46.0	43.0	3.0	0.0	63.8
7/2/2020	80.0	1.6	0.0	1.1	71.0	0.0	0.1	57.0	0.0	45.0	42.0	3.0	0.0	63.3
7/3/2020	80.0	1.2	0.0	1.1	70.0	0.0	0.0	58.0	0.0	44.0	41.0	3.0	0.0	63.0
7/4/2020	80.0	1.0	0.0	1.1	70.0	0.0	0.0	59.0	0.0	44.0	41.0	3.0	0.0	63.3
7/5/2020	80.0	1.0	0.0	1.1	70.0	0.0	0.0	59.0	0.0	43.0	40.0	3.0	0.0	63.0
7/6/2020	80.0	1.0	0.0	1.1	69.0	0.0	0.0	59.0	0.0	42.0	39.0	3.0	0.0	62.5
7/7/2020	80.0	1.1	0.0	1.0	68.0	0.0	0.0	58.0	0.0	43.0	40.0	3.0	0.0	62.3
7/8/2020	88.0	1.0	0.0	1.0	66.0	0.0	0.0	58.0	0.0	43.0	40.0	3.0	0.0	63.8
7/9/2020	91.0	1.0	0.0	1.0	66.0	0.0	0.2	58.0	0.0	42.0	39.0	3.0	0.0	64.3
7/10/2020	91.0	1.0	0.0	0.9	66.0	0.0	0.1	57.0	0.0	42.0	39.0	3.0	0.0	64.0
7/11/2020	91.0	1.0	0.0	0.8	68.0	0.0	0.1	56.0	0.0	43.0	40.0	3.0	0.0	64.5
7/12/2020	91.0	1.0	0.0	0.8	72.0	0.0	0.0	55.0	0.0	42.0	39.0	3.0	0.0	65.0
7/13/2020	91.0	1.0	0.0	0.9	73.0	0.0	0.0	54.0	0.0	42.0	39.0	3.0	0.0	65.0
7/14/2020	90.0	1.1	0.0	1.0	71.0	0.0	0.0	60.0	0.0	41.0	38.0	3.0	0.0	65.5
7/15/2020	91.0	1.1	0.0	1.1	71.0	0.0	0.0	63.0	0.0	41.0	38.0	3.0	0.0	66.5
7/16/2020	92.0	1.1	0.0	1.2	73.0	0.0	0.0	65.0	0.0	40.0	37.0	3.0	0.0	67.5
7/17/2020	92.0	1.1	0.0	1.2	73.0	0.0	0.0	65.0	0.0	39.0	36.0	3.0	0.0	67.3
7/18/2020	91.0	1.1	0.0	1.2	74.0	0.0	0.0	67.0	0.0	39.0	36.0	3.0	0.0	67.8
7/19/2020	91.0	1.1	0.0	1.2	75.0	0.0	0.0	67.0	0.0	40.0	37.0	3.0	0.0	68.3
7/20/2020	91.0	1.1	0.0	1.1	75.0	0.0	0.0	68.0	0.0	41.0	38.0	3.0	0.0	68.8
7/21/2020	92.0	1.1	0.0	1.0	75.0	0.0	0.0	68.0	0.0	41.0	38.0	3.0	0.0	69.0
7/22/2020	92.0	1.0	0.0	1.0	75.0	0.0	0.0	68.0	0.0	42.0	39.0	3.0	0.0	69.3
7/23/2020	91.0	1.0	0.0	1.1	75.0	0.0	0.0	70.0	0.0	42.0	39.0	3.0	0.0	69.5
7/24/2020	91.0	1.0	0.0	1.2	76.0	0.0	0.0	70.0	0.0	43.0	40.0	3.0	0.0	70.0
7/25/2020	91.0	1.0	0.0	1.3	76.0	0.0	0.1	70.0	0.0	43.0	40.0	3.0	0.0	70.0
7/26/2020	91.0	1.1	0.0	1.2	77.0	0.0	0.0	70.0	0.0	43.0	40.0	3.0	0.0	70.3
7/27/2020	92.0	1.0	0.0	1.2	77.0	0.0	0.0	71.0	0.0	45.0	41.0	3.0	1.0	71.3
7/28/2020	91.0	1.1	0.0	1.2	77.0	0.0	0.0	72.0	0.0	45.0	42.0	3.0	0.0	71.3
7/29/2020	91.0	1.2	0.0	1.1	77.0	0.0	0.0	72.0	0.0	47.0	44.0	3.0	0.0	71.8
7/30/2020	92.0	1.2	0.0	1.1	77.0	0.0	0.0	72.0	0.0	46.0	43.0	3.0	0.0	71.8
7/31/2020	91.0	1.1	0.0	1.0	77.0	0.0	0.0	73.0	0.0	46.0	43.0	3.0	0.0	71.8
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8/1/2020	91.0	1.2	0.0	1.0	77.0	0.0	0.0	72.0	0.0	47.0	44.0	3.0	0.0	71.8
8/2/2020	91.0	1.1	0.0	1.0	77.0	0.0	0.0	73.0	0.0	46.0	43.0	3.0	0.0	71.8
8/3/2020	92.0	1.0	0.0	1.0	77.0	0.0	0.0	73.0	0.0	47.0	44.0	3.0	0.0	72.3
8/4/2020	91.0	1.1	0.0	1.0	77.0	0.0	0.0	72.0	0.0	47.0	44.0	3.0	0.0	71.8
8/5/2020	91.0	1.1	0.0	1.0	77.0	0.0	0.0	72.0	0.0	47.0	44.0	3.0	0.0	71.8
8/6/2020	91.0	1.1	0.0	1.0	78.0	0.0	0.0	72.0	0.0	48.0	45.0	3.0	0.0	72.3
8/7/2020	91.0	1.0	0.0	1.1	77.0	0.0	0.0	72.0	0.0	49.0	46.0	3.0	0.0	72.3
8/8/2020	84.0	1.0	0.0	1.1	78.0	0.0	0.0	73.0	0.0	49.0	46.0	3.0	0.0	71.0
8/9/2020	80.0	1.1	0.0	1.1	78.0	0.0	0.0	73.0	0.0	49.0	46.0	3.0	0.0	70.0
8/10/2020	80.0	1.0	0.0	1.1	78.0	0.0	0.0	73.0	0.0	49.0	46.0	3.0	0.0	70.0
8/11/2020	80.0	1.1	0.0	1.0	76.0	0.0	0.0	74.0	0.0	50.0	47.0	3.0	0.0	70.0
8/12/2020	80.0	1.0	0.0	1.0	72.0	0.0	0.0	74.0	0.0	50.0	47.0	3.0	0.0	69.0
8/13/2020	80.0	0.9	0.0	1.1	70.0	0.0	0.0	75.0	0.0	51.0	48.0	3.0	0.0	69.0
8/14/2020	80.0	1.1	0.0	1.1	70.0	0.0	0.0	75.0	0.0	51.0	48.0	3.0	0.0	69.0
8/15/2020	80.0	1.1	0.0	1.1	70.0	0.0	0.0	73.0	0.0	51.0	48.0	3.0	0.0	68.5
8/16/2020	80.0	1.1	0.0	1.1	69.0	0.0	0.0	70.0	0.0	50.0	47.0	3.0	0.0	67.3
8/17/2020	80.0	1.0	0.0	1.0	70.0	0.0	0.0	69.0	0.0	52.0	47.0	3.0	2.0	67.8
8/18/2020	74.0	1.3	0.0	1.0	68.0	0.0	0.0	69.0	0.0	54.0	48.0	3.0	3.0	66.3
8/19/2020	70.0	1.3	0.0	0.9	68.0	0.0	0.0	69.0	0.0	53.0	48.0	3.0	2.0	65.0
8/20/2020	70.0	1.4	0.0	1.0	68.0	0.0	0.0	69.0	0.0	52.0	48.0	3.0	1.0	64.8
8/21/2020	70.0	1.4	0.0	1.0	66.0	0.0	0.0	68.0	0.0	52.0	48.0	3.0	1.0	64.0
8/22/2020	70.0	1.3	0.0	1.0	62.0	0.0	0.0	68.0	0.0	51.0	48.0	3.0	0.0	62.8
8/23/2020	69.0	1.3	0.0	1.0	61.0	0.0	0.0	67.0	0.0	50.0	47.0	3.0	0.0	61.8
8/24/2020	70.0	1.2	0.0	1.1	60.0	0.0	0.0	63.0	0.0	50.0	47.0	3.0	0.0	60.8
8/25/2020	70.0	1.2	0.0	1.1	59.0	0.0	0.0	62.0	0.0	50.0	47.0	3.0	0.0	60.3
8/26/2020	70.0	1.1	0.0	1.2	60.0	0.0	0.0	61.0	0.0	50.0	47.0	3.0	0.0	60.3
8/27/2020	70.0	1.1	0.0	1.1	59.0	0.0	0.0	60.0	0.0	48.0	45.0	3.0	0.0	59.3
8/28/2020	69.0	1.1	0.0	1.0	59.0	0.0	0.0	60.0	0.0	50.0	47.0	3.0	0.0	59.5
8/29/2020	70.0	1.1	0.0	0.9	58.0	0.0	0.0	59.0	0.0	45.0	42.0	3.0	0.0	58.0
8/30/2020	70.0	1.1	0.0	1.0	58.0	0.0	0.0	58.0	0.0	44.0	41.0	3.0	0.0	57.5
8/31/2020	69.0	1.1	0.0	1.0	58.0	0.0	0.0	57.0	0.0	43.0	40.0	3.0	0.0	56.8
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9/1/2020	69.0	1.1	0.0	1.0	58.0	0.0	0.0	57.0	0.0	46.0	38.0	8.0	0.0	57.5
9/2/2020	70.0	1.2	0.0	1.1	58.0	0.0	0.0	58.0	0.0	42.0	31.0	11.0	0.0	57.0
9/3/2020	70.0	1.2	0.0	1.1	58.0	0.0	0.0	57.0	0.0	42.0	31.0	11.0	0.0	56.8
9/4/2020	70.0	1.2	0.0	1.1	58.0	0.0	0.0	57.0	0.0	42.0	31.0	11.0	0.0	56.8
9/5/2020	70.0	1.1	0.0	1.0	57.0	0.0	0.0	57.0	0.0	42.0	31.0	11.0	0.0	56.5
9/6/2020	70.0	1.1	0.0	1.0	57.0	0.0	0.0	56.0	0.0	43.0	32.0	11.0	0.0	56.5
9/7/2020	70.0	1.2	0.0	0.9	57.0	0.0	0.0	58.0	0.0	43.0	32.0	11.0	0.0	57.0
9/8/2020	70.0	1.2	0.0	1.0	57.0	0.0	0.0	52.0	0.0	43.0	32.0	11.0	0.0	55.5
9/9/2020	69.0	1.2	0.0	1.0	58.0	0.0	0.0	50.0	0.0	44.0	33.0	11.0	0.0	55.3
9/10/2020	70.0	1.1	0.0	1.0	57.0	0.0	0.0	50.0	0.0	44.0	33.0	11.0	0.0	55.3
9/11/2020	70.0	1.2	0.0	1.1	58.0	0.0	0.0	50.0	0.0	45.0	34.0	11.0	0.0	55.8
9/12/2020	70.0	1.2	0.0	1.2	58.0	0.0	0.0	51.0	0.0	44.0	33.0	11.0	0.0	55.8
9/13/2020	70.0	1.1	0.0	1.3	59.0	0.0	0.0	51.0	0.0	44.0	33.0	11.0	0.0	56.0
9/14/2020	70.0	1.2	0.0	1.2	58.0	0.0	0.0	52.0	0.0	44.0	33.0	11.0	0.0	56.0
9/15/2020	70.0	1.2	0.0	1.0	58.0	0.0	0.0	52.0	0.0	44.0	33.0	11.0	0.0	56.0
9/16/2020	70.0	1.1	0.0	0.8	58.0	0.0	0.0	53.0	0.0	45.0	34.0	11.0	0.0	56.5
9/17/2020	69.0	1.1	0.0	0.9	58.0	0.0	0.0	53.0	0.0	44.0	33.0	11.0	0.0	56.0
9/18/2020	69.0	1.1	0.0	1.1	59.0	0.0	0.0	53.0	0.0	46.0	35.0	11.0	0.0	56.8
9/19/2020	70.0	1.0	0.0	1.3	59.0	0.0	0.0	53.0	0.0	46.0	35.0	11.0	0.0	57.0
9/20/2020	70.0	1.0	0.0	1.4	60.0	0.0	0.0	53.0	0.0	46.0	35.0	11.0	0.0	57.3
9/21/2020	70.0	1.0	0.0	1.3	59.0	0.0	0.0	53.0	0.0	46.0	35.0	11.0	0.0	57.0
9/22/2020	70.0	1.0	0.0	1.2	59.0	0.0	0.0	54.0	0.0	47.0	36.0	11.0	0.0	57.5
9/23/2020	70.0	1.0	0.0	0.9	59.0	0.0	0.0	54.0	0.0	46.0	35.0	11.0	0.0	57.3
9/24/2020	69.0	0.9	0.0	1.0	59.0	0.0	0.0	54.0	0.0	46.0	35.0	11.0	0.0	57.0
9/25/2020	70.0	0.9	0.0	1.2	59.0	0.0	0.0	54.0	0.0	46.0	35.0	11.0	0.0	57.3
9/26/2020	70.0	1.0	0.0	1.4	60.0	0.0	0.0	54.0	0.0	48.0	37.0	11.0	0.0	58.0
9/27/2020	70.0	1.1	0.0	1.4	60.0	0.0	0.0	55.0	0.0	48.0	37.0	11.0	0.0	58.3
9/28/2020	70.0	1.1	0.0	1.3	60.0	0.0	0.0	54.0	0.0	48.0	37.0	11.0	0.0	58.0
9/29/2020	70.0	1.1	0.0	1.1	59.0	0.0	0.0	54.0	0.0	48.0	37.0	11.0	0.0	57.8
9/30/2020	64.0	1.1	0.0	0.9	60.0	0.0	0.0	54.0	0.0	47.0	36.0	11.0	0.0	56.3

Notes: These measurements are not on the main channel of the Owens River, therefore highlighted columns are not included in average calculations.

3.0 LAND MANAGEMENT

3.1 Land Management Summary

The 2020 Lower Owens River Project (LORP) land management monitoring efforts continued with utilization monitoring across all leases and range trend monitoring on the Thibaut and Islands leases inside the LORP management area.

Pasture utilization within the LORP was within the allowable levels of use established for both riparian (up to 40%) and upland (up to 65%) areas. End-of-season utilization data for LORP leases from 2007 to present is provided in Land Management Appendix 1.

Irrigated pastures that scored below 80% in 2019 were revisited in the summer of 2020. Irrigated pasture scores from 2011-2020 are provided in Land Management Appendix 2 for reference.

3.2 Introduction

The land use component of this report is composed of project elements related to livestock grazing management. Under the land management program, the intensity, location, and duration of grazing are managed through the establishment of riparian pastures, forage utilization rates, and prescribed grazing periods (described in Section 2.8.1.3 and 2.8.2 LORP EIR, 2004). Other actions include the monitoring and 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 on the leases.

Grazing management plans that were developed for the ranch leases within the LORP modified the grazing practices in riparian and upland areas on seven LADWP leases in order to facilitate reaching the 40 LORP goals described in the LORP EIR (2007). The seven leases within the LORP planning area are: Intake, Twin Lakes, Blackrock, Thibaut, Islands, Lone Pine, and the Delta. LORP-related land use activities and monitoring that took place in 2020 are presented by lease below.

3.3 Utilization

The Lower Owens River Monitoring Adaptive Management and Reporting Plan (MAMP, Ecosystem Sciences, 2008) 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 these data to document the percent of biomass removed by grazing animals and determine whether or not grazing utilization standards are being exceeded. The calculation of utilization (by transect and pasture) is based on a weighted average. Species that only comprise a small part of available forage contribute proportionally less to the overall use value than more abundant species. 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.

3.3.1 Riparian and Upland Utilization Rates and Grazing Periods

Under the LORP MAMP, livestock are allowed to graze in riparian pastures during the grazing periods prescribed for each lease (see Sections 2.8.2.1 through 2.8.2.7 LORP EIR, 2004). Livestock are to be removed from riparian pastures when the utilization rate reaches 40% or at the end of the grazing period, whichever occurs first. 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 not hinder the 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 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, the riparian utilization rate of 40% is reached before 65% use in the uplands occurs.

3.3.2 Utilization Monitoring

Monitoring methodologies are fully described in Section 4.6.2 of the MAMP (Ecosystem Sciences, 2008).

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 data for 2020 is located in Land Management Appendix 1.

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 over an average of several years, then adjustments should be implemented (Holecheck and Galt, 2000; Smith et al. 2007).

Utilization monitoring is conducted annually. Permanent utilization transects have been established in upland and riparian areas of pastures within the LORP planning area. 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 mid-way through the grazing period (mid-season) and again at the conclusion of the grazing period or immediately prior to the end of plant dormancy (end-of-season).

3.4 Range Trend

3.4.1 Overview of Range Trend Monitoring and Assessment Program

A description of monitoring methods, data compilation, and analysis techniques can be found in the 2008 LORP MAMP. More detailed discussion of the Range Trend methods and considerations for interpretation can be found in previous LORP Annual Monitoring reports as well as descriptions of the range trend monitoring sites and their locations (LADWP 2011). Nested frequency and shrub cover data collected in 2020 are presented for each lease. Major departures from historic ranges of variability will be discussed at the lease level in the following sections.

Range trend monitoring for 2020 involves nested frequency monitoring of all plant species and line-intercept sampling for shrub canopy cover. Photo documentation of site conditions is included as part of range trend monitoring.

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 is the primary means for evaluating trend at a given site. 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. The 2020 results were compared to all sampling events during the baseline period to determine if results in 2020 were ecologically significant or remained within the typical range of variability observed for that particular site.

The ecological site on the LORP where the majority of land management monitoring transects are located is the Moist Floodplain ecological site (MLRA 29-20). The site describes axial-stream floodplains. Moist Floodplain sites are dominated by saltgrass (*Distichlis spicata,* DISP), and to a lesser extent alkali sacaton *(Sporobolus airoides*, SPAI), and creeping wildrye *(Leymus triticoides*, LETR5). Only 10% of the total plant community is expected to be composed of shrubs and the remaining 10% forbs. This ecological site does not include actual river or stream banks. Stream bank information is available from the 2016-18 Rapid Assessment Survey (RAS) reports and the Streamside Monitoring Report from 2014.

Saline Meadow ecological sites (MLRA 29-2) are the second most commonly encountered ecological sites on the LORP range trend sites. 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 SPAI 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 SPAI, 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)*, plant symbol ATTO, with a minor component of SPAI of up to 25% and 5% forbs.

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 differently to the variable precipitation conditions during the baseline period. This provided the Watershed Resources staff an opportunity to sample across a range of ecological conditions for these sites, which contributed to a robust baseline dataset bracketed by both dry and wet conditions. Data from the Lone Pine rain gauges are used to determine the growing conditions for each sampling year on the Islands, Lone Pine, and Delta Leases. Precipitation data from Independence are used for the Thibaut and Blackrock Leases, and data from the Intake are used for the Intake, Twin Lakes, and the northern portion of the Blackrock Leases.

Adaptive management recommended that a modified range trend schedule be implemented in 2012 as shown in Land Management Table 1. This schedule ensures that there will be some monitoring across the landscape annually, increasing the probability of documenting the influence of significant changes in climate or management on the various ecological sites in the LORP area.

Land Management Table 1. Revised LORP Range Trend Monitoring Schedule

2020	2021	2022	2023	2024	2025	2026
Thibaut	Twin Lakes	Blackrock	Thibaut	Twin Lakes	Blackrock	Thibaut
Islands	Lone Pine	Delta	Islands	Lone Pine	Delta	Islands

3.4.2 Irrigated Pastures

Monitoring of irrigated pastures consists 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%, the pasture is evaluated again in the following year and/or changes to pasture management are implemented.

All irrigated pastures in the LORP management area that scored below 80% in 2019 were revisited in the summer of 2020. Irrigated pasture scores from 2011-2020 are provided in Land Management Appendix 2 for reference.

3.4.3 Fencing

No new fence construction occurred in 2020, just general maintenance and repairs.

3.4.4 Discussion of Range Trend

Range Trend transects on the Islands and Thibaut Leases were read in August 2020. On the Thibaut Lease, in response to decreased precipitation, BAHY decreased on two moist floodplain sites (Land Management Table 2) and increased on THIBAUT_01B, a Saline Meadow site (Land Management Table 3). This transect is in an area that was flooded year-round and dominated by cattails prior to shifting the Thibaut Pond further east.

Range trend transects on the Islands Lease did not show any radical departures outside of previously observed ranges with the exception of Islands_13 where DISP made a dramatic decline from 56% to 3% (Land Management Table 4). This transect is situated inside a grazing exclosure that has accumulated a large amount of litter since it's construction in 2011.

Despite the exceedingly dry conditions in the spring and summer the sites have maintained fairly stable trends.

Land Management Table 2. Significant changes in percent frequency between 2019 and 2020 Plant Frequencies (p=0.1) on Moist Floodplain Sites, Thibaut Lease.

MOIST FLOODPLAIN (2019-2020)			
	No Change	**DISP**	**BAHY**
THIBAUT_04	↔		
THIBAUT_05			↓42%-14%
THIBAUT_06*	↔		
THIBAUT_07			↓69%-19%
*grazing exclosure			

Land Management Table 3. Significant changes in percent frequency between 2017 and 2020 Plant Frequencies (p=0.1) on Saline Meadow Sites, Thibaut Lease

SALINE MEADOW (2017-2020)							
	No Change	**DISP**	**BAHY**	**TYLA**	**CYDA**	**SCAM6**	**HEAN3**
THIBAUT_01B			↑17%-37%	↓26%-0%	↑0%-13%	↓59%-1%	↑0%-12%
THIBAUT_02		↑60%-70%					
THIBAUT_03	↔						

Land Management Table 4. Significant changes in percent frequency between 2017 and 2020 Plant Frequencies (p=0.1) on Moist Floodplain Sites, Islands Lease

MOIST FLOODPLAIN			
	No Change	**DISP**	**SPAI**
ISLANDS_06		↑69%-85%	↓33%-26%
ISLANDS_08	↔		
ISLANDS_09		↓78%-69%	
ISLANDS_10	↔		
ISLANDS_11	↔		
ISLANDS_13*		↓56%-3%	
*grazing exclosure			

3.5 LORP Ranch Lease Summary and Monitoring Results

The following sections are presented by ranch lease. The discussion includes an introduction describing the lease operations, pasture types, a map of the lease, and a summary of range trend, utilization, and irrigated pasture results where relevant. Reference to plant species by plant symbol are found in Land Management Table 5, which includes a list of the plant species, scientific names, common names, plant symbol, and functional group assignment for species encountered on the range trend transects.

Land Management Table 5. Common Species in Range Trend Transects

USDA Plant Code	Species Name	Common Name
ANCA10	*Anemopsis californica*	yerba mansa
ARPU9	*Aristida purpurea*	purple threeawn
ATSE2	*Atriplex serenana*	bractscale
ATTO	*Atriplex torreyi*	Torrey's saltbush
ATTR	*Atriplex truncata*	wedgescale saltbush
BAHY	*Bassia hyssopifolia*	fivehorn smotherweed
CHHI	*Chenopodium hians*	goosefoot
CHIN2	*Chenopodium incanum*	mealy goosefoot
CHLE4	*Chenopodium leptophyllum*	narrowleaf goosefoot
DESO2	*Descurainia sophia*	herb sophia
DISP	*Distichlis spicata*	saltgrass

Common Species Encountered in Range Trend Transects, continued:

USDA Plant Code	Species Name	Common Name
EQAR	*Equisetum arvense*	field horsetail
ERNA10	*Ericameria nauseosa*	rubber rabbitbrush
FOPU2	*Forestiera pubescens*	stretchberry
GITR	*Gilia transmontana*	transmontane gilia
GLLE3	*Glycyrrhiza lepidota*	American licorice
HECU3	*Heliotropium curassavicum*	salt heliotrope
JUBA	*Juncus balticus*	Baltic rush
LASE3	*Langloisia setosissima*	Great Basin langloisia
LEFL2	*Lepidium flavum*	yellow pepperweed
LELA2	*Lepidium latifolium*	broadleaved pepperweed
LETR5	*Leymus triticoides*	beardless wildrye
MALE3	*Malvella leprosa*	alkali mallow
NADE	*Nama demissum*	purplemat
POMO5	*Polypogon monspeliensis*	annual rabbitsfoot grass
SAEX	*Salix exigua*	narrowleaf willow
SAGO	*Salix gooddingii*	Goodding’s willow
SALA3	*Salix laevigata*	red willow
SAVE4	*Sarcobatus vermiculatus*	greasewood
SCAC3	*Schoenoplectus acutus*	hardstem bulrush
SCAM6	*Schoenoplectus americanus*	chairmaker’s bulrush
SCMA	*Schoenoplectus maritimus*	cosmopolitan bulrush
SPAI	*Sporobolus airoides*	alkali sacaton
TARA	*Tamarix ramosissima*	saltcedar
TYDO	*Typha domingensis*	southern cattail
TYLA	*Typha latifolia*	broadleaf cattail

3.5.1 Intake Lease

The Intake Lease (Land Management Figure 1) is utilized by horses and mules. The lease, which is approximately 102 acres, is comprised of three fields:

- Intake
- Big Meadow Field
- East Field

The Intake Field contains riparian vegetation and an associated 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 transects that would meet the proper range trend/utilization criteria. Much of the meadow in the Big Meadow Field was covered with dredged material from the LORP Intake during the implementation of the LORP project. These spoil piles now support shrubs associated with upland communities. The sandy soils and depth of the piles will likely impede any future development of a meadow plant community. The East Field consists of upland and riparian vegetation. 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.

Utilization

The Intake Field had no grazing in 2020.

Summary of Range Trend Data and Conditions

Range Trend data was not collected in 2020 on the Intake Lease.

Irrigated Pastures

There are no irrigated pastures on the Intake Lease.

Stockwater Sites

There are no stockwater sites on the lease. Stockwater is provided by the Owens River.

Fencing

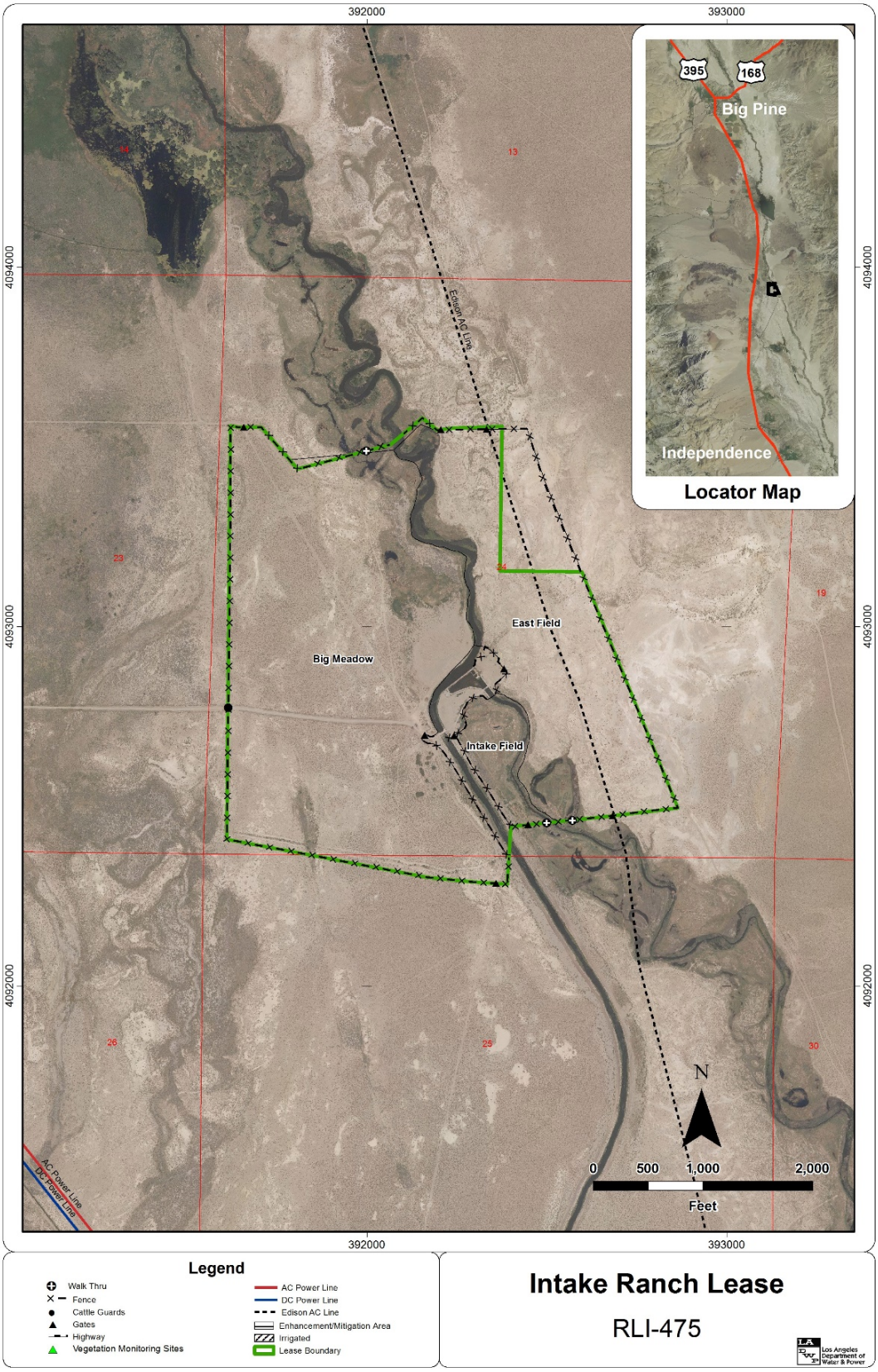
There was no new fence construction on the lease in 2020.

Salt and Supplement Sites

There are no salt and supplement sites on the lease.

Burning

No burns were conducted on the lease in 2020.



Land Management Figure 1. Intake Ranch Lease

3.5.2 Twin Lakes Lease

The Twin Lakes Lease (Land Management Figure 2) 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. 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
- 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 where livestock grazing does not occur.

Riparian Management Areas

Utilization in the Lower Blackrock Riparian and Upper Blackrock Field was within the allowable utilization standard of 40% for the grazing season. There are no recommended management changes for the lease.

Upland Management Area

Upland utilization was within the allowable standard of 65% in all fields.

Summary of Range Trend Data and Conditions

Range Trend data was not collected in 2020 on the Twin Lakes Lease.

Irrigated Pastures

There are no irrigated pastures on the Twin Lakes Lease.

Fencing

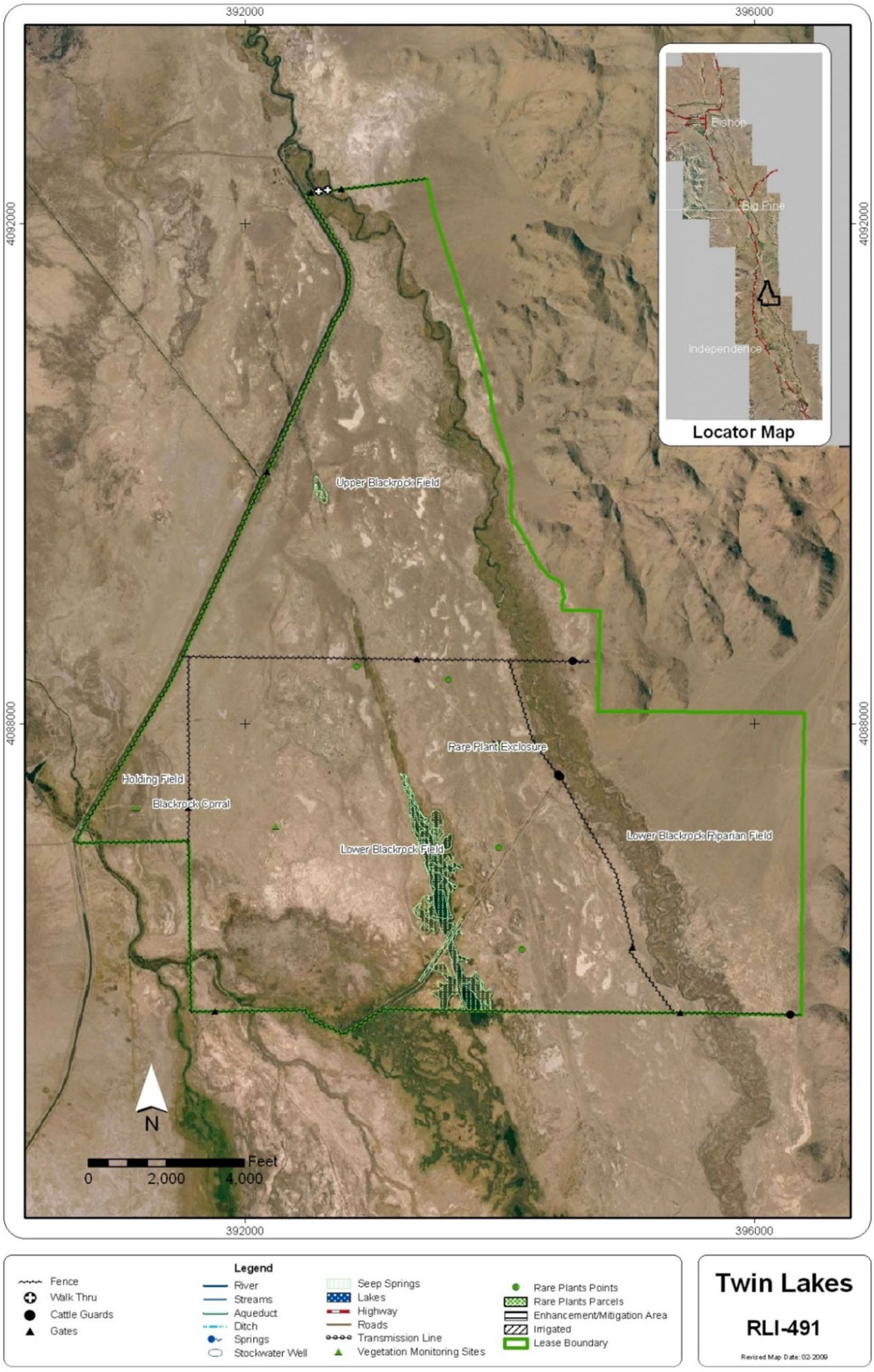
There was no new fence construction on the lease in 2020.

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

No burns were conducted on the lease in 2020.



Land Management Figure 2. Twin Lakes Lease

3.5.3 Blackrock Lease

The Blackrock Lease (Land Management Figure 3) is a cow/calf operation consisting of 32,674 acres. Blackrock is the largest LADWP grazing lease within the LORP area. The pastures 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 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
- North Blackrock Holding

Twelve of these pastures are monitored using range trend and utilization. The other eight are holding pastures for cattle processing or parts of the actual operating facilities. As outlined in the lease management plans, holding pastures, traps, and corrals are not monitored because of their small size and/or their role in operations.

Riparian Management Area

Riparian grazing on the Blackrock Lease was below the allowable 40% utilization standard.

Upland Management Areas

Fields in the upland portions of the Blackrock Lease remained well below upland utilization standard of 65%.

Summary of Range Trend Data and Condition Blackrock Lease

Range Trend data was not collected in 2020 on the Blackrock lease.

Irrigated Pastures

There are no irrigated pastures on the Blackrock Lease.

Stockwater Sites

All stockwater wells are planned to be in operation before 2021.

Fencing

There was no new fence construction on the lease in 2020.

Salt and Supplement Sites

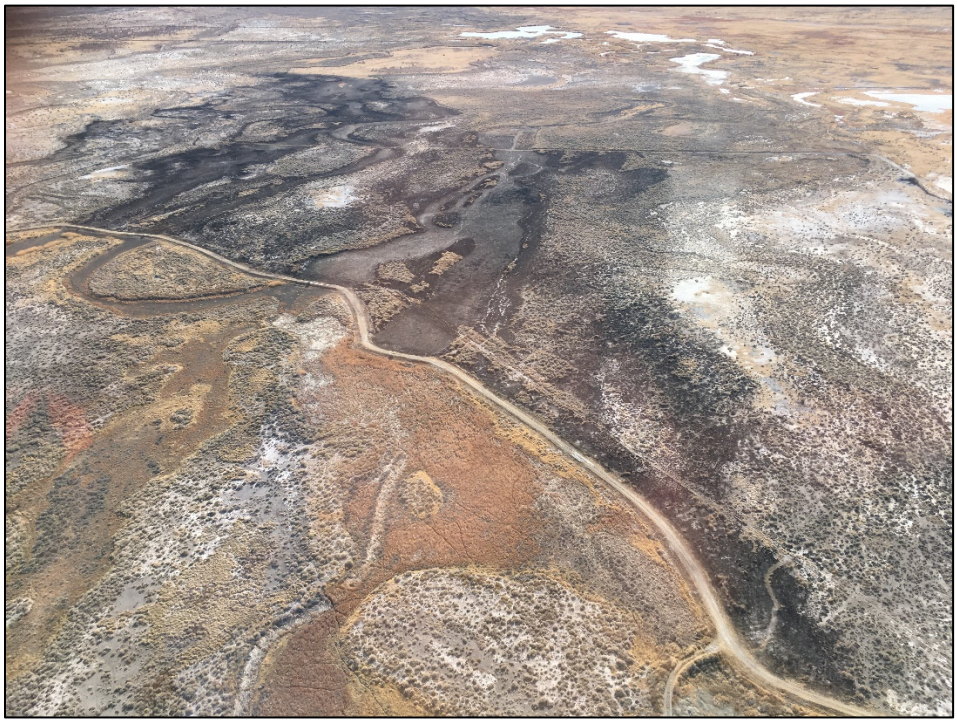
Many of the supplement sites located on the Blackrock Lease have been in place for many years and are located in upland management areas. A liquid molasses protein is placed in portable feeding stations at these locations.

Burning

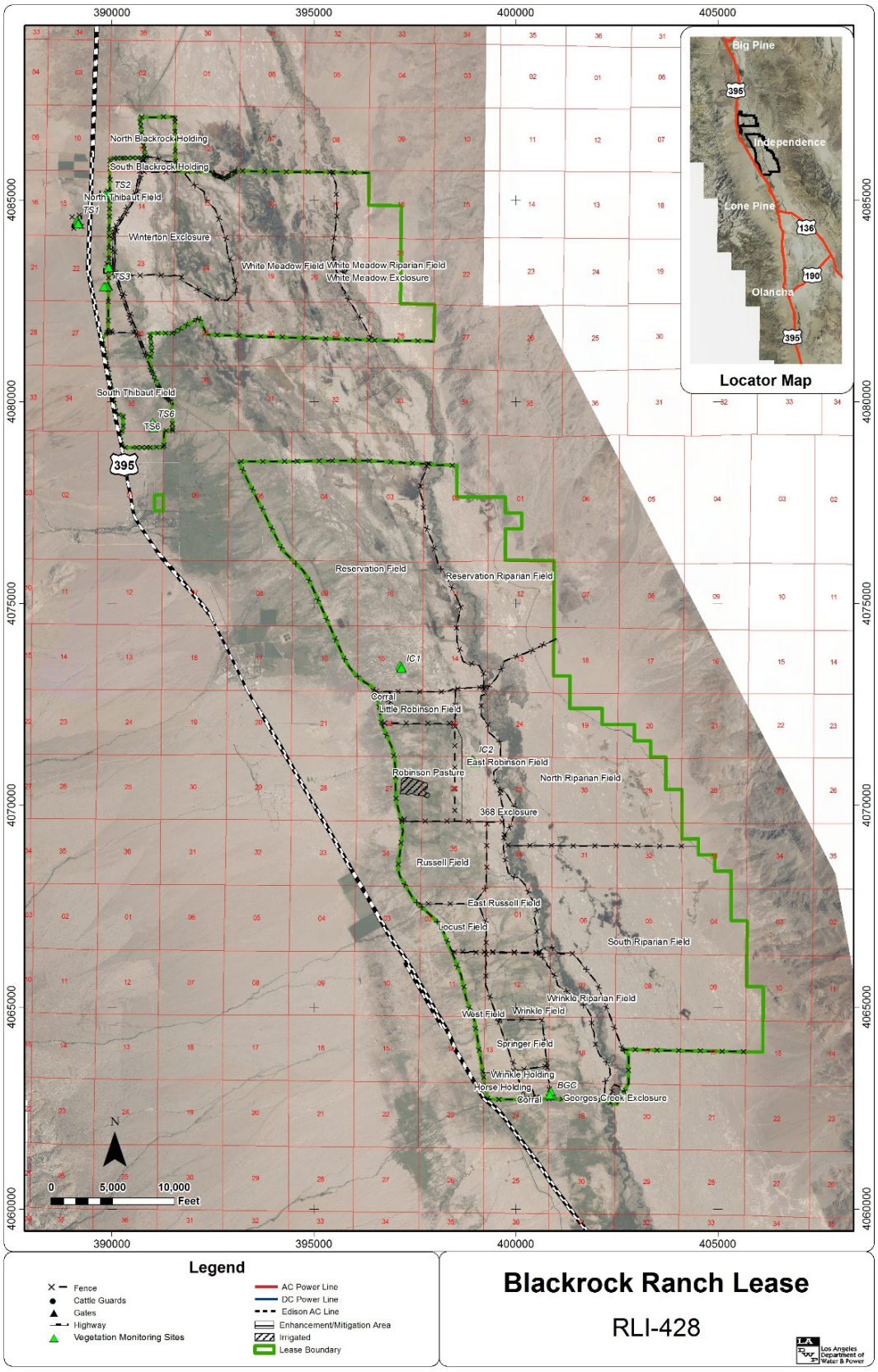
The South Winterton Burn was conducted in December 2019. Approximately 93 acres were burned in preparation for flooding the southernmost section of the Winterton Unit of the Blackrock Waterfowl Management Area.

Photograph 1. South Winterton Burn, 12/17/2019.

Photograph 2. South Winterton Burn, 12/18/2019.



Photograph 3. South Winterton Burn, aerial view.



Land Management Figure 3. Blackrock Ranch Lease

3.5.4 Thibaut Lease

The 5,259-acre Thibaut Lease (Land Management Figure 4) is utilized 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:

- Blackrock Waterfowl Management Area
- Rare Plant Management Area
- Thibaut Field
- Thibaut Riparian Pasture

Riparian Management Areas

The Thibaut Riparian Pasture has been excluded from grazing since the implementation of the LORP project. A grazing exclosure was constructed during the winter of 2018 (Land Management Figure 4). Livestock are now be permitted to graze the remainder of the Thibaut Riparian Pasture.

Upland Management Areas

The end-of-season use was below the allowable utilization grazing standard of 65%.

Summary of Range Trend Data and Conditions

Range trend data were collected on the Thibaut Lease in 2020. See section 3.4.4 for discussion.

Irrigated Pastures

Irrigated pasture evaluations were conducted in 2019. The irrigated pasture in the Thibaut Field was 72%, below the allowable score of 80% in 2019. This was due to weeds, poor irrigation practices, and spot grazing. Evaluation during the summer of 2020 showed improvement in pasture condition score (80%), due to lowering stocking levels during the growing season.

Stockwater Sites

Stockwater is provided by the Los Angeles Aqueduct and a stockwater well located in the Thibaut Field.

Fencing

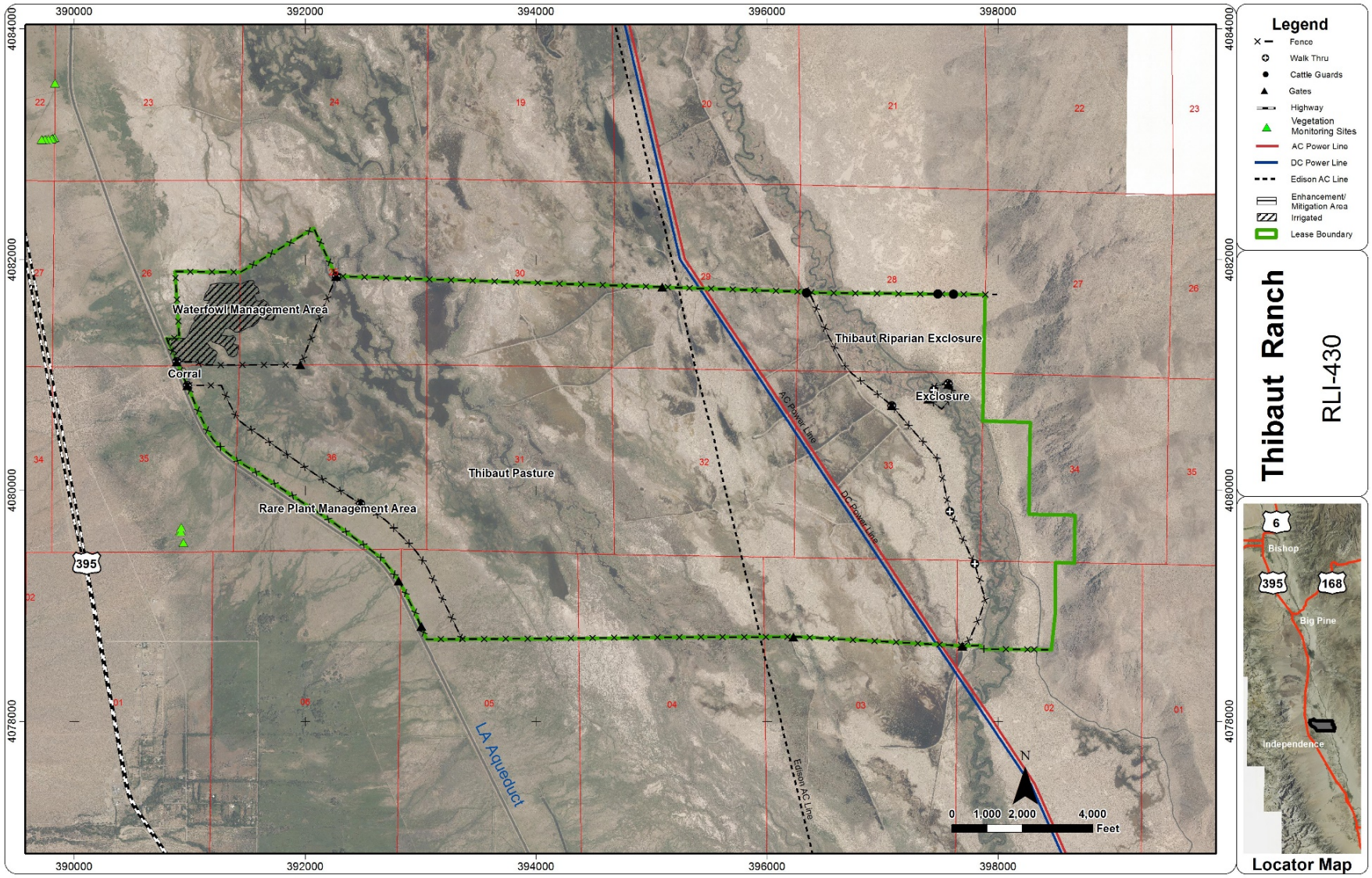
One mile of northern boundary fence was repaired after a controlled burn was conducted in 2019.

Salt and Supplement Sites

Horses and mules are fed hay in the winter. There are no established supplement sites on the lease.

Burning

A prescribed burn conducted on the Blackrock lease burned a small portion of the northern part of the Thibaut lease (< 2 acres).



Land Management Figure 4. Thibaut Ranch Lease

3.5.5 Islands Lease

The Islands Lease (Land Management Figure 5) 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

The Bull Field, Reinhackle Field, Carasco North, Carasco South, and Bull Pasture are spring dominated upland pastures.

Riparian Management Areas

All utilization transects on the Islands Lease were evaluated in 2020. Due to the continued inundation in the River Field, all of the meadows in the immediate area of the islands were flooded leaving only the southern end of the River Field for grazing. The southern portion of the Islands was below the allowable utilization standard of 40%.

Upland Management Areas

All upland pastures were well below the allowable 65% utilization rate in 2020.

Summary of Range Trend Data

Range trend transects on the Islands Lease were read in 2020. Please refer to section 3.4.4 for discussion.

Irrigated Pastures

The irrigated pastures located within the Bull Pasture and River Field each rated 86% in 2019. They will be rated again in 2022.

Stockwater Sites

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

Fencing

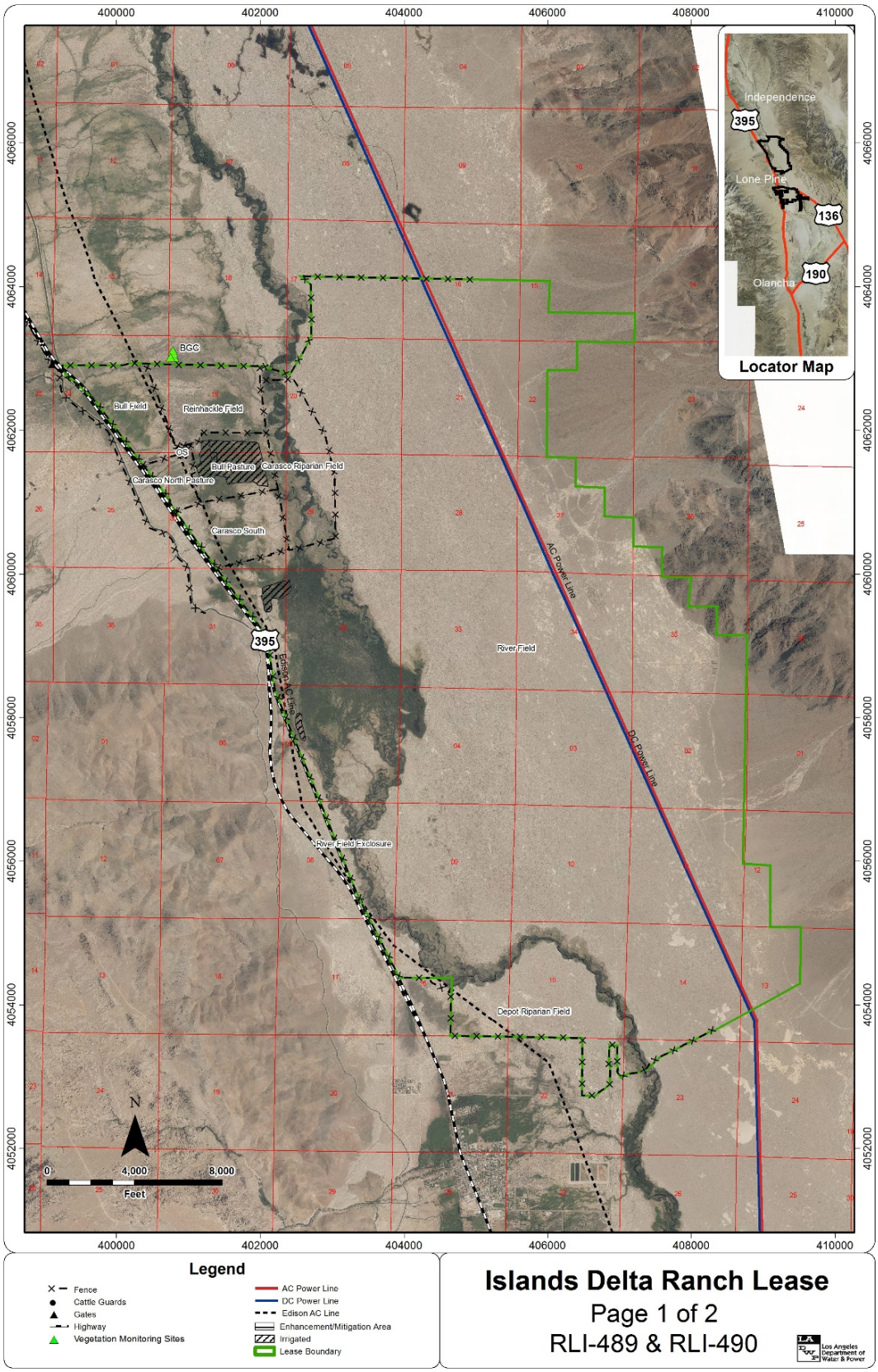
There was no new fence construction on the lease in 2020.

Salt and Supplement Sites

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.

Burning

No burns occurred on the lease in 2020.



Land Management Figure 5. Islands and Delta Ranch Leases (Islands Portion)

3.5.6 Lone Pine Lease

The Lone Pine Lease Land Management Figure 6) is an 8,274-acre cow/calf operation divided into 11 pastures and adjacent private ranch land. Grazing on the lease typically 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 to Forest Service grazing allotments on the Kern Plateau.

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

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

Two of these pastures contain utilization and range trend transects. The remaining nine pastures/fields are irrigated pastures, holding pastures for cattle processing or parts of the actual operating facilities. As outlined in the lease management plans, holding pastures, traps, and corrals are not monitored because of their small size and/or their role in operations. Irrigated pastures are evaluated using the Irrigated Pasture Condition protocol.

Riparian Management Area

Utilization was within the allowable 40% utilization standard. Herbaceous vegetation has fully recovered since the burn in 2013. Woody riparian species are continuing to recover and many willows are re-sprouting.

Upland Management Area

The upland utilization was below the allowable standard of 65%.

Summary of Range Trend Data and Conditions

Range Trend data was not collected in 2020 on the Lone Pine Lease.

Stockwater Sites

LADWP plans to complete installation of the pump and storage tank during the winter of 2020-21.

Fencing

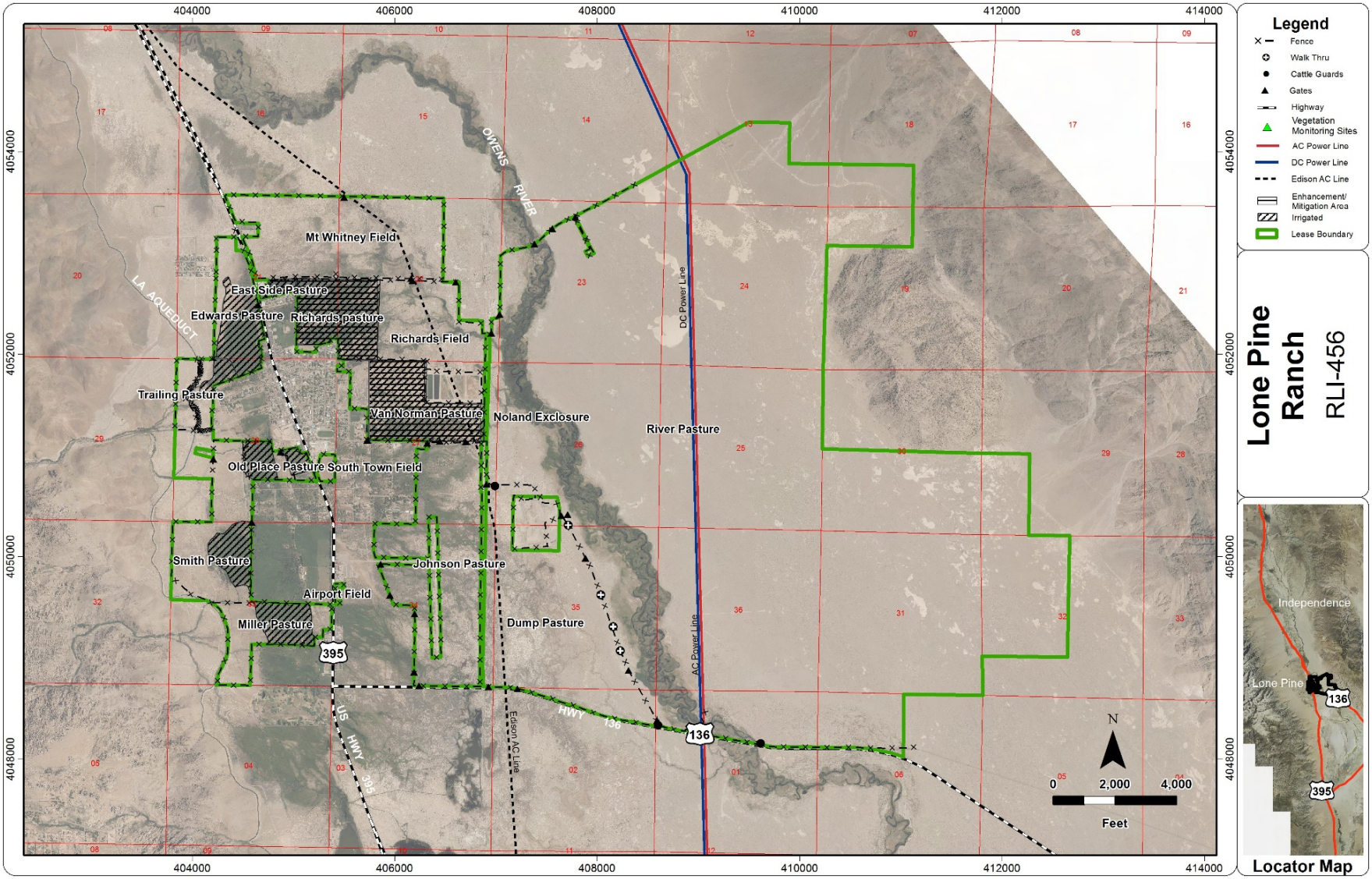
There was no new fence construction on the lease in 2020.

Salt and Supplement Sites

All supplement tubs were situated outside of the flood plain.

Burning

No burns were conducted on the lease in 2020.



Land Management Figure 6. Lone Pine Ranch Lease

3.5.7 Delta Lease

The Delta Lease (Land Management Figure 7) is a cow/calf operation and consists of 7,110 acres divided into four fields within the LORP project boundary:

- Lake Field
- Bolin Field
- Main Delta Field
- 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 concurrently with California State Lands Commission leases.

Grazing utilization estimates are taken in the Bolin Field and 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 portion, northwest of Owens Lake, supports little in the way of forage and has no stockwater.

Riparian Management Areas

End-of-season utilization was below the allowable utilization standard of 40%.

Upland Management Areas

The upland grazing was below the allowable utilization standard of 65%.

Summary of Range Trend Data and Conditions

Range Trend data was not collected in 2020 on the Delta Lease.

Irrigated Pastures

The Lake Field is located west of U.S. Highway 395 north of Diaz Lake. This irrigated pasture was evaluated in 2019 at 86%. It will be evaluated again in 2022.

Stockwater Sites

Stockwater for the Bolin Field is supplied from a diversion that runs from Tuttle Creek.

Fencing

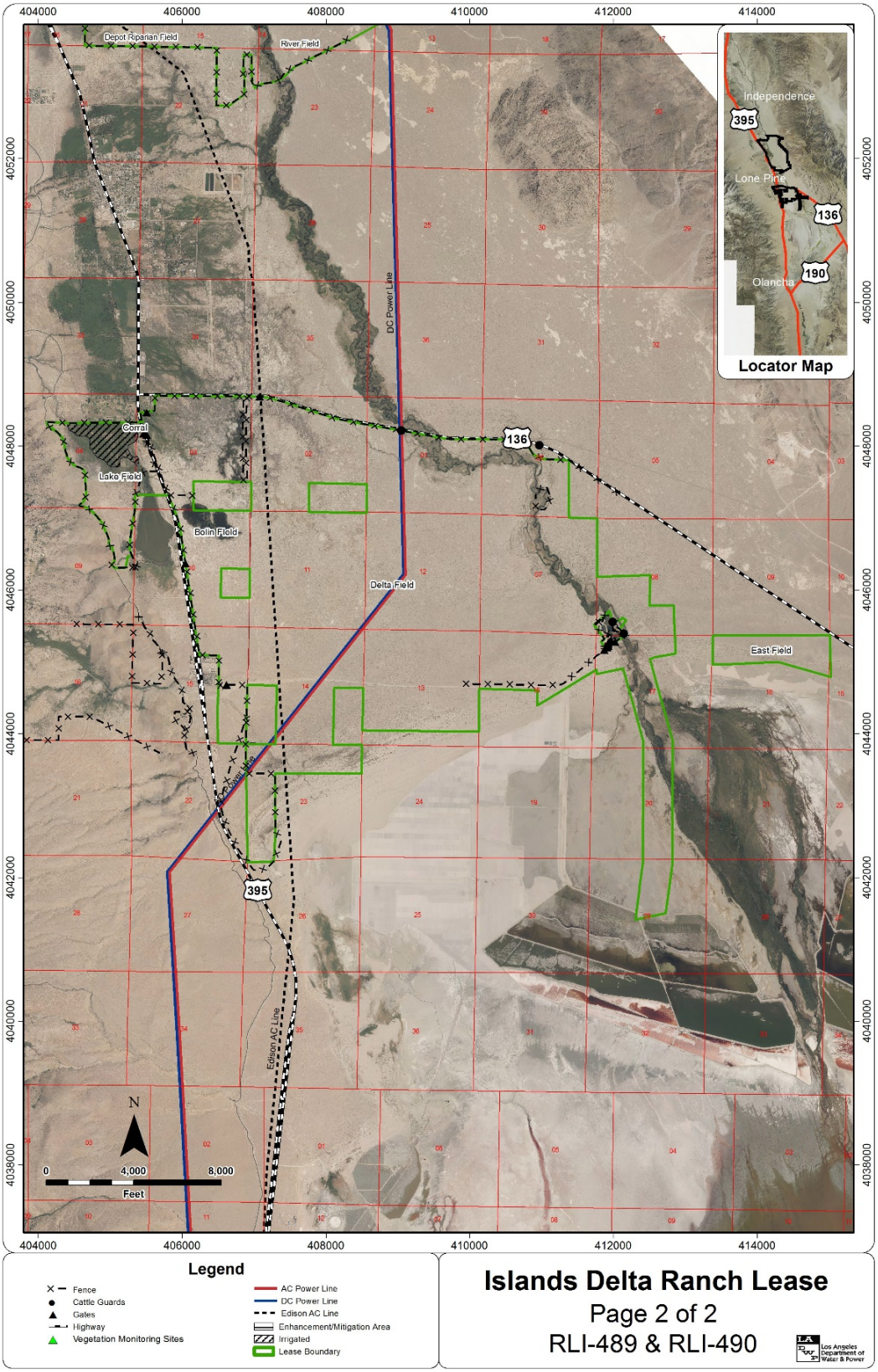
There was no new fence construction on the lease in 2020.

Salt and Supplement Sites

Supplement tubs containing protein and trace minerals are used in established supplement sites. Empty tubs are collected by the lessee.

Burning

No burns were conducted on the lease in 2020.



Land Management Figure 7. Islands and Delta Ranch Leases (Delta Portion)

3.6 Land Management Summary and Conclusion

Utilization

Utilization on all leases continues to meet the grazing management plan utilization standards.

The Islands lease will continue to operate below normal stocking rates due to riparian pastures being continually inundated. Past and current flow management has perpetuated this problem beyond the Islands lease and is now affecting portions of the Blackrock lease. Continued loss of meadow habitat and stressed woody species has increased on both Islands and Blackrock leases.

Range Trend

Range trend results point towards stable or upward trends in plant frequency of saltgrass and sacaton on moist floodplain sites. Despite the extremely dry spring and summer, the Islands and Thibaut sites appear to have held up well based on results from sampling in early August of 2020.

Irrigated Pastures

All irrigated pastures were evaluated in 2019. All pastures scored above 80% except Thibaut (72%). Evaluation in 2020 showed improvement to vegetation conditions due to reduced grazing pressure during the growing season. This allowed the pasture to reach the minimum pasture condition score of 80%.

Prescribed Fire

A successful prescribed burn in the South Winterton area occurred in late December 2019. The primary objective for this burn was to eliminate standing dead shrubs which would increase open water when the waterfowl subunit is flooded.

The Long Pond burn area continues to respond favorably to the spring 2019 prescribed fire. There is an obvious contrast between a shrub dominated meadow (outside of the burn area) to an herbaceous dominated plant community (inside the burn area). That being said, LADWP Watershed staff have observed a marked difference in rubber rabbitbrush mortality between the two units. Shrub mortality appears to be greater in the north burn unit. The north unit which was ignited in late February with some wind led to a hotter burn than the south unit which was burned later in the spring with little wind (mid-March). Visually, there were more standing stobs from burnt shrubs in the south unit which is indicative of a ‘cooler’ fire. In addition, mid growing season there was a noted higher frequency in resprouts of rabbitbrush in the south unit. These observations

should be factored into the decision matrix when deciding the best time to burn future areas.

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Land Management Appendix 1. End of Season Utilization by Lease and Pasture, 2007-2020

End of Season Utilization by Lease and Pasture, 2007-2020																
Lease Name	**Pasture Name**	**Transect Name**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Blackrock	Horse Holding	BLKROC_09	67%	13%	1%	36%	29%	31%	0%	0%	0%	0%	0%	0%	0%	4%
		HORSEHOLD_02		59%	37%	34%				0%					0%	0%
	Horse Holding Average		67%	36%	19%	35%	29%	31%	0%	0%	0%	0%	0%	0%	0%	4%
	Locust Field	BLKROC_06	68%	15%	14%	34%	13%	32%	32%	53%	18%	32%	0%	25%	0%	0%
	Locust Field Average		68%	15%	14%	34%	13%	32%	32%	53%	18%	32%	0%	25%	0%	0%
	North Riparian Field	BLKROC_12		67%	6%	16%										
		BLKROC_22	72%	36%	36%	43%	31%	10%		21%	20%	23%	20%	12%	9%	0%
	North Riparian Field Average		72%	51%	21%	29%	31%	10%		21%	20%	23%	20%	12%	9%	0%
	Reservation Field	BLKROC_02	69%	31%		36%		18%	35%	0%	17%	11%	30%	0%	0%	0%
		BLKROC_03	81%	44%	54%	46%	53%	27%	33%	12%	13%	13%	11%	3%	0%	6%
		BLKROC_44	72%	37%	49%	45%		28%	40%	22%	43%	10%	0%	0%	3%	0%
		BLKROC_49	41%	10%	12%	16%	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%
		BLKROC_51	80%	46%	48%	33%	41%	39%	44%	15%	30%	16%	12%	26%	0%	28%
		RESERVATION_06			29%	48%	23%	34%	30%	18%	15%	13%	30%	0%	2%	2%
	Reservation Field Average		68%	34%	38%	37%	29%	26%	30%	11%	20%	10%	14%	5%	1%	6%
	Robinson Field	BLKROC_04	76%	58%	14%	22%	8%	38%	24%		9%	1%	0%	0%	6%	
		ROBINSON_02		52%	15%	23%	4%	18%	25%			7%	0%	0%		3%
	Robinson Field Average		76%	55%	14%	23%	6%	28%	25%		9%	4%	0%	0%	6%	3%
	Russell Field	BLKROC_05	85%	43%	19%	48%	13%	24%	22%	2%	2%	13%	0%	13%	9%	3%
		RUSSELL_02		55%	12%	31%	0%	28%	31%	0%	1%	4%	0%	13%	0%	

End of Season Utilization by Lease and Pasture, 2007-2020																
Lease Name	**Pasture Name**	**Transect Name**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
	Russell Field Average		85%	49%	15%	39%	6%	26%	26%	1%	1%	8%	0%	13%	5%	3%
	South Riparian Field	BLKROC_13	45%	29%	28%	10%	31%			15%		0%	5%	23%		28%
		BLKROC_23	25%	8%	43%	20%	22%	8%			27%	0%	25%	7%	15%	32%
		SOUTHRIP_03		39%	5%	33%	19%			7%	12%	0%	7%			
		SOUTHRIP_04					20%			2%	5%		0%	5%		
	South Riparian Field Average		35%	25%	26%	21%	23%	8%		8%	15%	0%	9%	12%	15%	30%
	Springer Field	BLKROC_08	77%	43%						0%	5%	1%	0%	0%	1%	0%
	Springer Field Average		77%	43%						0%	5%	1%	0%	0%	1%	0%
	White Meadow Field	BLKROC_01	7%	2%	4%	4%	0%	9%	18%	0%		7%	0%	0%	0%	0%
		BLKROC_39	0%	4%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%		0%
		WHITEMEADOW_03		15%	37%	12%		29%	43%	0%	10%	19%		4%	2%	9%
		WHITEMEADOW_04		7%	0%	0%	0%	3%	0%	5%	0%	0%	0%	0%	0%	8%
		WHITEMEADOW_05		17%	52%	34%	36%	54%	32%	29%	0%	35%	0%	13%	4%	
	White Meadow Field Average		3%	9%	19%	10%	9%	19%	19%	7%	3%	12%	0%	3%	1%	4%
	White Meadow Riparian Field	BLKROC_11			75%	0%	68%	55%		16%	27%	26%	22%	5%	11%	10%
		BLKROC_14	87%	0%												
		BLKROC_26					45%			18%				31%		
		WMRIP_T2										0%	0%			
		WMRIP_T5						23%				11%	3%			

End of Season Utilization by Lease and Pasture, 2007-2020																
Lease Name	**Pasture Name**	**Transect Name**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
		WMRIP_T4						23%				44%		4%		
		WMRIP_T1						26%				12%	27%			
	White Meadow Riparian Field Average		87%	0%	75%	0%	57%	32%		17%	27%	19%	13%	13%	11%	10%
	Wrinkle Field	BLKROC_07	51%	28%	26%	40%		7%	28%	6%	7%	16%	0%	4%	0%	3%
		WRINKLE_03		37%	28%	48%	24%	34%	17%	35%	0%		0%	9%	7%	6%
	Wrinkle Field Average		51%	33%	27%	44%	24%	20%	22%	21%	3%	16%	0%	6%	3%	5%
	Wrinkle Riparian Field	BLKROC_18	30%	21%	43%	46%	48%				3%	10%	7%	10%		31%
		BLKROC_19	0%	10%	12%	26%	8%				10%	18%	0%	13%	11%	
		BLKROC_20	0%	11%	34%	53%	12%				28%	15%	13%	0%	13%	34%
		BLKROC_21	0%	9%	28%	38%	6%				15%	19%	0%	0%	12%	35%
	Wrinkle Riparian Field Average		8%	13%	29%	41%	18%				14%	16%	5%	6%	12%	34%
	West Field	WRINKLE_02				22%	38%	41%	36%	9%	39%	7%	0%	0%	0%	0%
	West Field Average					22%	38%	41%	36%	9%	39%	7%	0%	0%	0%	0%
Delta	Bolin Field	BOLIN_02							25%		5%			16%	0%	13%
		BOLIN_01						65%	27%	16%				0%	0%	50%
	Bolin Field Average							65%	26%	16%	5%			8%	0%	32%
	Main Delta	DELTA_01	58%	56%	59%	70%	38%	30%	19%	39%	35%	53%	9%	3%	26%	
		DELTA_02	61%	49%												
		DELTA_03	72%	60%	54%	71%	12%	45%	26%	50%	8%	59%	12%		18%	18%
		DELTA_04	83%	50%	55%	62%	33%	44%	38%	30%	11%	63%	15%	5%	31%	11%
		DELTA_05	50%	73%	54%	29%	50%	42%	40%	22%	60%	43%	24%	14%	0%	0%
		DELTA_06	26%	50%	35%	23%	42%	41%	26%	30%	66%	55%	36%		8%	12%
		DELTA_07	60%	65%	61%	49%	51%	58%	36%	49%	63%	20%	13%	21%	14%	13%

End of Season Utilization by Lease and Pasture, 2007-2020																
Lease Name	**Pasture Name**	**Transect Name**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
	Main Delta Average		58%	58%	53%	51%	38%	43%	31%	37%	41%	49%	18%	11%	16%	11%
	Dune Pasture	DELT_UP_01					0%							0%	0%	0%
	Dune Pasture Average						0%							0%	0%	0%
Intake	Intake	STUART_01				0%					0%	0%	0%	0%	0%	0%
	Intake Average					0%					0%	0%	0%	0%	0%	
Islands	Carasco Riparian Field South	ISLAND_06	28%	18%	11%			26%	21%		5%	41%	3%	0%		25%
	Carasco Riparian Field South Average		28%	18%	11%			26%	21%		5%	41%	3%	0%		25%
	Depot Riparian Field	ISLAND_08	72%	18%	12%	20%	0%	68%	27%	31%	23%	25%	16%	13%	5%	15%
		ISLAND_09	92%	40%	49%	49%	25%	67%	39%	91%	71%	48%	9%	40%	2%	50%
		RIVERFIELD_07				26%	29%	52%	47%	19%	60%	61%	24%	14%	10%	11%
		RIVERFIELD_09				9%	8%	9%		51%		15%	27%			
		RIVERFIELD_12				44%	41%	71%	58%	38%	63%	53%	1%	0%	30%	19%
	Depot Riparian Field Average		82%	29%	30%	30%	20%	53%	43%	46%	54%	41%	16%	17%	12%	24%
	Lubkin	LUBKIN_01	48%	0%	14%		0%	5%	6%	3%	16%	34%	33%	8%	0%	1%
	Lubkin Average		48%	0%	14%		0%	5%	6%	3%	16%	34%	33%	8%	0%	1%
	River Field - Islands	ISLAND_07	63%		46%	0%	0%		0%	0%						
		ISLAND_10	63%	16%	3%	28%	0%	40%	44%	0%	25%	40%	8%	22%	20%	27%
		ISLAND_11	0%	6%	22%		11%	6%	0%		7%	0%	0%	3%	1%	1%
		ISLAND_12			25%	0%	34%	31%	0%	41%	28%					

End of Season Utilization by Lease and Pasture, 2007-2020																
Lease Name	**Pasture Name**	**Transect Name**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
		RIVERFIELD_08			47%	3%	0%	71%	52%		34%	0%	5%		17%	10%
		RIVERFIELD_11				0%	58%	89%	0%		20%					
		RIVERFIELD_06				0%	0%	31%		0%	0%					
		ISLAND_14						81%	20%	48%	49%	67%	0%			
	River Field - Islands Average		42%	11%	27%	4%	15%	50%	17%	18%	23%	27%	3%	13%	12%	13%
	South Field	ISLAND_02	31%	15%	8%		23%	0%		0%		14%			0%	
		ISLAND_59	74%	47%	18%	0%				0%	0%	29%		0%	0%	0%
		SOUTHFIELD_02			3%	7%	24%	19%		0%	0%	36%		14%	0%	15%
	South Field Average		52%	31%	8%	3%	23%	10%		0%	0%	26%		7%	0%	8%
Lone Pine	Johnson Pasture	LONEPINE_05	44%	0%	34%	63%	14%	0%		79%	0%	21%	0%	10%	0%	7%
	Johnson Pasture Average		44%	0%	34%	63%	14%	0%		79%	0%	21%	0%	10%	0%	7%
	River Field - Lone Pine	LONEPINE_01	80%	45%	61%	49%	28%	22%		38%	42%	26%	26%	37%	39%	
		LONEPINE_02	79%	47%	48%	25%	30%	32%		30%		29%	24%	45%	29%	
		LONEPINE_03	81%	49%	70%	37%	52%	63%		64%	49%	45%	25%	28%	26%	6%
		LONEPINE_04	67%	55%	47%	32%	45%	45%		20%	40%	29%	26%	47%	20%	40%
		LONEPINE_06	78%	44%												13%
		LONEPINE_07		52%	51%	38%	8%	21%		0%	19%	25%	13%	20%	5%	33%
		LONEPINE_08						42%		52%	21%	24%	35%	49%		
	River Field - Lone Pine Average		77%	49%	55%	36%	32%	37%		34%	34%	30%	25%	38%	24%	23%
Twin Lakes	Drew Slough	BLKROC_37	40%	9%	0%	0%	0%	5%	15%		2%		5%	16%	3%	6%

End of Season Utilization by Lease and Pasture, 2007-2020																
Lease Name	**Pasture Name**	**Transect Name**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
		BLKROC_FIELD_04		10%		0%	0%		23%				7%	0%		
		TWINLAKES_02	16%	17%		0%	4%		0%	6%		0%	0%		0%	
		TWINLAKES_05	65%	23%												
	Drew Slough Average		40%	14%	0%	0%	1%	5%	13%	6%	2%	0%	4%	8%	1%	6%
	Lower Blackrock Riparian Field	BLKROC_RIP_07		61%	53%		34%	72%		14%	0%		0%	11%	0%	
		TWINLAKES_03	82%	28%	21%	6%	42%	36%				0%	14%		0%	24%
		TWINLAKES_04	85%													
		TWINLAKES_06														
	Lower Blackrock Riparian Field Average		89%	44%	37%	6%	38%	54%		14%	0%	0%	7%	11%	0%	24%
	Upper Blackrock Field	BLKROC_RIP_05			52%	21%	25%	51%		9%	0%	10%	3%	2%	26%	
		BLKROC_RIP_06			53%	19%	29%	74%		10%		0%		56%		5%
		BLKROC_RIP_08		41%	42%	17%	18%	70%		50%		69%	27%	61%	66%	18%
		INTAKE_01	45%		25%	13%	30%	49%		10%	12%	2%	9%	4%	0%	3%
		BLKROC_RIP_09									43%					
	Upper Blackrock Field Average		45%	41%	43%	17%	26%	61%		20%	18%	20%	13%	31%	31%	9%

End of Season Utilization by Lease and Pasture, 2007-2020																
Lease Name	**Pasture Name**	**Transect Name**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Thibaut	Rare Plant Management Area	RAREPLANT_02	76%		77%	0%					0%		16%	22%	0%	16%
		RAREPLANT_03	98%		58%	7%		45%	4%		8%	15%				
		THIBAUT_02	88%		49%	0%		34%	36%	29%	13%	34%	11%	7%	0%	
	Rare Plant Management Area Average		87%		61%	2%		39%	20%	29%	7%	25%	14%	14%	0%	16%
	Thibaut Field	THIBAUT_03	89%	65%	36%	65%	74%	15%	20%	40%	6%	56%	78%	16%	3%	9%
		THIBAUT_08		15%	8%	4%	0%	14%	0%	0%	1%	7%	2%	0%	8%	
		THIBAUT_09		3%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
		THIBAUTFIELD_02	81%	64%	62%	31%	76%	30%	0%	22%		44%			0%	
		THIBAUTFIELD_03			13%	3%	0%		5%	0%		2%	0%		0%	
		THIBAUTFIELD_04			6%	0%	0%	0%	0%	0%		7%	0%		0%	
	Thibaut Field Average		85%	37%	22%	17%	25%	12%	4%	10%	2%	19%	16%	8%	1%	9%
	Waterfowl Management Area	THIBAUT_01	80%			3%				50%	40%	3%	9%	0%	1%	31%
		WATERFOWL_02	15%			40%	30%			56%	30%	16%	8%			
		WATERFOWL_03				21%	33%			33%	25%	4%		7%	0%	
		WATERFOWL_04	57%			11%	51%									
		WATERFOWL_05	77%				39%									

End of Season Utilization by Lease and Pasture, 2007-2020																
Lease Name	**Pasture Name**	**Transect Name**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
	Waterfowl Management Area Average		57%			19%	38%			46%	32%	8%	8%	3%	1%	31%

Land Management Appendix 2. LORP Irrigated Pasture Condition Scores, 2011-2020

X = Pasture not rated

LORP Irrigated Pasture Condition Scores, 2011-2020											
Lease	**Pasture**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Thibaut											
	Thibaut Field	82	81	78	X	X	80	X	X	72	80
Islands											
	B Pasture	X	90	90	X	X	88	X	X	86	X
	D Pasture	X	90	90	X	X	88	X	X	86	X
Delta											
	Lake Field	X	X	74	X	X	88	X	X	86	X
Lone Pine											
	Edwards	X	X	84	X	X	84	X	X	80	X
	Richards	X	X	84	X	X	84	X	X	92	X
	Van Norman	X	X	84	X	X	84	X	X	84	X
	Old Place	X	X	84	X	X	76	86	X	96	X
	Smith	X	X	84	X	X	84	X	X	94	X
	Miller	X	X	86	X	X	84	X	X	90	X

4.0 LORP TAMARISK TREATMENT

Tamarisk (*Tamarix ramosissima*), also known as saltcedar, is a non-native invasive plant that spreads rapidly in the Owens Valley where conditions are favorable for its establishment. It was introduced into the United States in the early 1800s as a windbreak and ornamental. Since that time, it has invaded most major drainage systems in the southwest, including the Owens Valley. It colonizes moist areas that have been disturbed by land clearing, grading, or other disturbances that removes native plants. Once established, tamarisk is a very hardy plant that can withstand adverse soil and weather conditions. It displaces native plants as it grows in size and reproduces, creating dense stands of tall shrubs. Tamarisk is undesirable because it threatens native plant communities and the associated wildlife. (LORP EIR 10.4.1.4)

Starting in 1997 the Inyo County Water Department administered the Saltcedar Control Program for treatment on City of Los Angeles lands in the Owens Valley. The program was funded by LADWP under the Inyo-Los Angeles Water Agreement and was supplemented with grant funding. Additionally, LADWP provided funds to Inyo County as required the 2004 Stipulation and Order, the LORP EIR, and LORP Post Implementation Funding Agreement for tamarisk treatment in the LORP. In 2017, with the retirement of the Inyo County Saltcedar Program Manager and cessation of a Wildlife Conservation Board grant in 2016, Inyo County largely suspended their tamarisk program. In October 2017, LADWP initiated a tamarisk control program to manage tamarisk on City property including the LORP. In fall of 2019 Inyo County Water Department created a Water Agreement funded part-time position to assist LADWP in saltcedar control. Addition of this position created a synergistic relationship between Inyo and LA regarding saltcedar control which in part resulted in the treatment of approximately 1,144 acres of saltcedar during the 2019-2020 season. This Inyo/LA saltcedar partnership is planned to continue through 2020-2021.

During the 2019-2020 tamarisk treatment season, LADWP treated 1,144 acres in the LORP area (Saltcedar Figure 1), including:

- Lower Owens River immediately east of treated spreading basins (355 treated acres).
- Spreading basins south of Blackrock Ditch (789 treated acres).

The 2019-2020 control efforts consisted of cut stump treatment of larger diameter trees using a skid steer mounted turbo saw attachment (Saltcedar Figure 2), mowing of smaller diameter trees including saplings and seedlings, and hand cutting using chainsaws and pruners. Garlon 4-Ultra herbicide was applied to cut stumps using the turbo saw attachment, spray equipment mounted on side by side utility vehicles, and

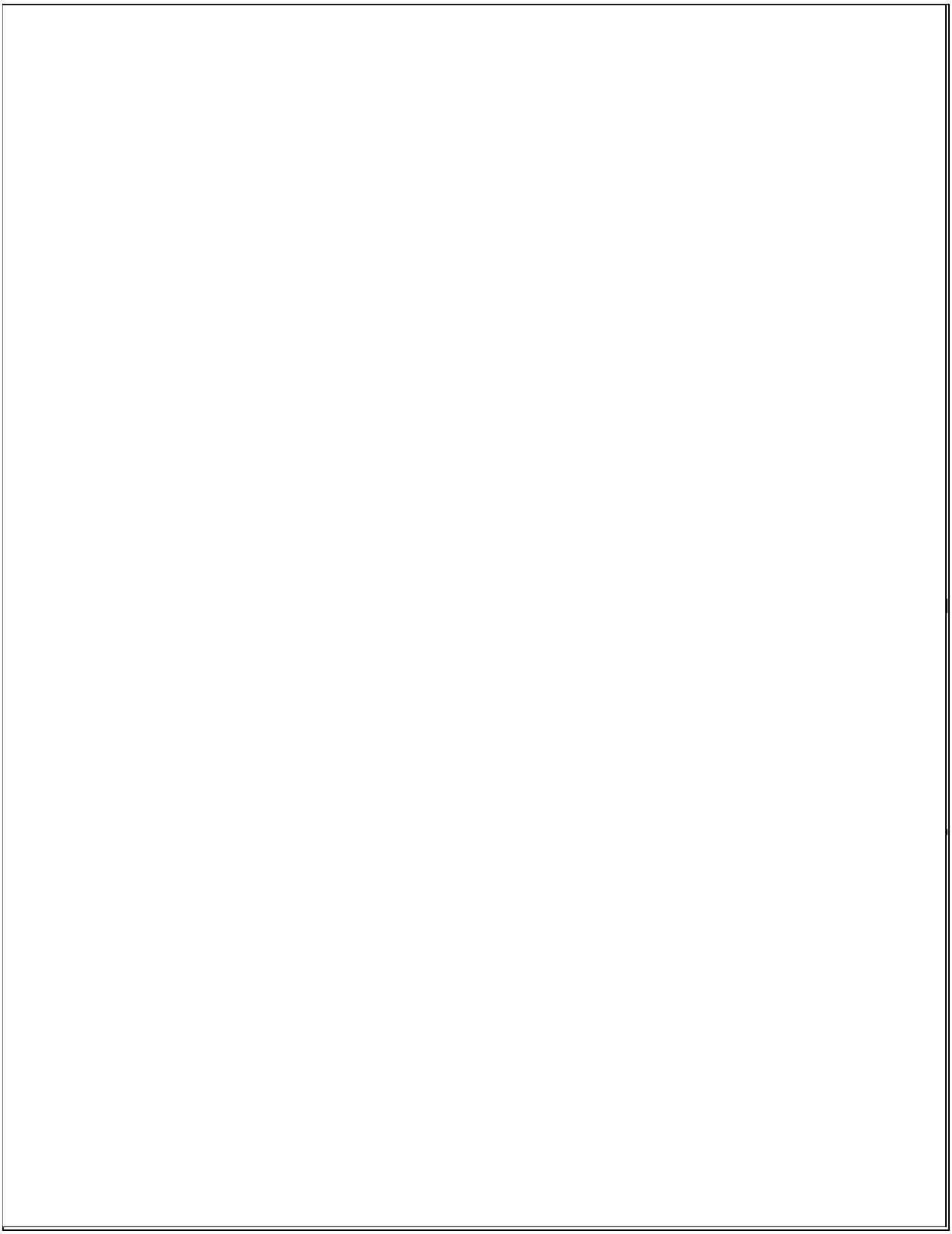
backpack sprayers. California Department of Correction crews assisted with hand treatment efforts in areas where mechanized equipment could not effectively work such as along ditch banks.

A skid steer mounted grapple rake attachment (Saltcedar Figure 3) was utilized to gather and consolidate substantial volumes of slash into piles for burning. Approximately 200 piles measuring 10 ft. in diameter and 6 ft. tall were stacked in locations to be burned by Cal Fire. A Cal Fire Vegetation Management Plan (VMP) will be utilized to permit and coordinate burning activities. Pile burning is planned for the winter of 2021-2022.

The Tamarisk leaf beetle (*Diorhabda spp*.), a natural insect herbivore of tamarisk leaves that has been used for tamarisk control along many southwest riparian corridors, appears to have become established within the LORP area (per LADWP Watershed Resources Staff). However, the long-term effect of the beetle on LORP tamarisk populations is unknown. The landscape-level control of tamarisk through this biocontrol agent is a worthwhile area of study and/or monitoring. Biological control of tamarisk through sustained colonization could reduce the amount of resources currently allocated to mechanical control. Staff are currently monitoring the effects of the beetle at various locations. See section 6.0 for discussion.

Tamarisk will continue to be treated within LADWP spreading grounds from October 15, 2020 through March 31, 2021 using methods described above or similar. Treated acres are expected to be similar during the 2020-2021 tamarisk control season.

LADWP has been tracking saltcedar recruitment that may have resulted from water spreading during high runoff in 2017 and 2019 and has prioritized saltcedar treatment in these areas. Priority sites for the upcoming season include in and around the McNally Canals, Laws spreading basins, LORP river banks, and Blackrock spreading areas.



Saltcedar Figure 1. 2019-2020 Tamarisk treatment areas

Saltcedar Figure 2. Turbosaw attachment used to cut larger diameter tamarisk trees and apply herbicide to the cut stumps

Saltcedar Figure 3. Grapple rake used to collect and consolidate tamarisk slash

5.0 LORP WEED REPORT

5.1 Inyo and LADWP Activities

5.1.1 LADWP Weed Treatment

Broadleaved perennial pepperweed (*Lepidium latifolium*) (Weed Figure 1) was the primary species of concern for weed treatment in the LORP by LADWP personnel in 2020. A total of 4,207 acres within the LORP project boundaries were canvased in the search for pepperweed (Weed Figures 2a and 2b). All pepperweed populations were herbicide treated using broadcast applications from a spray truck, spray equipment mounted on side by side utility vehicles, or backpack sprayers.

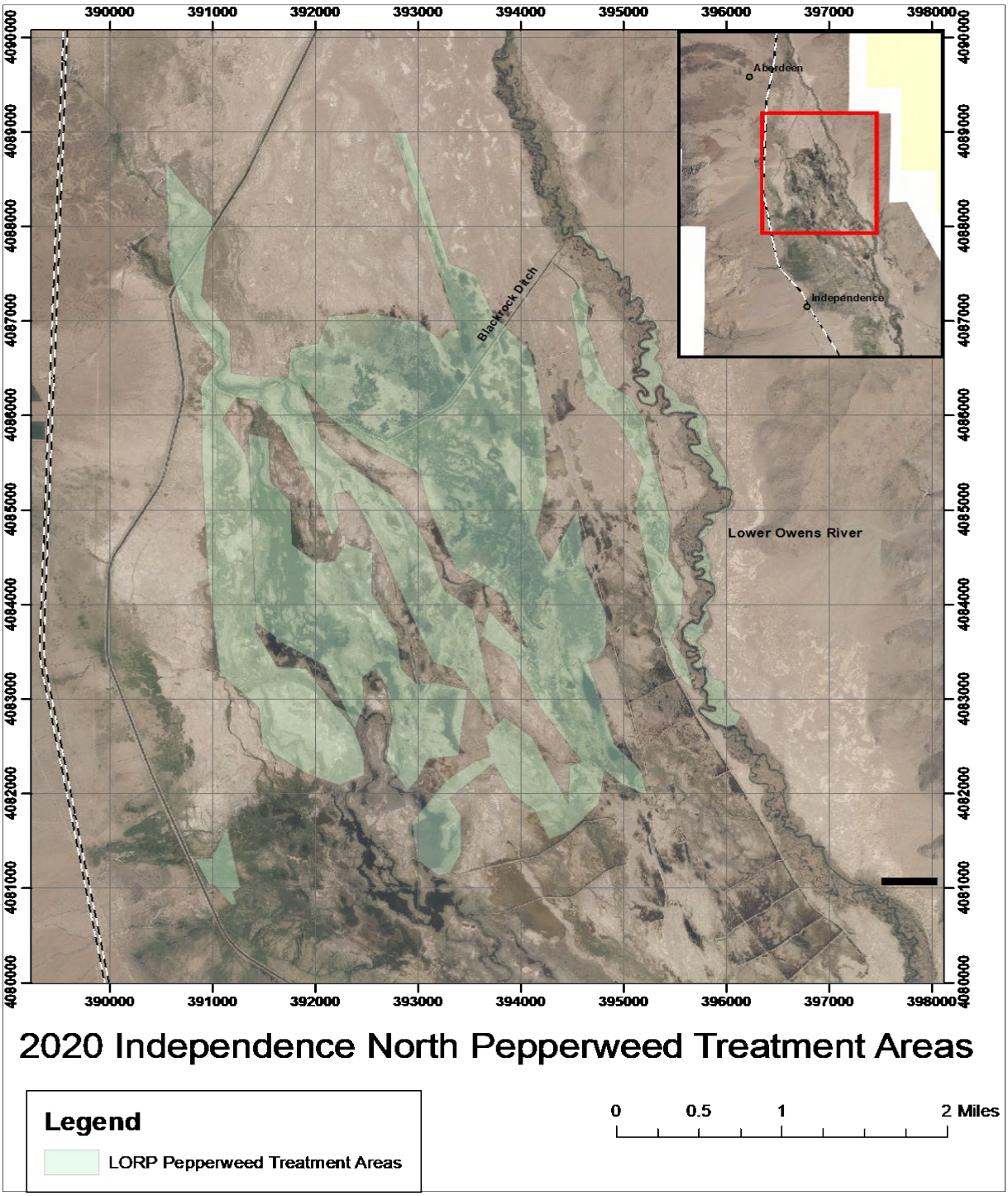
Pepperweed typically flourishes and displaces native vegetation in irrigated meadows and around the wetted extent of irrigation ditches, creeks, sloughs, rivers, water spreading basins, and some alkali meadows. On occasion pepperweed is found to exist, although in lower densities, in drier upland shrub communities. In areas occupied by cattle, LADWP personnel have noted persistent grazing of younger pepperweed plants has reduced larger stands from developing, thus reducing seed production capabilities. To capitalize on this observation modified grazing strategies and targeted mowing will be integrated with future strategic herbicide applications.

During the 2020 season typical herbicide applications consisted of spraying plants in various growth stages with a broadleaf selective herbicide with an ATV mounted spray system (Weed Figure 3).

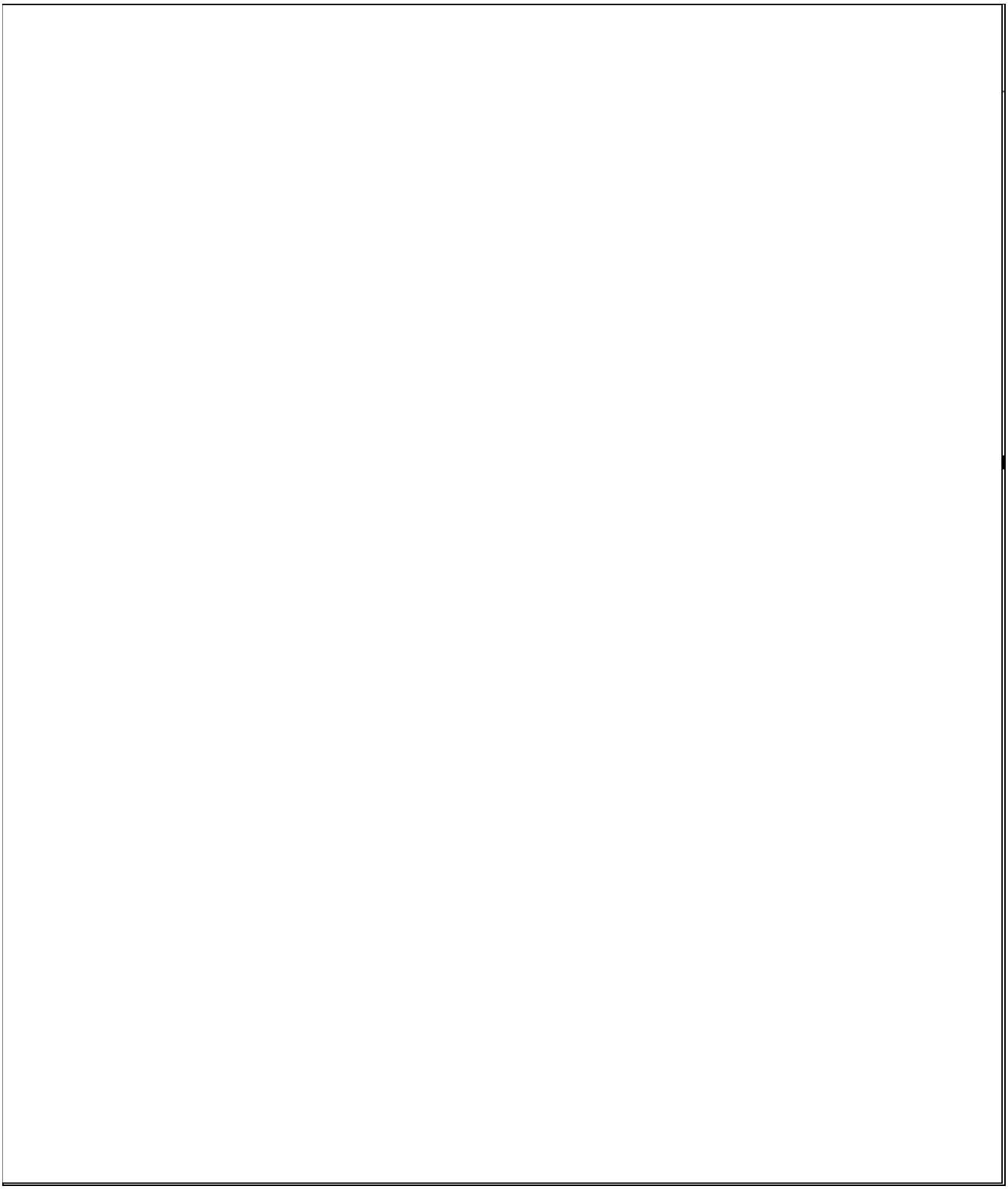
To gain control over observed increases in pepperweed along the Owens River banks and flood plain LADWP weed eradication crews spent two weeks in early summer targeting dense populations along the eastern side of the river north of Independence (Weed Figures 2a and 2b). This effort was coordinated with the Inyo County Agricultural Commissioner’s Office with LADWP crews treating this area in late spring and Commissioner’s crews retreating in late summer.

In the Winterton Blackrock Waterfowl Area, LADWP personnel treated pepperweed in the spring and again in late summer of 2020. Water drawdown in this area created moist bare ground favorable to pepperweed colonization in 2019. To control these new recruits from becoming established crews spent four weeks in the spring strategically targeting the young plants. Crews reentered in late summer for one more week to ensure effective treatment and found their efforts largely successful as locating and treating individuals during the second go around proved more tedious. This area will continue as a treatment priority in 2021.

Weed Figure 1. Pepperweed (late season with seed)



Weed Figure 2a. Weed treatment areas LORP 2020



Weed Figure 2b. Weed treatment areas LORP

Weed Figure 3. Utility terrain vehicle with mounted herbicide spray system

5.1.2 Inyo County Rapid Assessment Survey

Inyo staff began the Rapid Assessment Survey (RAS), field data collection, on August 3, 2020. The effort concluded on August 6.

The RAS began like previous years with a training day that included a Power Point presentation describing what the RAS is, what we look for, and how we record data. This year due to Coronavirus Disease (COVID-19) restrictions on group meetings, the Power Point was a 'Paper Point' that is a printed version, and we went through the presentation with proper social distancing procedures outside on benches behind the Court House. This year's RAS was reduced in scope and only surveyed for perennial pepperweed, tamarisk, and beaver activity. With the limited scope we were able to finish the training presentation in the morning and spent the rest of the day at the river looking for examples of these impacts. The field staff was familiar with pepperweed and tamarisk, and we discovered some signs of beaver activity during training.

Field staff used the ARC Collector application on iPhones to collect data. The staff was familiar with collector as they used it for vegetation Line Point transects the prior two months.

Due to the scaled back RAS, we concentrated on pepperweed hot-spots identified in previous years. This area is from the LA Aqueduct intake to just south of Two Culverts (approx. river mile 0.0 to 19.3), and Manzanar Reward Road to the Islands (approx. river-mile 27.7 to 37.1). These areas were chosen because in recent past surveys, pepperweed was not found below Goose Lake Return (river-mile 12.3) with the exception of one site discovered just below Two Culverts near rm 16.4. In the lower or southern section along the river, pepperweed is found just below Manzanar Reward Road near river-mile 27.7 and extends to the Lacey-George Exclosure around river-mile 31.7. Pepperweed is found on both sides of the river. In the previous year, the infestations were just found on the east side and just down to the Exclosure.

In addition to the previous year's discoveries, this year we located pepperweed on the west side of the river at 15 new locations, and many new populations were found on the east side from Manzanar Reward Road to the Lacey-George Exclosure. We also found pepperweed further down on the east side that extended into the northeast corner of the Islands down to about river-mile 35.0, which is the middle of the Islands on the east side. This is concerning in that pepperweed has not previously been found south of the Lacey-George Exclosure, or near the Islands. Infestation here would be difficult to control due to wildlife movement and lack of access in the islands.

Tamarisk is ubiquitous along much of the LORP and it was found regularly in both sections of the river that were surveyed in 2020. Most observations were of recent establishment; seedlings, 1-3 years old. These populations appear to have established as a result of the previous three years (2017-2019) high river stage and associated bank and floodplain wetting.

There were three BEA (beaver activity) locations found all in the upper or northern section surveyed.

5.2 Inyo/Mono Counties Agricultural Commissioner's Office Weed Report

Introduction:

The Inyo and Mono Counties Agricultural Commissioner's Office (CAC) manages certain invasive weed infestations within the LORP project area in conjunction with the City of Los Angeles Department of Water and Power (LADWP), and in coordination with the Inyo County Water Department. Funds from all three agencies are used to support the effort.

Target weeds for CAC management and control include California Department of Food and Agriculture (CDFA) designated noxious weeds with a significant focus on *Lepidium latifolium* (perennial pepperweed). Management of *Lepidium* in the LORP is accomplished both by efforts to control and eradicate known weed populations in the area as well as monitoring for pioneer populations. This program is managed to prevent the widespread establishment of invasive weed populations throughout the 78,000 acre LORP area.

While eradication of all known weed populations in the LORP is the long-term goal of the program, new populations will continue to establish so long as a source of seed and root fragments entering the area, especially on sites where disturbance occurs. Thus, the detection component of the program is critical to the protection of the LORP's newly developing habitat--early detection is critical to limit the spread of weeds. It is far less costly to find and treat newly established infestations then to do so once establish.

In the LORP, operations and maintenance activities, flooding, wildlife activity and cattle grazing, off road vehicles and other recreational uses all create disturbances and can carry and spread weeds. A significant source of weed contamination comes from outside the LORP boundary. The middle Owens River from the Pleasant Valley Dam to the LORP Intake contains large established populations of *Lepidium* that can be mobilized to contaminate the Lower Owens River and LORP area. To limit spread, CAC now treats areas of extensive *Lepidium* populations from Pleasant Valley to Warm Springs Road as grant funding permits, and LADWP is managing invasive weeds on city owned lands including along the Owens River from Warm Springs Road to the LORP intake.

Protecting native habitat is the paramount goal of controlling weeds and maintaining a healthy native plant habitat that will support wildlife (including some threatened and endangered species), help reduce stream bank erosion, control dust, maintain healthy fire regimes, preserve the viability of open-space agriculture, and enhance recreational experiences.

Summary of LORP Weed Management Activities in 2019 and Comparison with Previous Years' Activities

In 2020, the CAC was staffed with a Field Operations Supervisor, two seasonal field assistants, and one AmeriCorp member. CAC staff began surveillance activities in early April and treatment in May. A total of 8.93 net acres were treated this season. Treated

means some sort of intervention (chemical or mechanical) has been applied to a weed population. Net acreage treated can be calculated by physically measuring the treated area or by calculating the amount of dilute herbicide applied by calibrated spray equipment—chemical use provides a rough proxy for population density. The CAC does not have sufficient personnel to conduct ground surveys to measure physical area where chemical treatment occurs.

AmeriCorp is a federally subsidized program broadly intended to help connect people looking for service projects and job opportunities with state or nonprofit organizations. In 2020, the CAC participated in the AmeriCorp program ran by the Sierra Nevada Alliance whose specific goal is to connect early career individuals with environmental management job opportunities in the Sierra Nevada Mountains. Participating in this program allowed the CAC to hire one more person to help with fieldwork than would have been feasible with our current budget.

Challenges

This was the first season in two years where there was below average annual runoff which that more area was exposed and treatable than has been in the preceding two seasons. As of the last 8 years, there has been an inverse correlation between seasonal water runoff and acreage treated (Chart 1). This relationship demonstrates the effect water levels have on our ability to access and treat area in or near the river channel. In high seasonal water runoff years CAC crews cannot physically access *Lepidium* populations and if the populations are accessible them they cannot apply herbicide to plants in standing water or overly wet soil. In high seasonal water runoff years, this artificially lowers treatment acreage and provides time for inaccessible *Lepidium* populations to recover. The result in a following low seasonal water runoff year is that acreage treatment appears to increase.

Geographic Distribution

Comparing 2019 to 2020, the distribution of *Lepidium* along the Lower Owens River appeared not to expand; however the area surveyed was focused on populations discovered in 2019, including twelve miles downriver of the LAA intake and five miles downstream from Manzanar Reward Road.

In 2018, newly observed infestations were discovered along the Owens River from the LORP Intake to the southern boundary of the Twin Lakes Ranch Lease (river mile 7.8) for a total of 4.18 net acres. In 2019 that same area required only 1.0 acre of treatment; that is a reduction of 76% in that section alone. In 2020, the total treated area was 5.72 acres which is a 37% increase over 2018 and a 472% increase from 2019.

The section from Manzanar Reward Road (river mile 27.8) to the southern boundary of the Blackrock Ranch Lease (river mile 31.7) decreased in net acres treated from 2019 to 2020; 1.37 net acres were treated in 2019 and 0.53 net acres were treated in 2020.

In the 2019 RAS pioneer populations were discovered from the Reinhackle Gauge (river mile 33.6) to the Owens Dry Lake (river mile 57.6). Total acreage treated was 0.11 acres, indicating small and dispersed populations.

Although a few new pioneer populations were observed within a few miles downstream of previously infested areas, no sites were found from Mazourka Canyon Road (river mile 20.7) to Manzanar Reward Road (river mile 27.8). This section remains free of *Lepidium*.

Treatment Challenges

In May 2020 the CAC began treatment activities of all known *Lepidium* sites and new populations discovered during the 2019 season. Low-volume, directed spot treatments using the selective herbicide Telar XP were employed. Applications were made from all-terrain vehicles where terrain allowed and from backpack sprayers in more challenging terrain. Care was taken to minimize damage to native plant communities within the LORP.

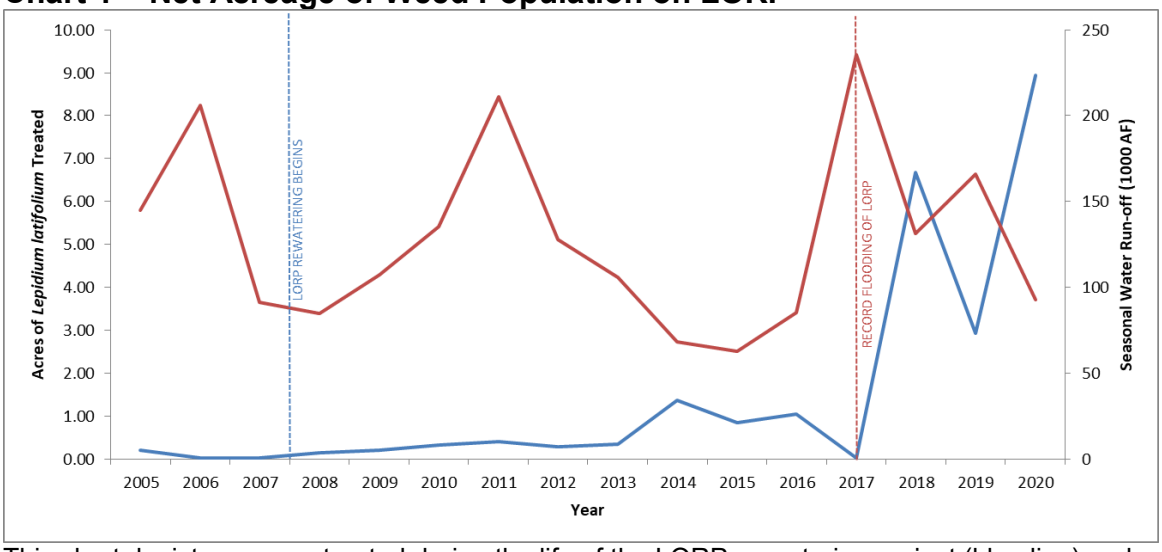
Rapid Assessment Survey (RAS) data provided by ICWD was received by the CAC in late July and early August 2019. This was the RAS data used in the 2020 field season.

The total net *Lepidium* acreage treated in 2020 was 8.93 acres. This represents a 200% increase from the total 2.99 net acres treated in 2019. 6.73 net acres were treated along the Owens River channel. 2.8 net acres in the Drew management Unit, 0.72 net acres in the Thibaut management unit, and 1.08 net acres in the Winterton Management Unit of the Blackrock Wildfowl Management Area were treated. Chart 1 depicts the net weed acreage trend from 2005 to 2020.

No *Lepidium* populations in the LORP have been fully eradicated in recent years. Eradicated means there have been 5 consecutive years of survey and no plants have been detected. Eradication is a goal, but given available resources, the focus of the CAC's effort is on treating to gain control and prevent the geographic spread of weeds.

The most significant management difficulty continues to be maintaining adequate staffing for effective management of such a large project. The 2020 permanent and seasonal CAC staff assigned to the project are shared between the LORP project and several other weed management projects. If additional funding could be acquired, the dedication of seasonal staff to work solely within the LORP project area would be preferred in future years, allowing greater focus and progress on the project.

Chart 1 – Net Acreage of Weed Population on LORP



This chart depicts acreage treated during the life of the LORP re-watering project (blue line) and seasonal Water Run-off for the Owens River measured at the Long Valley Dam as reported by the California Department of Water Resources *(red line).

*source: http://cdec.water.ca.gov/reportapp/javareports?name=FLOWOUT

6.0 2020 LORP ADAPTIVE MANAGEMENT ACTIONS

The LORP was implemented in 2006 by LADWP and is presently managed jointly by LADWP and Inyo County (County). Nearing the end of the LORP's prescribed 15-year monitoring program, LADWP and the County conducted a comprehensive evaluation of the project in 2019 to assess its status with respect to the goals and requirements defined by the guiding legal documents. Through this evaluation, a series of adaptive management actions were identified and are being pursued. During the 2020-2021 fiscal year, LADWP and the County are working on the following:

- Implementation of a five-year interim flow regime in the Delta Habitat Area and related monitoring,
- Development of a Blackrock Waterfowl Management Area Interim Management and Monitoring Plan (BWMA Plan),
- Revision of Indicator Species & Avian Habitat Models
- Conducting a tamarisk beetle study,
- Conducting a tree recruitment assessment,
- Conducting migratory bird surveys on river, and
- Conducting a noxious species survey and treatment.

Information about each of these items is summarized below. Results from these efforts will be summarized in subsequent LORP Annual Reports.

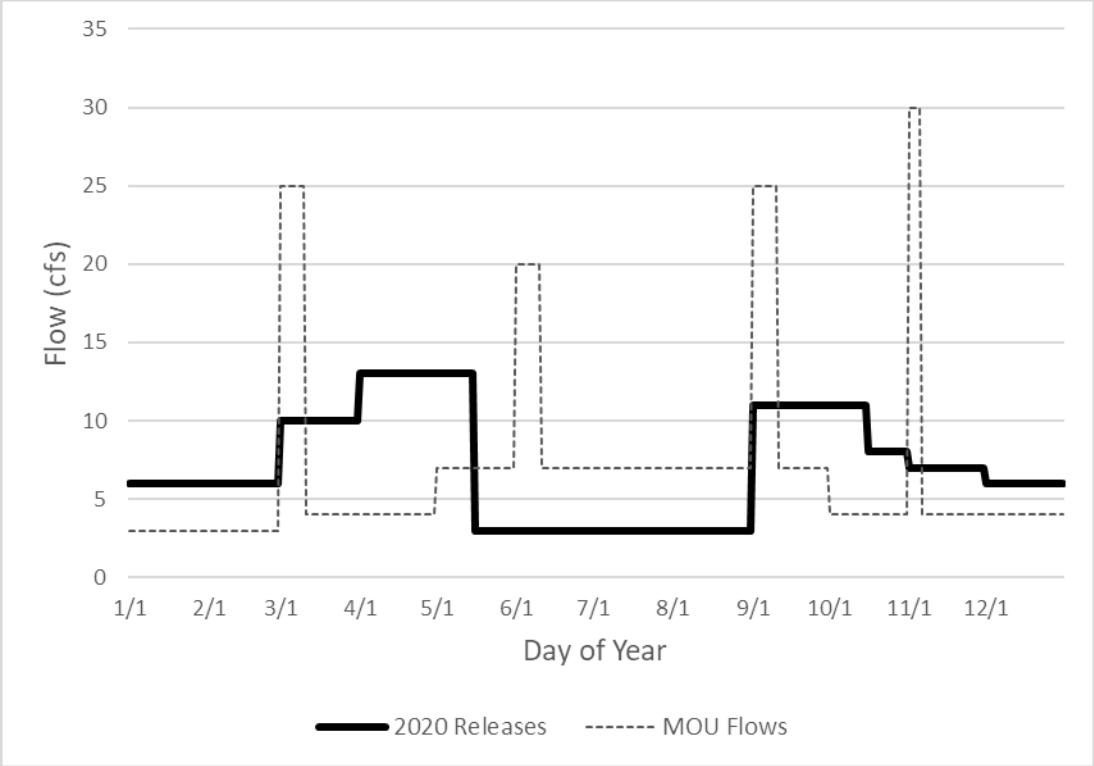
6.1 Delta Habitat Area Revised Interim Flow Regime and Related Monitoring

As recommended in the 2019 LORP Evaluation Report, LADWP implemented a revised interim flow regime in April 2020 which is intended to further improve habitat conditions for migratory waterfowl and shorebirds. As designed, it will maintain required minimum baseflows during the growing season and redistribute summer and winter pulse flows to fall and spring in order to maximize open water during migratory periods. This will also promote a shift in the vegetation community to more desirable species. In fiscal year 2020-2021, LADWP and the County are conducting avian surveys, photo point monitoring and an assessment of flooding. Landtype mapping will be completed at the beginning and end of the interim flow study period to evaluate longer term changes in the vegetation community.

There are two important differences between the original flow releases and the adaptive management releases (Adaptive Management Figure 1). The first is that summer releases were decreased to a minimum flow in order to induce hydrological stress on marsh vegetation. This was done to limit the further expansion of marsh and

subsequent decrease in open water and meadow habitats due to conversion. The second difference in flow is a lengthening and flattening of seasonal pulse flow releases. This was done to extend the period of flooding to better match seasonal migratory patterns of habitat indicator species.

The adaptive management flows to the DHA were initiated April 1, 2020.



Adaptive Management Figure 1. 2020 Adaptive Management Water Release to Delta Habitat Area vs. MOU flows

Monitoring

Avian Surveys

Avian monitoring was conducted in 2020 following previously established protocols. As proposed in the 2019 LORP Evaluation Report, surveys were not conducted between mid-May and August 31 during the summer drying period of minimum flows. The new survey protocol eliminates the two surveys conducted in June, and the two early fall surveys in August. The 10 surveys scheduled for 2020-2021 fiscal year will prioritize monitoring during times of the year when flows are being targeted to enhance waterbird habitat. These surveys will be conducted at comparable time periods as all previous surveys in order to allow comparison with prior data. The survey schedule for the 2020-2021 fiscal year includes four fall period surveys between September 1 and October 31,

two winter period surveys between November 1 and February 28, and four spring surveys between March 1 and May 15.

Photo Monitoring
Once each season, photos are being taken at each bird monitoring station in order to document general habitat conditions. Four photos are taken facing each cardinal direction, using true north.

Effectiveness of Adaptive Management Flows
The extent of flooding will be assessed seasonally for a total of four times a year to assess winter, spring, summer and fall conditions. Field conditions and extent of flooding will also be noted during avian surveys. Remote sensing, photos, and aerial imagery may be used to evaluate seasonal flooding in the DHA from adaptive management flows.

Landtype Mapping
Landtypes will be mapped during the 2020-2021 fiscal year using imagery captured in 2020.

6.2 Blackrock Waterfowl Management Area Interim Management and Monitoring Plan (BWMA Plan)

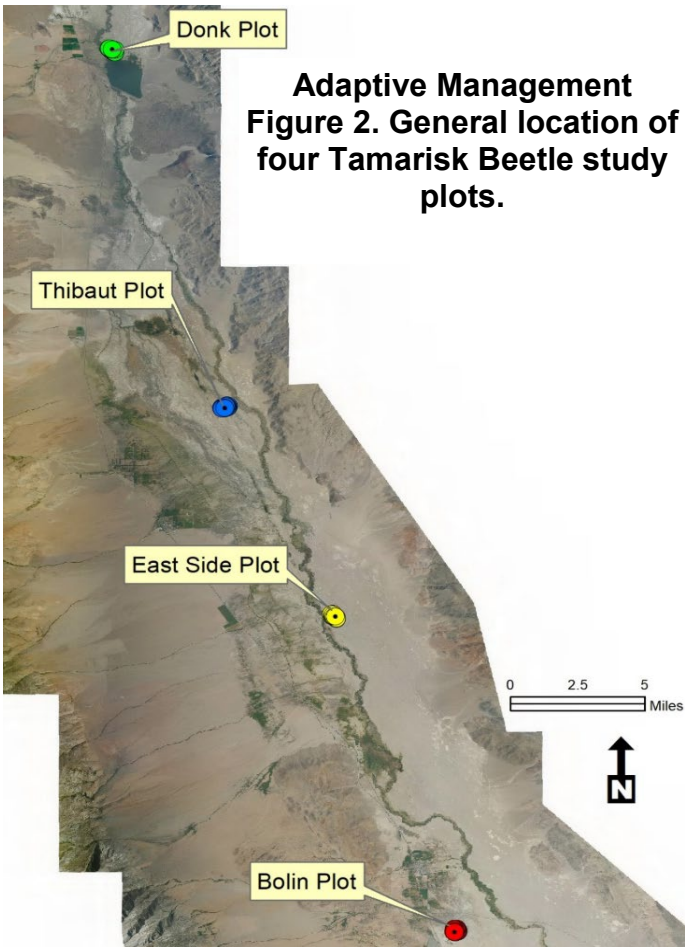
LADWP and the County are working to develop a five-year interim plan to further improve habitat conditions in the BWMA that will incorporate a seasonal flooding regime of the waterfowl units rather than year round flooding required by the guiding documents. This plan is under development for possible implementation in 2021.

6.3 Revision of Indicator Species & Avian Habitat Models

The County and LADWP will conduct a focal species analysis to evaluate avian community response to restoration and develop a habitat relationship model using existing data to replace the use of CWHR as a habitat model for the LORP. The new model will be used for predictive habitat suitability mapping of focal species in the LORP.

6.4 Tamarisk Beetle Study

LADWP is conducting a study to track the spread of the tamarisk beetle (*Diorhabda carinulata*) and document its effectiveness in controlling saltcedar in the LORP area. A summary of the study and findings to date are provided below.



Adaptive Management Figure 2. General location of four Tamarisk Beetle study plots.

The Northern tamarisk beetle was originally released west of Tinemaha in 1999. This was the only site where *D. carinulata* was successfully established in California. The leaf beetle never went beyond 2km from its original release location (Pratt et al. 2019). The population was not successful because of the shorter daylengths found at the 37 parallel and latitudes further south (Dudley, 2005).

Eighteen years later, in 2017, *D. carinulata* were observed in the LORP below Manzanar Reward Road on the east side of the Lower Owens River (LADWP and County of Inyo 2017). It is not known if this population are descendants of the 1999 Tinemaha release or have arrived from another area. Once thought to only spread at a rate of 2 km/year, *Diorhabda* sp. are now spreading upwards of 24 km-50 km/year across the western U.S. (Jamison and van Riper C., III 2018; Carruthers et al. 2008). During the testing period at Tinemaha (Dudley, 2005) and immediately following the first release in 2003 in the Humboldt River basin in northern Nevada, it was thought the Northern tamarisk beetle would be restricted to north of the 38 parallel because of the shorter cumulative daylength further south which prematurely induced diapause. However, *D. carinulata* has evolved since its release in 1999. It has prolonged diapause, extending its active period resulting in increased metabolic reserves that assist with overwintering. The extended active period increases time for reproduction and an associated rise in population. These adaptations have permitted *D. carinulata* to establish further south than what was once thought possible (Bean 2012).

Methods

During the spring of 2020, LADWP and ICWD agreed to establish four sampling plots (Adaptive Management Figure 2) dispersed across the LORP with the objective to follow *D. carinulata* herbivory impacts to salt cedar communities. To do this, LADWP staff adopted the Tamarisk Impact Monitoring Protocol, a quick sampling method which is widely used throughout the southwestern United States (Tamarisk Coalition 2013) to track *Diorhabda* sp. impacts on saltcedar over time.

Four plots containing salt cedar were established in May of 2020. Plots were selected based on tree densities and their locations in relation to the upper, middle, and lower sections of the LORP project area. The Donk plot, located outside of the LORP boundary, was chosen because the site represented one of the largest saltcedar stands in the valley, was inside the original 1999 release zone and was proximally located in relationship to other saltcedar communities in the northern portion of the Owens Valley.

Plot Locations and Description

Moving from north to south, the Donk Plot (named after the nearby Donkey Spring) was established on the northeast side of Tinemaha. The salt cedar community was established in response to the rising and falling of Tinemaha reservoir levels.

The Thibaut Plot is situated 0.7 miles south of Goose Lake return and two miles north of Twin Culverts in a spreading basin east of the transmission line. It is estimated that this stand established around 1969 when LADWP was spreading excess snowmelt runoff. The spreading basin was again flooded in 2017 which resulted in the establishment of a new stand of saplings. The older aged trees in this basin were cut approximately 8-9 years ago by the ICWD Saltcedar program. However, since then the majority of them have re-sprouted.

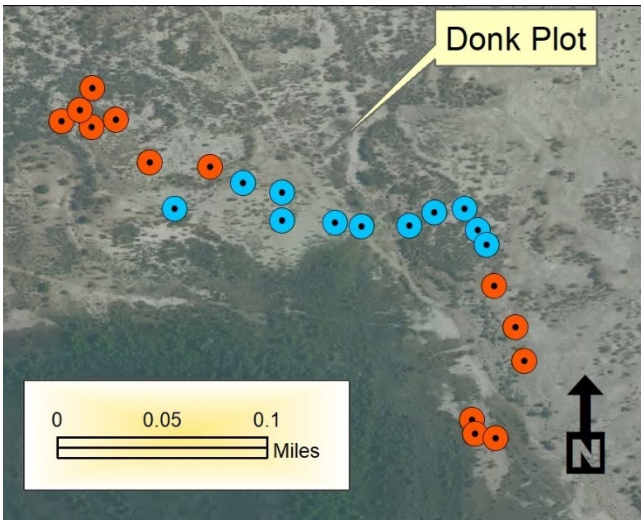
The East Side Plot is located 0.7 miles north of Manzanar Reward road on the east side of the Owens River. This saltcedar patch also is thought to have originated from water spreading in 1969. This area was again inundated in 2017 from water diverted into the Eclipse Canal from the Lower Owens.

The Bolin Plot is located 0.6 miles east of Diaz Lake. This area was also flooded in 1969 and again in 2017. This basin is a natural formation and the majority of saltcedar are established along the toe slope of adjacent dunes and sandy hummocks that ring the natural playas.

Each plot contained 24 tagged trees, divided into two bands, 12-13 trees inside a 0m-100m belt and 12 trees inside a 100m-200m belt. Trees were selected to be of a size where an observer could walk around the entire tree and make an accurate ocular estimate. Plots were sampled the first week of June and then revisited in late August or early September. Estimates were based on percentage categories for green foliage, brown foliage (result of herbivory by *D. carinulata*), yellow foliage (result of leafhoppers–none observed), regrowth foliage, and dead wood. Categories were: 0%, 1%-5%, 6%-25%, 26%-50%, 51%-75%, 76%-95%, and 96%-100%. When present, number of beetle or larval infestations were estimated using the following categories: N=0, L=1-10, ML=11-50, M=51-100, MH=101-500, H=501-1000, and V=>1000.

Results

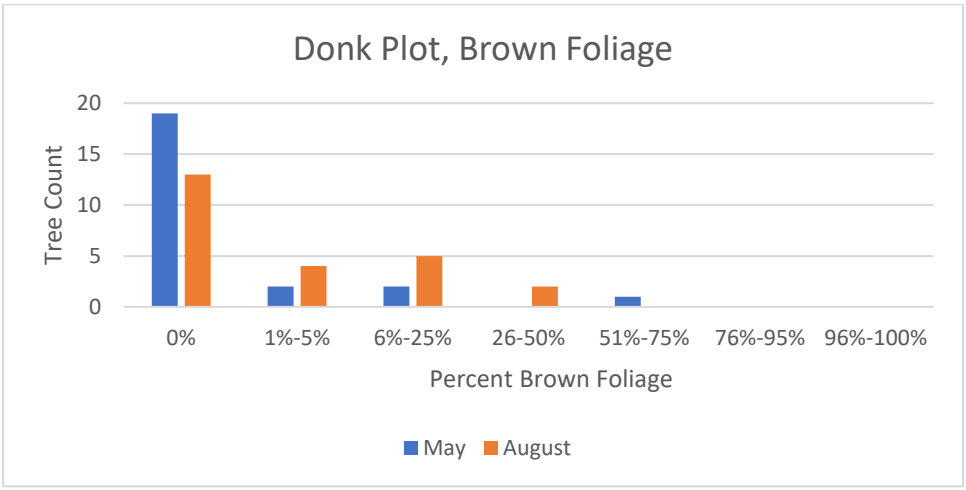
Results (presented north to south) of estimates of percent brown foliage estimated in late May/early June compared to estimates in late August/early September, and larval counts between both periods are presented below for each plot. Varying percentages of brown foliage is an indicator of intensity of herbivory of *D. carinulata*. Dead wood is also useful in understanding lasting impacts of herbivory and will be presented in subsequent reports as a time series develops.



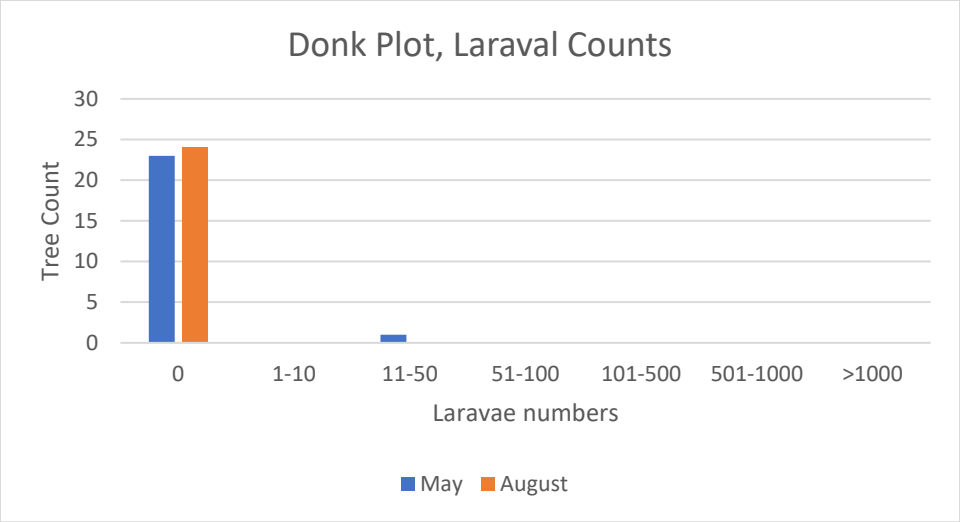
Donk Plot

The Donk Plot showed comparatively little browning and very few larvae compared to the other three plots. Estimates of dead wood at the site were greater than the other three locations which point to possible larvae/beetle feeding in 1999. However, larval activity in 2020 was minimal. (Refer to Adaptive Management Figures 3, 4, and 5.)

Adaptive Management Figure 3. Donk Plot, blue points are trees within 100m of centroid and red points are trees 100-200m of centroid



Adaptive Management Figure 4. Donk Plot, Brown Foliage Estimates Late May and Late August

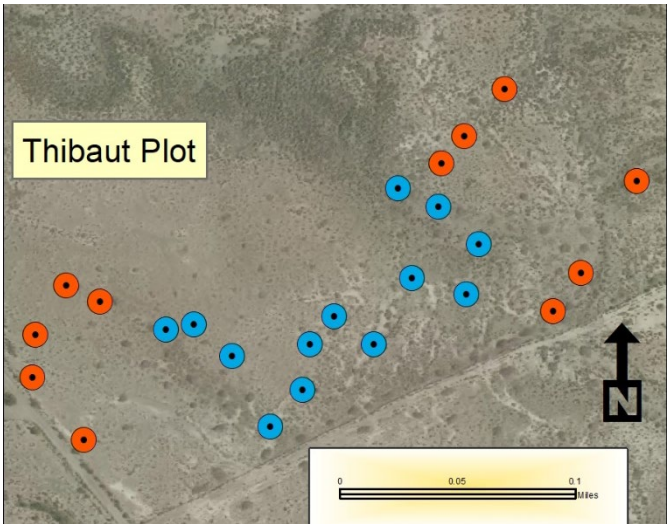


Adaptive Management Figure 5. Donk Plot, Larval Counts Late May and Late August

Thibaut Plot

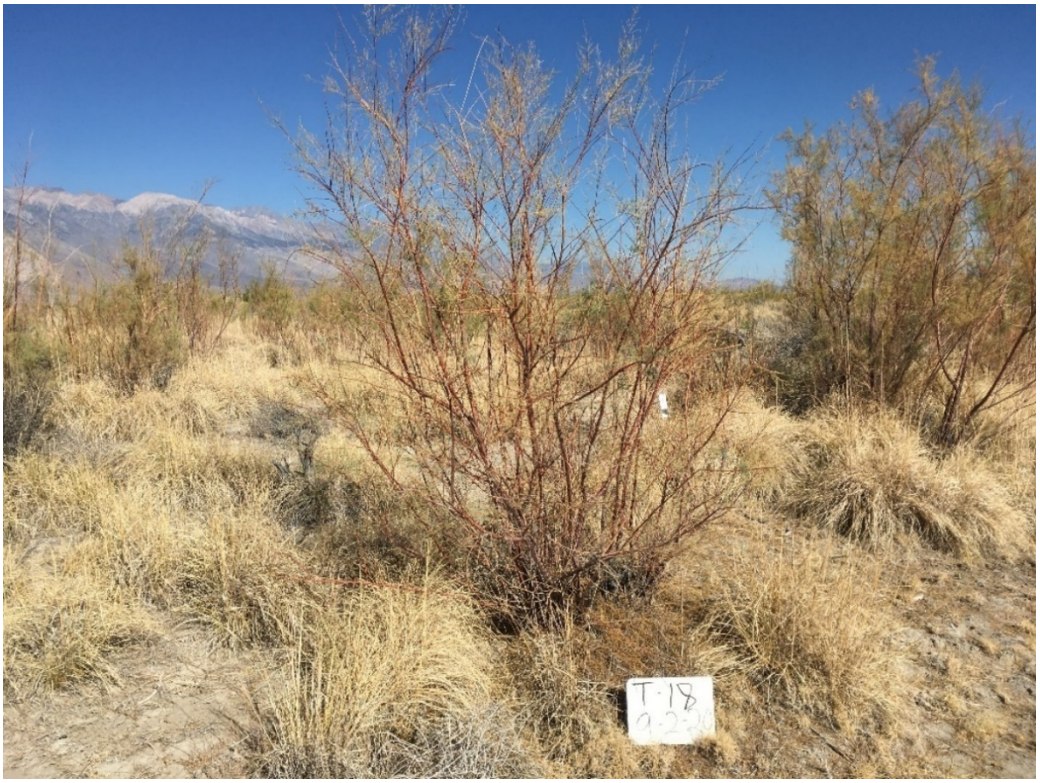
Saltcedar leaves within the Thibaut Plot were consumed between May and August by *D. carinulata.* Larvae (Photo 1) were observed on six of the 24 trees within the plot and beetles were observed only on a single tree. Larvae consume more salt cedar vegetation than the beetles themselves. Within this plot brown vegetation was observed

only during the second sampling period. (Refer to Adaptive Management Figures 6, 7, and 8 and photographs 1-3.)

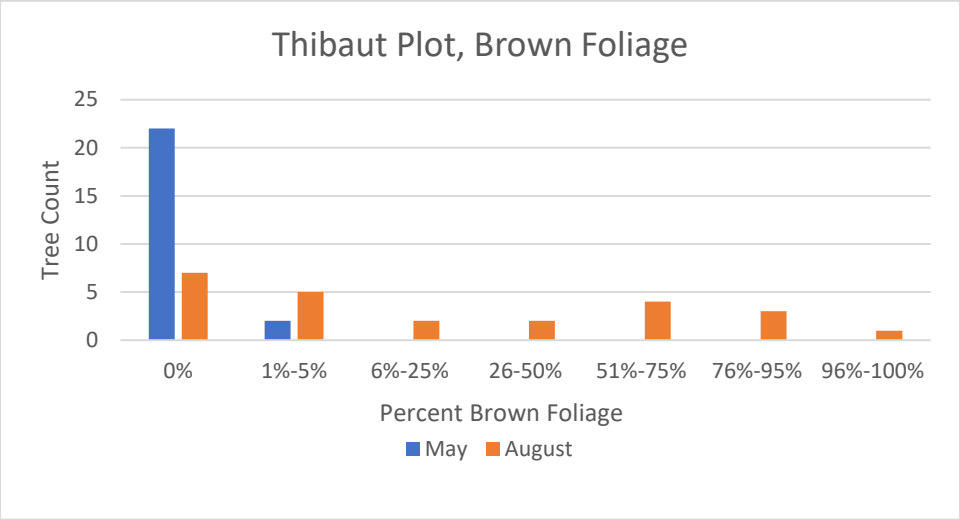


Adaptive Management Figure 6. Thibaut Plot, blue points are trees within 100m of centroid and red points are trees 100-200m of centroid

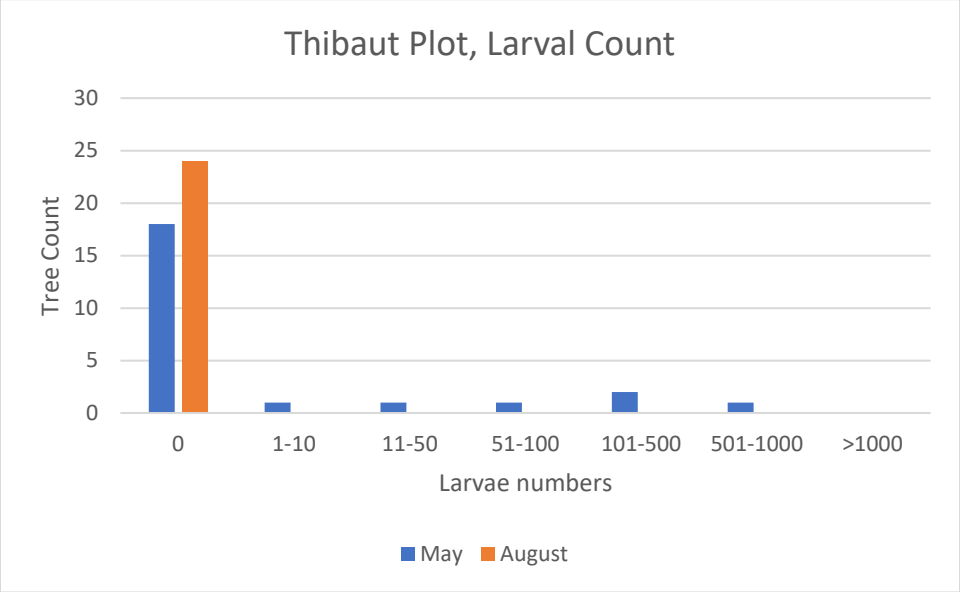
Photograph 1. *D. carinulata* larvae actively feeding on Tamarisk in June within the Thibaut Plot



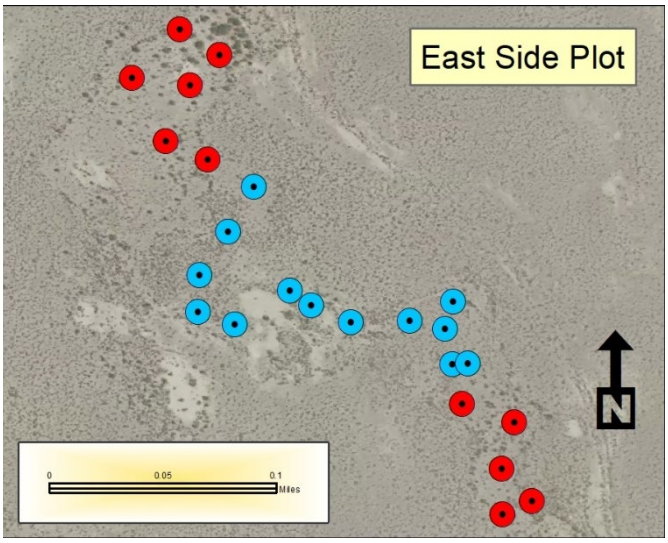
Photograph 2-3. Tree T18 on the Thibaut plot. Larvae are observed on the tree in late May. By August the tree was severely defoliated though no larvae were observed



Adaptive Management Figure 7. Thibaut Plot, Brown Foliage Estimates Late May and Late August



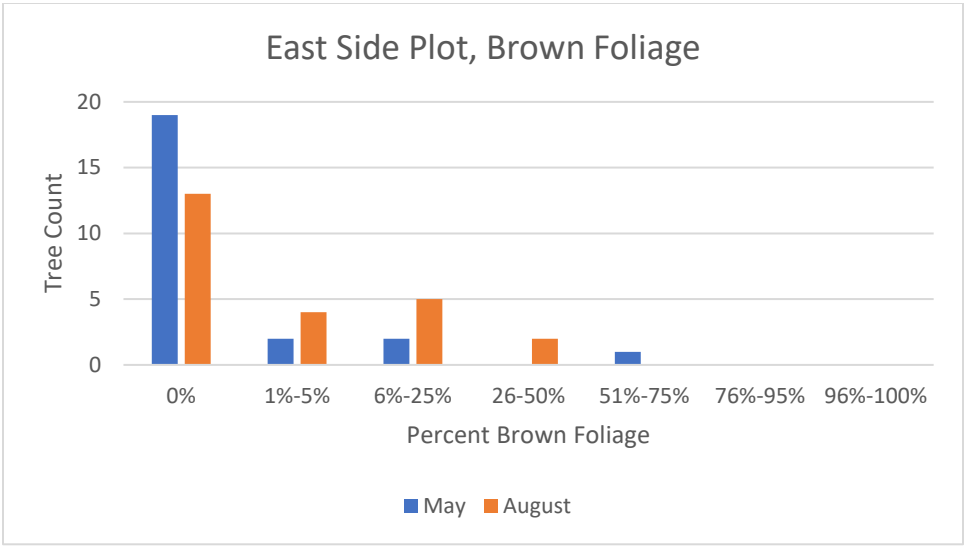
Adaptive Management Figure 8. Thibaut Plot, Larval Counts Late May and Late August



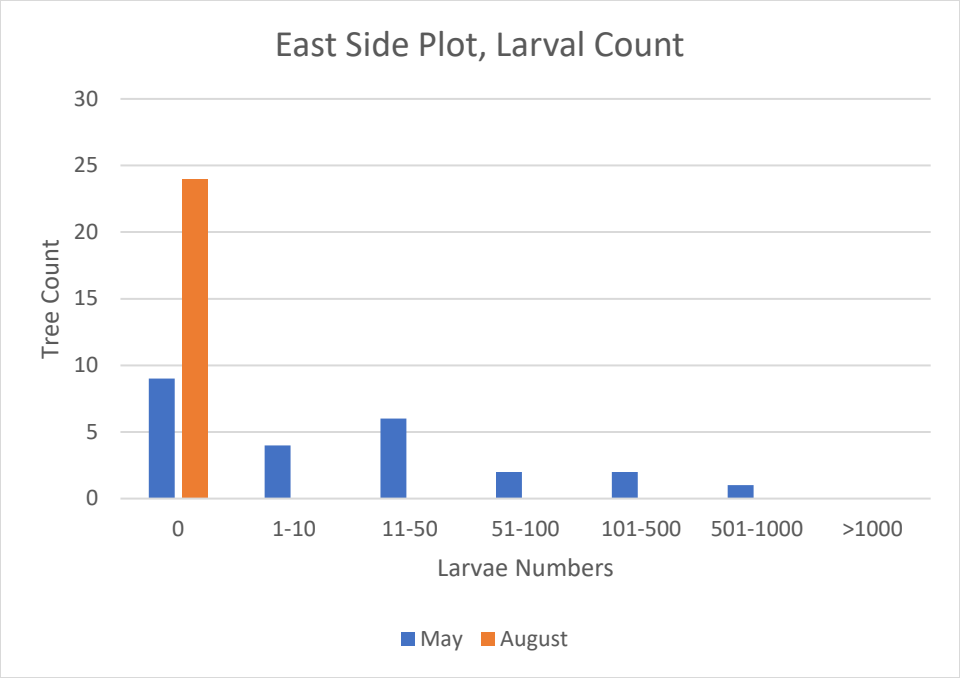
East Side Plot

The East Side plot exhibited browning on more trees in August than in May and no larvae were observed during the second sampling period. (Refer to Adaptive Management Figures 9, 10, and 11.)

Adaptive Management Figure 9. East Side plot, blue points are trees within 100m of centroid and red points are trees 100-200m of centroid



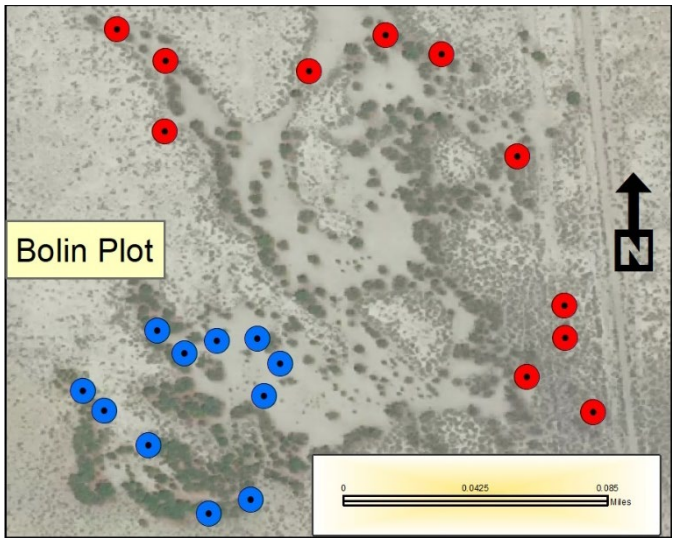
Adaptive Management Figure 10. East Side Plot, Brown Foliage Estimates Late May and Late August



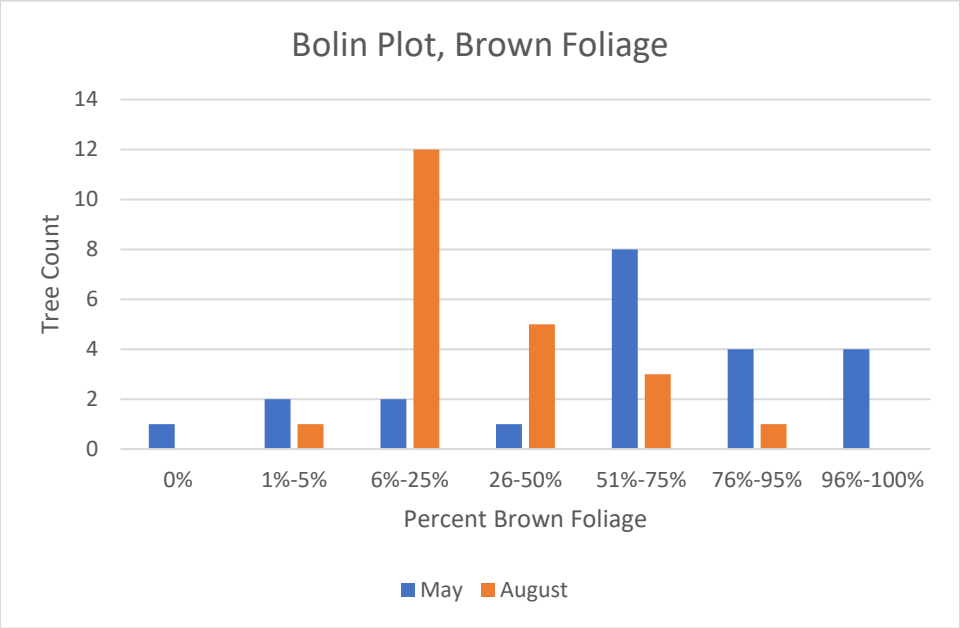
Adaptive Management Figure 11. East Side Plot, Larval Counts late May and Late August

Bolin Plot

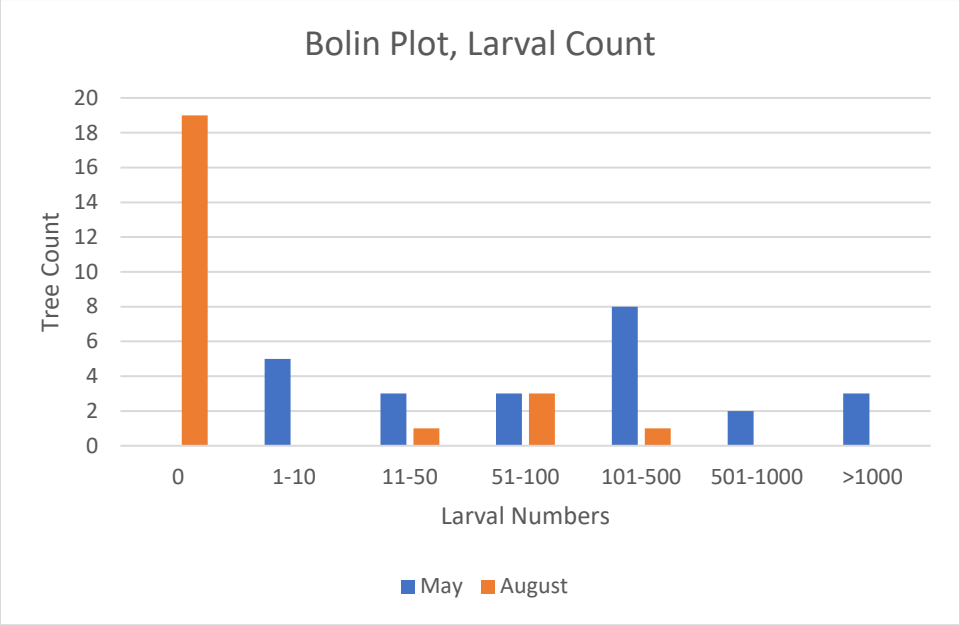
The Bolin Plot had evidence of herbivory both in May and August with a larger number of trees showing browning by late August. Very few larvae were observed in August. Unlike the other three plots, widescale feeding by larvae and/or beetles occurred during the weeks prior to the first sampling in late May. This behavior corresponds to literature linking *Diorhabda sp*. beetle emergence to warming temperatures (Bean, 2012). The Bolin Plot is located further south in the Owens Valley where spring temperatures are generally higher. (Refer to Adaptive Management Figures 12, 13, and 14.)



Adaptive Management Figure 12. Bolin Plot, blue points are trees within 100m of centroid and red points are trees 100-200m of centroid



Adaptive Management Figure 13. Bolin Plot, Brown Foliage Estimates Late May and Late August



Adaptive Management Figure 14. Bolin Plot, Larval Counts Late May and Late August

Conclusion

The first year for this study initiates a systematic documentation of the effects of moderate to light infestations of *D. carinulata* in the Owens Valley. Despite all plots exhibiting varying levels of use by *D. carinulata*, no evidence of mortality of tamarisk from *D. carinulata* was observed. Impacts from the beetle can vary widely from large defoliation (>100 acres) events (Hultine et. al, 2014) to limited evidence of *D. carinulata* making a lasting impact on tamarisk communities despite being present in an area for several years (Sher et al. 2014). Repeat visits to these four locations will generate a better understanding of the beetles impacts on Tamarisk in the Owens Valley over time.

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6.5 Tree Recruitment Assessment

The County will conduct a tree recruitment assessment to understand historic recruitment processes to identify and support new tree establishment for native riparian trees including black willow (Salix gooddingii), red willow (Salix laevigata), or Fremont cottonwood (Populus fremontii). Studies and observations will describe conditions which have permitted historic tree establishment during pre-project conditions on the LORP, conditions which have permitted the limited recruitment since project inception, and concurrent biological processes which may be inhibiting current germination and establishment.

6.6 Migratory Bird Surveys

One ecological benefit of LORP implementation is the reestablishment of a continuous riverine-riparian corridor to support animal movements. LADWP and the County will conduct spring migratory bird surveys on the Lower Owens River to document use of the LORP as migration stopover habitat, which has not been captured to date by the project's monitoring protocols in the LORP Monitoring and Adaptive Management Plan.

6.7 Noxious Species Survey and Treatment

The County and LADWP will conduct a noxious weed survey and increase treatment efforts of perennial pepperweed (*Lepidium latifolium*) within the LORP during fiscal year 2020-2021.

7.0 MOU CONSULTANTS' LORP ADAPTIVE MANAGEMENT RECOMMENDATIONS

2020 LORP ADAPTIVE MANAGEMENT RECOMMENDATIONS

BY Dr. William Platts and Mr. Mark Hill

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EXECUTIVE SUMMARY

RECOMMENDATION # 1 --- LAND MANAGEMENT – GRAZING

The MOU Consultants recommend that the City maintain all current grazing strategies and forage utilization standards. Present strategies and standards would remain in effect until any proposed increases are well tested, evaluated, and justified. Strategies and standards would be evaluated for riverine-riparian environmental compatibility and fish-wildlife impacts. If testing and evaluations support changes, then these changes should then successfully pass through the Adaptive Management process, so all MOU Parties have input.

RECOMMENDATION # 2 --- ACTIVE MANAGEMENT POTENTIAL

The MOU Consultants recommend the MOU Parties approach, study, implement, and apply LORP active intervention very cautiously. Active intervention projects should only be attempted after solid justification, economic feasibility, and potential for significant success are demonstrated. All active management projects should pass the Adaptive Management process for approval.

RECOMMENDATION # 3 --- WATER VOLUME AND FLOW CONTROL STRUCTURES

The 2019 MOU Consultants recommendation for the Scientific Team to evaluate the possibility of using water volume and flow control structures to improve environmental conditions in the Lower Owens River still stands.

RECOMMENDATION # 4 --- ANNUAL REPORT CONTENTS

The MOU Consultants recommend that the County and the City, in future Annual Reports cover less compliance and grazing information. Instead, use this time and space to better identify what Adaptive Management needs should be implemented to better attain 1997 MOU goals.

RECOMMENDATION # 5 – 2021 Preliminary Active Intervention Workshop

The MOU Consultants recommend the MOU Parties sponsor a “Active Management Needs Evaluation Workshop” in 2021.

RECOMMENDATION # 6 --- FIRE THE LORP MOU CONSULTANTS

The MOU Consultants recommend that the MOU Parties fire the MOU Consultants.

INTRODUCTION

2020 Adaptive Management Report Format, Approach, And Concerns

The MOU Consultants 2020 Adaptive Management Recommendations in this report are discussed in more detail near the end of this report. The background, the reasoning, the supporting information, and the justification behind each recommendation is introduced in this report first. Hopefully, this will allow the user to better understand where the Consultants are coming from. This year's recommendations were influenced heavily by the MOU Parties constant concern that without substantive Adaptive Management implementation, blended with needed active intervention, the LORP will fail to meet the goals set forth in the 1997 MOU.

California Department of Wildlife (CDW) continual expresses concern regarding LORP progress in their 2015, 2017, 2018, and 2019 responses to LORP Annual Reports. They maintain there is no existing evidence that Lower Owens River condition goals are being met. Insufficient and minimal Adaptive Management implementation is occurring to help meet these goals. CDW is concerned that the current river flow regime has not and will not in the future achieve LORP goals. They also stress that no successful Adaptive Management has been implemented within the riverine-riparian component of the LORP. The Owens Valley Committee (OVC) and the Sierra Club also continually point out that the past and present Lower Owens River flow regime clearly will not attain LORP goals as mandated in the 1997 MOU. They support flow regime change through Adaptive Management implementation.

The Consultants attempt to address MOU Party concerns, in their Adaptive Management responsibilities, by using whatever information is available in the LORP Annual Reports. Because the Consultants are greatly restricted in their ability to gather needed LORP information, conduct on-site field observations and evaluations, and collect data; Consultants are restricted mainly to what they can glean from the Annual Reports. Annual Reports and information gleaned from them will determine how much LORP progress can be made. There are no LORP strategy sessions, no evaluations, no workshops, no MOU Party-Consultant field evaluations, no planning meetings or any more "River Summits". Communication between the Consultants and the MOU Parties or even within the MOU Parties themselves, is lacking.
Consultants are not invited to MOU Party meetings. Consultants were not allowed to evaluate LORP conditions this year, probably because of COVID-19 restrictions. It's very difficult to make progress without communication and interaction.

Adaptive Management Status

MOU Party Concerns

The 1997 MOU provided for modifying LORP management, as needed, via the Adaptive Management process. A process to ensure applying successful management practices that will result in the attainment of LORP goals. Therefore, Adaptive Management success will determine the final LORP success and the resulting beneficial resources produced. Without constructive Adaptive Management implementation all 1997 MOU goals and 2004 EIR direction will probably not be met.

The Sierra Club, in their 2017 response to the County-City Annual Report, called for Adaptive Management to be a major management tool for the LORP, but this tool is not being used very much. Dr. Patton (Sierra Club Consultant) believed it noteworthy that the highly selective and ignoring approach taken by the City and County Standing Committee to the application of needed Adaptive Management implementation needs to be challenged.

CDW, in their response to the 2017 Annual Report, stressed that the LORP was supposed to incorporate Adaptive Management Recommendations into the design and implementation of the LORP so uncertainties in the restoration success can be addressed. They then identified that bulrush and cattail growth has received no control through Adaptive Management. The unlimited vegetation growth and resulting channel encroachment has received no MOU Party discussion or any Adaptive Management implementation. Actions are not being taken to counter their encroachment into and over the river channel.

Dr. Vorster (OVC Consultant), in his review of the 2014 Annual Report, argued that it was the lack of implementing meaningful and specific Adaptive Management Recommendations that has inhibited LORP progress. He called for more emphasis on addressing and determining how the Adaptive Management process is to proceed and be successfully implemented in the future.

Take-Away

The Lower Owens River is having some environmental problems partly because it is physically fixed in place by legal stipulations, orders, and unnecessary handicaps. Seasonal river flow levels are dictated by flow regimes that do not conform to any biological, ecological, physical or natural process. Compliance restrictions set in place by the MOU Parties are inhibiting the LORP's potential and are affecting it negatively. Also, improving LORP habitat conditions can be no better than the MOU Parties ability to do so.

These restrictions, along with lack of needed attention, has broken the Adaptive Management process. To continually apply constraints over time and space, as the MOU Parities are doing, and then expect variability in biological and physical response in return is not logical nor is it sensible and it is not defensible. Consultants have a hard time understanding why anyone would even want to think applying constraints would result in desired changes. These restrictions are going to stymie the future Adaptive Management process. Another restriction is that the Consultants could not find anywhere is the 2019 Annual Report where any Adaptive Management Recommendation had been responded to or evaluated. Nor narrative as to why they were rejected or accepted.

As stated earlier, to display some reasoning behind the MOU Consultants 2020 Adaptive Management Recommendations, background and supporting information appears first in this report. The following sections covering the “Present Status of Adaptive Management”, “Past and Present Condition of the Lower Owens River”, “MOU Goal Attainment”, “Livestock Grazing Status”, “Future Management Potential”, and “Active Intervention Possibilities”, hopefully will provide some reasoning for the Consultants final recommendations that follow.

Lower Owens River Condition

Past Condition

The LORP 2017 Annual Report described the present status of the Lower Owens River as a “desert river”. A “desert river” with dissolved oxygen levels falling to lethal levels under certain river conditions. Fish kills that can occur when river flows exceed 70 to 80 cfs and river temperatures are above 60 to 65°F. They point out that poor water quality conditions are expanding upstream from the Keeler Bridge. The river channel is described as being infested with tules and cattails. Recruitment of surrounding trees, needed to form a future canopy, is ineffective and not improving.

The report describes a Lower Owens River channel that is aggrading and covered by tule-cattail growth. They high-light that the present flow regimes are furthering tule-cattail expansion, increasing summer water quality critical conditions, stagnating woody tree recruitment, and decreasing the number of existing trees. This combined City-County description of present environmental river conditions is quite concerning. This description points out the need to improve present conditions via the Adaptive Management process.

As the MOU Consultants continually stress, however, this unbalanced City-County description of river conditions leaves out the fact that the LORP, and especially the Lower Owens River segment, has gained many environmental improvements. Many additional beneficial resources now exist that did not exist before the LORP. All these benefits will continue to exist well into the future. Balance must come when displaying

LORP conditions if future decision making is going to be fair and accurate. Balance is not being considered properly at the present time, even by the Consultants.

Many unnecessary restrictions were placed on Lower Owens River flows without any sensible justification. A very recent example is a City-County recommendation appearing in their 2019 Annual Report. In this report the County and the City recommended that any release of high river flows should be done in a manner that limits, to the extent possible, any entrainment of organic material. Their only reason given is, this would reduce the potential of hydrogen sulfide being formed in the river. Based on all the years of flow information, river chemistry data, and field observations, there is not any documented evidence that hydrogen sulfide content in the river has ever caused any problems. Also, extremely important, if sediment and muck cannot be moved, or entrained and eliminated from the channel, as the County-City recommended, improvement of river conditions and the resulting beneficial resources is an impossibility. Under this applied additional handicap, the Consultant's yearly statement that, "You now have the river you are going to get" -- is going to become a reality.

Other limitations, such as "must be water neutral" and especially the flow handcuffs placed on the City and the County by the MOU Parties, makes progress almost unattainable. Strict uniform base flow mandates applied by river reach, along with the low seasonal habitat peak flows, makes it impossible to pursue more beneficial flow management now and in the future. Flow management by itself cannot be counted on to be the miracle salvation that will solve all future LORP problems.

Applied current base and seasonal habitat river flows will continue to meet Court and MOU Party mandated guidelines. But, abiding by these flow guidelines will in no way substantially improve the river in the future from its present condition. Needed flow management to improve habitat conditions in the Lower Owens River, after 13 years of the MOU Consultants pushing for much higher river flows, are "off the table" and probably always will be. There are too many restrictions, combined with major valley infrastructure constraints, and especially when economic reality sets in, to ever obtain ideal river flow management.

Present Condition

The LORP, under 1997 MOU and 2004 EIR direction, has produced many successes, many resources, and many added benefits. Large improvements in riparian vegetation has occurred. The creation of a continuous riverine corridor resulted in the increased availability of wetland habitats. This, in turn, has improved conditions for many wildlife species. Fish and wildlife populations have expanded their previous boundaries. Additional habitat has been added for indicator species. Some avian species have dramatically increased. Recreational fishing has expanded over broader areas. Open river water area and surrounding riparian plant diversity have increased. Not bad for a river having to build and maintain its own environmental conditions with what little beneficial help it had to work with.

OVC pointed out, in their response to the 2018 Annual Report, that the Lower Owens River is in pretty good shape. They found there is an abundance of life in the wetlands and riparian areas, fish and birds appear to be surviving, tules and cattails over the long-term may be out-competed by more favorable plants, and they also pointed out that there is no degradation of water quality as far as the warm water fishery is concerned. The native American representative, at a MOU Party session, stressed that Lower Owens River-riparian conditions were very good. He quoted that, “There is a lot of life down there and everything is doing very well.”

As some us downgrade the present conditions and past management of the LORP in Annual and Adaptive Management reports, Consultants and the MOU Parties need to remember that LORP management has produced many successes. As previously stated, many beneficial resources such as vast increases in wetland and marsh, the proliferation of avian species, improvement of ecosystem function, expansion of the recreational fishery, the large increase in riparian habitat, and all the increased benefits to wildlife populations must be considered. All Parties must keep in mind, that without the 1997 MOU there would be no LORP. Without a LORP all of these benefits displayed would never have been gained.

Future Condition

Lower Owens River environmental conditions in the future, under continuation of present flow management, will be very similar to the present river condition the City and the County described in their 2017 Annual Report. This also includes the MOU Consultants added beneficial gains that must be added to their description. Consultants predict that future MOU Party river flow management will not change significantly from present flow management. Therefore, river conditions are not going to change significantly in the near future. Even with the application of active intervention there will not be much beneficial gain without better river flow management. Only the application of improved river flows will significantly improve the future conditions of the Lower Owens River. The Parties should not put all their eggs in one basket thinking active intervention is going to solve any or all the problems.

GOAL ATTAINMENT

Most of the important LORP goals have been met to date via implementation of the project. The 2019 Annual Report acknowledged that some LORP goals are incompatible and LORP biological processes appear to have reached a more or less stable condition. MOU Consultants agree with the City and County interpretations that some goals are unrealistic and should be deleted. Establishing 854 acres of additional riparian forest, through LORP implementation, is a prime example. An example of a goal that is unreasonable and should now be eliminated. The Lower Owens River never had this kind of forest bordering its complete channel and it never will.

The County and City recommended in their 2019 Annual Report that future seasonal habitat flows follow the guidance and direction provided in the 1997 MOU and the 2004 EIR. This includes all flow volumes and river flow ramping rates. The City requires that any experiments and evaluations dealing with changing the seasonal river flow hydrographs, must be “water neutral”. The Pumpback Station capacity needed to allow larger volumes of flows to be tested and evaluated was nullified by OVC and the Sierra Club. Under these limitations’ Consultants predict that some goals not yet met, will never be met, and it is time that these unrealistic goals be eliminated.

There are very few ideal sites along the river corridor for willow and cotton wood natural recruitment and establishment. The quick turn-around-fire frequency alone would eventually degrade any future willow or cottonwood pole planting and continue to stymie natural recruitment. The MOU Consultant’s previous predictions that a tree covered riparian corridor would form over time, is just not going to happen in the LORP. The fire-frequency along the river corridor (about one significant fire every 1.5 years) will alone preclude large mature stands of forest along the river. If the river continues to be managed as it is today (under the 2007- 2008 guidelines) with 14 years of no significant modifications and continue to function under MOU Party applied restrictions, there is little that can be done to further increase goal attainment success. Valley infrastructure constraints alone are of such magnitude that applying very high river flows for future testing and evaluation to determine if they can help meet goal attainment, is just not going to happen.

It is evident that after 15 years, since the inception of the LORP, flow management alone, as implemented per the guiding documents, is insufficient to eliminate, control, or reduce tules and cattails in the channel. Nor are flows effective in promoting conditions suitable for tree willow requirement and establishment. As stated before, dense native forests were never naturally a dominant component of the Lower Owens River riparian habitat. The Lower Owens River is a “desert river” functioning under limited floodplain and streambank precipitation.

Therefore, dense forest will never be a dominant feature in the future. It is now time to

face reality and concentrate on identifying other active actions that have a chance to improve the Lower Owens River and, in turn, better meet goal attainment.

LAND MANAGEMENT-GRAZING

The MOU Consultants could not make a 2020 evaluation of grazing conditions and compliance for the 2020 Adaptive Management Report. The City did not provide a contract through most of the year to perform field evaluations to determine rangeland grazing results. The Spring evaluation was put-off because of COVID-19 restrictions. Consultants believe this was a very good and justifiable reason for canceling the Spring evaluation. On the other hand, the Consultants could not perform a Fall evaluation because the City could not get a contract in place in time. As of this writing, the MOU Consultants just received a request for a proposal from us, as well as compliance forms due by December 1; which is too late to perform the Fall evaluation.

Since the initiation of the LORP the grazing lessees have done a very good job managing their livestock on city lands. The MOU Consultants, therefore, see no reasoning that that past favorable evaluations would not also apply to the 2020 grazing season. Implementation of LORP grazing management plans have produced favorable results and will continue to produce favorable results in the future, if grazing plans are abided by. In the future Consultants see no reason to evaluate rangeland conditions and grazing compliance each year as long as grazing plans are abided by. This evaluation could be staged, instead by only one evaluation every 5- or 10-years.

Active Grazing Intervention Attempts

Consultants, in their 2019 Adaptive Management Report, recommended that the City initiate a grazing strategy to test and evaluate if heavy cattle soil trampling through heavy grazing plant utilization could decrease bassia abundance, encroachment, and density in selected riparian pastures. The City previously attempted this same experiment, but never reported the results. The City also artificially disturbed streambank and floodplain vegetation and soil areas to try and increase tree recruitment and this experiment was never reported on. The city in their 2020 Annual Report again did not report any of their findings.

An “experiment” that fails or appears to fail is not a failure at all, but a lesson to be applied to future “experiments” or restoration approaches (Dr. Patton email to Bagley January 7, 2015). The City should report on its past experiments in their Annual Reports. They should do this even if they did not accomplish what was intended or results come out the way the City had hoped for. Some good information is being lost and this is not defensible.

Increased Grazing Utilization

The City, during field evaluations and in their past couple Annual Reports, have indicated they would like to consider increasing LORP livestock grazing plant utilization in the riparian corridor. In their 2019 Adaptive Management Report the Consultants previously pointed out that the City is considering increasing the present allowable 40% utilization level in riparian and streambank areas. It may be time to increase riparian plant utilization by livestock, but to do so without first demonstrating how this increase will meet LORP goals, objectives, and requirements, outlined in the Lessees grazing management plans, is like putting the cart way out in front of the horse.

Before the City even attempts to implement this increase, yet to be justified, and tries to fix a problem that isn't broken, they should first place their supporting data base and scientifically derived justification information through the Adaptive Management process. Then all MOU Parties can participate in the final decisions and know what is going on. No data, no information, or no justification has ever been passed through the Adaptive Management process for Standing Committee approval to date. The MOU Consultants have seen no data, no information, no verbal reasoning, no observations, or any scientific reasoning that would justify this action at this time.

WETLAND MANAGEMENT

LADWP and ICWD have developed an interim adaptive management and monitoring plan for the Blackrock Waterfowl Management Area (BWMA); which the MOU Consultants have reviewed and commented on. The plan finally lays out a periodicity approach to managing the BWMA following years of recommendations by the MOU Consultants. While the plan is still in draft form and being negotiated, our conclusion is that it is a positive step forward to meet LORP wetland habitat goals. Presumably, the plan will be available for the MOU Party's examination soon.

We also concur with the revised interim flow regime implemented in April for the Delta Habitat Area (DHA). The new flow management will decrease summer releases to a minimum to inhibit the expansion of marsh vegetation and promote open water areas. Seasonal habitat flows (pulse flows) will be longer in duration but lower in magnitude, as described in the annual report. Avian surveys will be the monitoring tool to assess habitat suitability.

Also, as described in the annual report, there will be an effort conduct a focal species analysis to determine which species will be most appropriate as habitat indicators, and

development of a local-based predictive habitat suitability model. This will be a welcome revision to the current list of Habitat Indicator Species. Hopefully, using focal species will result in fewer, but more representative species.

WATER VOLUME AND FLOW CONTROL STRUCTURES

In their 2019 Adaptive Management Report the MOU Consultants recommended that the Scientific Team study the opportunity to construct one or more water volume control structures in the Lower Owens River. The purpose was to determine if these structures have any chance to enhance the effectiveness of seasonal habitat flows, reduce tule and cattail dominance and encroachment, increase river flooding potential, increase fish and wildlife populations, allow successful down-river flow augmentation, and increase fishing, hunting, and other recreational uses of the Lower Owens River. The Scientific Team was to do all this
evaluation under “water neutral” direction, therefore, only using present LORP available water. To date, the MOU Parties have not accepted this recommendation and at the same time do not provide any active intervention efforts that are worthy of evaluation.

FUTURE ACTIVE MANAGEMENT POTENTIAL

For Goal Attainment

The LORP Ecosystem Management Plan called for emphasizing and implementing the “self- designing” and “self-organizing” capacity of nature to develop the future Lower Owens River. The Monitoring and Adaptive Management Pan (MAMP) also emphasized the “self-designing” and “self-organizing” capacity of nature to form the final LORP ecological condition. This passive approach and the benefits it produced should now be evaluated. An example of an
ecological outcome needing evaluation is the colonization, encroachment, and extreme density of tules and cattails now dominating the Lower Owens River. So far, this condition evolved under the influence of the “self-designing” and “self-organizing” approach.

“Self-design” emphasizes the development of natural habitat that can take care of itself. This is called for in the 1997 MOU. Past and present Lower Owens River flows have now completed most of the “self-designing” and “self-organizing” they are going to do. Therefore, if modifications to flow management, as continually recommended by MOU and MOU Party Consultants, are never to be implemented, it may be necessary to now consider some active management methods. Active actions that have a chance to improve environmental conditions and better meet riverine-riparian goals. Active projects worthy of any consideration should be economically feasible and socially acceptable and

actually make a significant long-term difference. There is no need to consider those that are not. There are numerous active interventions that could be considered for improving the LORP. Only through the process of justification, testing and evaluation can it be determined if any active intervention would produce significant beneficial results to justify the time and money spent. The Consultants predict that the MOU Parties will not come up with any active intervention project that would produce significant Lower Owens River benefits and in turn would not “break the bank”.

To date, the MOU Parties have not tested and evaluated any Adaptive Management Recommendation that may have a chance to control or better manage tule-cattail complexes. Nor have the Parties tested and evaluated any recommendations that offer a chance to increase more favorable water quality conditions. The County believes there is general agreement that tules and cattails cannot be controlled on a large scale by methods that are within the limits of available resources (money). Also, there are river reaches of the Lower Owens River that tule-cattail reductions or control should not even be considered.

The Sierra Club and OVC challenged the 2019 LORP Annual Report findings on “Goal Attainment”. They pointed out that goal attainment cannot be determined at this time because substantial Adaptive Management of any type has yet to be implemented. If a goal has been met, however, and will be met in the future, as some have, the Consultants recommend that these goals be set aside and time and money be directed toward those goals not yet attained. A few goals may require some active management considerations. It is time to get on with the analysis.

ACTIVE MANAGEMENT POSITIONS

Sierra Club Consultant

Dr. Patton pointed out early in the LORP process that as much as passive restoration may be the most logical approach, from of an ecological perspective, once ecosystems have been greatly altered, some active intervention may be necessary to restore the system to a “healthy functional system”. Dr Patton, however, emphasized, as the MOU Consultants have continually emphasized, that active restoration alone should be implemented only as a last resort. He points out that active combined with passive may be the best approach for final LORP management. Dr. Patton recommended that if the Lower Owens River response, to the limited re-watering approach, does not create a “natural functioning system” then active management must come into play. Also, he pointed out that physical actions within and adjacent to the riverine system will have to be considered under this approach.

California Department of Wildlife

CDW continually recommends renewed efforts to conduct willow and cotton wood tree plantings. They point out that active intervention should be considered in all river-reaches. They justify their position based on past and present river flows not being capable of creating the disturbed habitat necessary for natural tree recruitment. Despite the recent pole planting mortality failure, CDW continues to support active intervention to create tree establishment. Pole planting mortality was blamed on long-term applied flooding stress. The Consultants are quite skeptical of this analysis because while almost all the artificially planted willows died, the surrounding wild willows of comparable size showed no mortality from the long-term flooding. Willows have a natural tolerance for intermittent flooding, or they would not be where they are.

CDW believes, based on data the City collected for their hydraulic model (LADWP 2012 Annual Report), that seasonal habitat flows of 800 to 3,500 cfs may be required to meet LORP goals using flow management alone (CDW response to the 2019 Annual Report). The MOU Consultants agree with this assessment. CDW believes that implementing flows of this magnitude are impossible. Again, Consultants agree. Therefore, CDW believes extensive mechanical removal of emergent vegetation (bulrush and cattails) in conjunction with new flow modifications is the best option for creating self-sustaining fluvial (river) habitat as described in the 1997 MOU. This active intervention has yet to be evaluated and justified to determine if it has any application for success.

CDW in a recent letter to the City and County went on record that both river flow management AND active management are necessary to achieve LORP goals. They requested that further consideration be given to applying a combination of treatments. CDW believes there is a need to cut tules and continue to plant competitive species (trees). They want to determine the minimum cutting effort required to reduce tule abundance. Consultants are quite skeptical of this approach and cutting of tules would never result in continuous benefits to the Lower Owens River.

Owens Valley Committee

OVC continues to support active efforts to establish tree sites along the riverine-riparian corridor. They urge the City and the County to fund and implement another pole planting project in the coming seasons (OVC comments to the 2017 Annual Report). OVC pushed for a combination of mechanical means (including explosives) to remove tules and detritus.

Their previous recommendation on tule and cattail management, however, was very much different. OVC requested that tules be allowed to “live out” their lifetime. The reason was they may be successional to the next wave of dominant (more beneficial) vegetation. They are also on record that increasing river flows into tule impacted river reaches will

not control tules. OVC now believes that Adaptive Management via measures such as tree planting and channel clearing of tules in selected areas should now be initiated.

Inyo County

Inyo County still expects some ecological improvements in the LORP over-time. The County did not specify which improvements this would be. They point out that the disturbance of past flooding flows will result in further improvement. If, however, the LORP is locked-in its present position, and barring the ability to create periodic large-scale natural flow disturbances, the County believes active intervention would be appropriate (County input into the 2017 Annual Report).

Sierra Club

Very early in the LORP process, the Sierra Club was recommending extensive removal of emergent vegetation (tules and cattails) in the river channel. The Sierra Club, in their 2013 response to the Annual Report, stressed that managing tules will require active intervention because LORP goals are not being met. Their Consultant Dr. Patton pointed out that the overall recruitment of a healthy riparian habitat, which should be dominated by dense woody riparian plant species, has failed. The Sierra Club firmly believes that Adaptive Management through active management actions, such as tree planting and channel clearing of tules in selected areas should be performed.

Scientific Team

There has never been an effective Scientific Team functioning to help guide the LORP. The City in a May 9, 2012 letter to the County expressed the opinion that the Scientific Team be the ones to adapt and make the Adaptive Management Recommendations. This same letter said that the Scientific Team would be led by the MOU Consultants. The Scientific Team was to be composed of scientists from the City, the County, and the MOU Consultants. This recommendation could have led to better LORP management, but it was never followed.

Especially important, in all this, do the MOU Parties actually have the interest and capability to use their Scientific Team effectively. Time has proven they do not have the interest and especially the capability to ever make the Scientific Team effective.

The MOU Consultants have never participated in a Scientific Team function let alone lead the Scientific Team. In a letter from the MOU Consultants to the City and County, the Consultants stated that there has never been a process for the Scientific Team to function under. They go on to state that the Scientific Team, as described in the LORP MAMP, has never been

established or used. The MOU Consultants submitted an Adaptive Management Recommendation to enhance the Scientific Team's ability to participate in Monitoring and Adaptive Management Recommendations, but this was never accepted by the MOU Parties. The "Take-Away" is that the MOU Consultants do not believe the Scientific Team has developed to the point that it can determine, design, or implement effective active management actions at this time or in the future.

MOU Consultants

In their 2019 Adaptive Management Recommendations the Consultants stressed that they do not believe the MOU Parties have the necessary tools and process to ever conduct successful active management projects. Projects that in the future would produce significant benefits to the LORP. This belief still applies

LADWP

The City advised in their 2019 Annual Report that any potential active intervention proposal would need to be extensively analyzed for feasibility, economic cost, and the short-and long- term benefits that would be gained. Consultants agree that this proposal is justified and should be a requirement.

WHAT ARE FUTURE POSSIBILITIES FOR ADAPTIVE MANAGEMENT?

Twenty-three years have now elapsed (plus another previous 5 years of prior pre-LORP negations) since the County and City drafted the 1997 MOU. The Technical Committee has been on board for 38 years. Much more time has elapsed than needed to allow LORP successes and failures to be evaluated. Ample time was available for Adaptive Management actions to have been justified, tested, evaluated, and implemented. The MOU Parties have yet to implement any changes in river flows that would have any chance to improve environmental conditions in the Lower Owens River.

The present LORP riverine-riparian habitat condition will persist well into the future if present LORP management continues as is. The future Lower Owens River is going to increase slightly in the ratio of tules and cattails to open water, water quality will become a little more degraded, the river channel will continue to aggrade, but very slowly, and there will be more frequent and larger fish kills. The future Lower Owens River will closely resemble today's Lower Owens River. If this future river condition prediction is to be changed for the better, it can only be done through improved Adaptive Management process.

The MOU Consultants previously predicted that because of the many differing views and agendas within the MOU Parties, and when physical and especially when economic realities are faced, it will be very difficult if not impossible in the future for the Parties to apply successful feasible active management actions. Consultants now accept that the MOU Parties are not going to change flow management in any significant way in the future. Based on the past record, MOU Parties have gained all they are going to through flow management. Unless present thinking and actions change dramatically this same result would continue in the future.

Another major obstacle is the 2004 EIR project description and direction that could present a block for implementing certain active management actions. As an example, the EIR states that extensive removal or active management of tule stands (tule and cattail) to retard the expansion of tule growth or to increase open water habitat for habitat purposes, will not be considered. The EIR also goes on to state that, “Only if funding is obtained from sources other than the City or the County will tule-cattail control be considered”. Like the MOU Parties trying to change river flow management, there may not be much hope for implementing improved tule-cattail control actions.

Changing LORP management from dominant passive restoration to SUCCESSFUL significant active applied management will greatly increase monies spent (or wasted), resources used, and time expended. Studies, experience, testing and evaluations, all necessary for even getting small active management actions started, and have yet to begin. So far, active intervention by the MOU Parties, has resulted in dismal failures with no benefits obtained. The Consultants do not see this changing much in the future.

The MOU Consultants have advised the MOU Parties numerous times that “You Now Have the River You Are Going to Get”. Applying active management is not going to change this situation very much in the future. The best “pay-off” at this time per dollar spent is to try and come up with much improved river flows with the water now available. The MOU Parties are going to find that implementing successful and significant active intervention actions will be much more difficult than their watching passive management do its thing. We do not believe the MOU Parties are capable at this time of initiating any active intervention that will result in any significant beneficial result. They have not done and will not do their preparatory homework.

FIRE THE MOU CONSULTANTS

Justification

OVC and the Sierra Club, in their response to the 2019 Annual Report (OVC and Sierra Club second letter on March 6, 2020 commenting on the 2019 Annual Report), again reiterated previous recommendations by the OVC in their 2014 response to the Annual Report, that the

MOU Parties should consider " retiring" the current MOU Consultants (Sierra Club Memo to MOU Parties, September 17, 2014). MOU Consultants know that "retiring" usually always comes with benefits. There will be no benefits so "firing" is a much more appropriate word for the Parties to use.

MOU Consultants agree with OVC and Sierra Club conclusion that it is time to fire the MOU Consultants. We also agree with all the reasons they use to justify their recommendation. The Sierra Club and OVC justify their "retiring" of the MOU Consultants because its apparent to them that the value of product received from the Consultants is not worth the expense. Again, we agree with this reasoning. The Consultants were continually unsuccessful in coming up with any suggestions and recommendations that the MOU Parties would even acknowledge, let alone implement. It would be very interesting, however, and especially very timely if each MOU Party member was evaluated using this same criterion whether their annual product is worth their time.

CDFW believes the MOU Consultants, LADWP, and the County do not have the expertise to construct a successful Blackrock Waterfowl Management Plan (BWMP) (CDFW response to the 2019 Annual Report). Consultants do believe that the Parties, and especially the County and the City, have the expertise to successfully produce a plan. It's not expertise that is lacking, its process. MOU Consultants have stated numerous times, "It's not the lack of science stagnating LORP progress, it's the failure of the MOU Parties (As Dr. Patton also pointed out) to apply proper Adaptive Management evaluations and follow-up with implementation".

Take-Away

Consultants have now submitted to the MOU Parties over 100 recommendations and solutions that they should test and evaluate to determine their value to improve LORP conditions. From pre-project studies to now, The LORP has engaged over 30 different Consultants. This large number of Consultants have included some of the best river and ecosystem scientists in the world. These scientists have presented to the MOU Parties countless ideas and innovations for future management of the LORP. The MOU Consultants, during the most critical time period to gain restoration success (2007 to 2012), listed 35 very important Adaptive Management Recommendations that needed to be tested and evaluated. Like all other recommendations, they were ignored by the MOU Parties. At the same time the MOU Parties were ignoring the MOU Consultants, they could not by themselves come up with anything of value.

The MOU Parties have ignored the abundance of council and advice provided whether it be good or bad. Of course, it was fortunate that the Parties did ignore the bad advice. However, their constant failure to ignore good advice stymied any possible LORP improvement. Based on the past track record this will continue into the future. The MOU Parties do not have the

desire, knowledge, process, or the ability to work together to come up with solutions to problems. This past history alone demonstrates that its useless for the MOU Parties to continue receiving Consultant input as directed for in the 1997 MOU and the 2004 EIR. This MOU Party dismal historic record is a major reason the MOU Consultants now recommend it is in the best interest of the LORP to now fire the MOU Consultants.

OVC and the Sierra Club also justify their frequent Consultant firing recommendations because nearly all the MOU Consultants Adaptive Management Recommendations, in the past 5 or 6 years, except some related to grazing management, have not been implemented by Inyo County or LADWP. This indicates, to the OVC and Sierra Club, that Inyo County and LADWP lack confidence in the MOU Consultants work. OVC and the Sierra Club do have a very valid point here as the 30 plus Consultants that have input into the LORP process received very little consideration or attention from any of the MOU Parties.

Another justification for firing is that there is almost no communication between the MOU Parties and the Consultants at any time. It has been years since some of the MOU Parties have had any communication with their MOU Consultants. As a result, Consultants are alone and now restricted almost entirely to just reviewing Annual Reports. With only this information to work with they are expected to come up with Adaptive Management Recommendations that will then be mainly ignored.

The 1997 MOU requires the MOU Consultants, while conducting their LORP responsibilities, to work under the direction of the County and the City. The County and City have given good productive direction to the Consultants. They did, however, apply some very tight restrictions. The County and City direct the Consultants through Task Orders. These Task Orders do not allow the Consultants to do any scientific research, any scientific searches, collect any data, conduct significant LORP field observations, nor develop and improve any monitoring approaches. During 2020, the City did not give the MOU Consultants a contract to perform on site field review of grazing conditions in the Spring or Fall.

The Task Orders restrict MOU Consultant participation to be expended mainly on reviewing the Annual Report. From this report Consultants must come up with recommendations based only on the information in these reports. Annual Reports have not given the Consultants everything they needed to work with. Needed information, testing, and evaluation was always insufficient to allow Adaptive Management Recommendations to receive proper consideration. MOU Consultants were restricted to only one, two-day per year field trip, to evaluate and understand what was going on with the Lower Owens River. As stated before, very limited communication existed between the MOU Parties and the MOU Consultants. This caused a dampening of potential progress that could have been made in the LORP. All of the above does justify, however, firing the MOU Consultants because there is not much that ANY consultant can do to help the Parties now or in the future.

CONSULTANTS RECOMMENDATIONS

RECOMMENDATION # 1 – LAND MANAGEMENT – GRAZING

The MOU Consultants recommend the City maintain current grazing strategies and their present forage utilization standards until any proposed changes or increases are well studied and thoroughly evaluated for environmental effects on fish, wildlife, and riverine-riparian conditions. Recommended changes for increases should first successfully pass through the Adaptive Management process. These evaluations need to demonstrate via real data, justifiable scientific information, and adequate testing and evaluation that the recommended increases will not impact any “target species”, or “species of concern”. The evaluations must determine if any effects from the increase will occur to the above-mentioned species habitat, or apply a limiting factor to any of their life cycle needs. Evaluations must also detriment if there will be any impacts to the Lower Owens River and its bordering riparian habitat. When trying to fix a problem that isn’t broken, the initiator deserves to be put through the test of reality and reliability. The Consultants believe the City does not have its “ducks-in-order” to even approach this proposal at this time.

RECOMMENDATION # 2 – ACTIVE MANAGEMENT POTENTIAL

The MOU Consultants recommend the MOU Parties approach, evaluate, and implement active interventions very slowly and very cautiously. And then only after solid justification for success and economic feasibility are demonstrated. Active management applied to the LORP at the magnitude needed to result in any significant improvement in LORP resources is going to be very difficult, and very expensive. Its implementation and especially follow up maintenance could use up very large amounts of treasure and time. MOU Consultants predict little benefit will be gained from all this over-time. The MOU Party track record of applying active management (which was not passed through the Adaptive Management process as it should have been) has been very dismal and very unproductive. The MOU Consultants predict this will also be the case in the future.

RECOMMENDATION # 3 – WATER VOLUME AND FLOW CONTROL STRUCTURES

The MOU Consultants still believe this recommendation has some merit and still recommend that the possibilities of this approach should still be evaluated by the Scientific Team before it is discarded.

RECOMMENDATION # 4 – ANNUAL REPORT CONTENTS

The MOU Consultants recommend the County and the City, in preparation of future Annual Reports, emphasize Adaptive Management. Their needs to be less emphasis on compliance and especially the large grazing Chapter. Instead, stress Adaptive Management needs, process, evaluation, and implementation. The grazing portion that takes up most of the report could be cut drastically and still provide all the needed

information. Like previous annual reports, the 2020 draft Annual Report still places Adaptive Management Recommendations (AMRs) in the back of the report, which epitomizes the importance AMRS in LORP management.

Over 100 recommendations have now been made by Consultants. Very little reaction to this has showed up in Annual Reports. Future reports need more discussion and analysis of Adaptive Management Recommendation's worth and why they should or should not be implemented. Dr. Patton's statement (and supported by other MOU Parties) that the LORP Adaptive Management process has been a failure should be a wake-up call.

RECOMMENDATION # 5 – 2021 PRELIMINARY ACTIVE INTERVENTION WORKSHOP

The MOU Consultants recommend that the MOU Parties sponsor a "Preliminary Active Intervention Workshop" in 2021. This Workshop would initiate the process of determining if there are any active management actions that are economically and physical feasible and could result in a significant benefit to LORP resources. To get actual long-term benefit pay-offs from implementing any active intervention may not be possible, but no one will know until the homework is done.

RECOMMENDATION # 6 – FIRE THE LORP MOU CONSULTANTS

The MOU Consultants recommend that the MOU Parties fire the MOU Consultants. The last 23 years have more than demonstrated that the MOU Parties do not have the desire, the experience, the process, the knowledge, and especially the communication-collaboration ability to benefit from ANY Consultants advice, insight, knowledge, experience, or recommended Adaptive Management solutions. Therefore, the MOU Parties and the LORP have nothing to lose by firing the MOU Consultants.

A PARTING SHOT

The MOU Consultants, 13 years ago, way back in the early beginning of the LORP (Consultants 2007 Letter to all MOU Parties), pleaded with the MOU Parties to not set Lower Owens River flows via Stipulation and Orders. Consultants sent this letter of council to all MOU Parties because they firmly believe, and time has proven them right, sufficient knowledge and experience was not yet available to start setting any river flow levels and timing in concrete. They knew that codified flow management would never be changed in the future. Consultants predicted way back then this tact would badly affect the future of the LORP. This council was completely ignored by the MOU Parties and the Parties even went on record that this was not the business of the MOU Consultants. Consultants were advised to stay out of this issue in the future.

8.0 PUBLIC MEETING AND COMMENTS

8.1 LORP Annual Public Meeting

The LORP 2020 Draft Annual Report public meeting was held on December 17, 2020 at 1:00pm. Due to the COVID-19 pandemic, the meeting was hosted virtually on Zoom. Ten staff members from LADWP and Inyo County Water Department (ICWD) were in attendance as well as nine members of the public. An audio recording of the meeting can be made available upon request.

8.2 LORP 2018 Draft Annual Report Comments

The comment period for the LORP 2020 Draft Annual Report was from December 2, 2020 through January 8, 2021. LADWP and ICWD accepted comments through January 29, 2021 due to MOU Party requests for extension of the comment period.

8.2.1 Sierra Club/Owens Valley Committee

Via Email

Date: January 13, 2021

From: Owens Valley Committee
Kammi Foote, President
PO Box 77
Bishop, CA 93515

Sierra Club
Lynn Boulton, Chair Range of Light Group
PO Box 1973
Mammoth Lakes, CA 93546

To: Aaron Steinwand, PhD
Water Director
Inyo County Water Department
PO Box 337
Independence, CA 93526

Adam Perez
LA Aqueduct Manager
Los Angeles Department of Water and Power
300 Mandich Street
Bishop, CA 93515-3449

Subject: Draft Lower Owens River Project 2020 Annual Report Comments

Dear Dr. Steinwand and Mr. Perez:

The Owens Valley Committee and the Sierra Club are resubmitting the comments made last year on the 2019 Lower Owens River Project Annual Report as the riverine portion of the project has not changed and our recommendations still stand. The riverine system is not healthy and the problems need to be addressed. We are requesting a meeting to discuss possible adaptive management actions for the riverine habitat this year so that changes to how it is managed could be implemented in 2022. We asked for a meeting last year and we request it again this year.

We support the adaptive management changes in the Delta Habitat Area, but are concerned about how the effectiveness of the changes are going to be evaluated. What is the vegetation baseline that will be used to assess the vegetation change? We are concerned that the proposed changes in avian monitoring for 2021 might make it difficult to compare with the older data. We ask that these concerns be addressed in the final report.

We also support the development of the five-year interim plan to improve conditions in the Blackrock Waterfowl Management Area based on the elements of the proposed plans described in the 2019 LORP Annual Report and discussed at the 2014 LORP Summit. We urge you to complete the plan this spring so these critical changes are implemented this year.

Sincerely,

Mark Bagley

Mark Bagley
Sierra Club MOU Representative
For Owens Valley Committee and Sierra Club

cc: Kammi Foote, OVC President
Lynn Boulton, Chair Sierra Club Range of Light Group
Don Mooney, OVC Attorney
Larry Silver, Sierra Club Attorney

Attachments: 2 comment letters- February 25, 2020 and March 6, 2020

VIA EMAIL

Date: February 25, 2020

From: Owens Valley Committee
Mary Roper, President
P.O. Box 77
Bishop, CA 93515

Sierra Club
Mark Bagley, 1997 MOU Representative
Lynn Boulton, Range of Light Group Chair
P.O. Box 1973
Mammoth Lakes, CA 93546

To: Aaron Steinwand, Ph.D.
Water Director
Inyo County Water Department
P.O. Box 337
135 S. Jackson St.
Independence CA 93526

Mr. Clarence Martin
Manager of Aqueduct
Los Angeles Department of Water and Power
300 Mandich Street
Bishop, CA 93514-3449

Subject: Draft Lower Owens River Project 2019 Annual Report Comments

Dear Dr. Steinwand and Mr. Martin,

This comment letter on behalf of the Owens Valley Committee and Sierra Club responds to several of the recommendations contained in the 2019 LORP Evaluation Report, Volume II. We will submit a second comment letter that will address the remaining recommendations and other questions and concerns raised in the 2019 Draft LORP Annual Report.

Recommendation for riverine-riparian pilot project to improve riparian forest (p. 7-95)
"Inyo staff recommends the LORP Scientific Team develop a pilot project to establish new and enhance existing riparian forest, which by necessity will include adaptive and active management. A plan could include a systematic pole-planting or seeding approach to test several viable locations along the river. . ." We support this idea as the decrease of LORP riparian forest is a major concern for us and an area where the project goals are not being met. In developing the pilot project it is critical to identify areas with the best chance of success and focus in those areas.

LADWP should reconsider its position that such a project must be supported by outside funding or volunteer efforts. Improvement of LORP riparian forest habitats must be done to meet the Project's goals. Adaptive management is supposed to be a major part of the LORP implementation and after 12 years it is time for something to be done after decline in riparian forest by 259 acres from 2000 to 2017. (Table 6, p. 7-47).

Recommendation for riverine-riparian SHF Procedure (p. 7-95)
This recommendation proposes *"a modified process for setting the annual SHF timing by the LORP Scientific Team to allow for the SHF release earlier in the season when water temperatures are lower"* and would remove the Standing Committee approval required in the MOU. The 1997 MOU (p. 12) provides that *"the amount of the annual habitat flow will be set by the Standing Committee"* in consultation with DFG (now California Department of Fish and

Wildlife) and in compliance with certain court orders and based on certain elements of the LORP Plan. So, it is the **amount** of the SHF that is set by the Standing Committee, not the timing. This recommendation needs to reflect that fact. We understand the amount of the SHF to essentially be the hydrograph of the flow; how high is the peak flow and what is the ramping and duration of the SHF.

We understand that the reason to move approval to the Scientific Team from the Standing Committee is to facilitate possible SHF earlier in the season, given that the amount of SHF is based on the April 1 runoff figures and that the Standing Committee does not meet until some time in May. In some years this has led to delays in releasing the SHF until water temperatures have risen to levels that can threaten water quality and fish health. We also understand the competing goals of timing the SHF with the release of willow and cottonwood seeds and the protection of the warm water fishery by releasing the flows when water temperatures are not too high.

This recommendation does not correctly indicate the necessary approvals needed to implement the recommendation. The columns on p. 7-95 indicate that approval is needed from the LORP Scientific Team and the Inyo/LA Standing Committee. Approval is not needed from either of these. Since the 1997 MOU establishes the Standing Committee as the entity that sets the amount of the SHF, it is the MOU Parties that will need to modify the MOU in order for this recommendation to be implemented.

As noted above, the recommendation as written only mentions timing of the SHF. It should address the timing **and the amount** of the SHF. We would support a change that confers that authority to the Inyo-LA Technical Group (not the ill-defined LORP Scientific Team), after consultation with California Department of Fish and Wildlife (CDFW). (Please correct the reference to the California Department of Fish and Game in the second column of the recommendation on p. 7-95.)

However, we are very concerned with the notion set forth in the last paragraph of the Evaluation Report, Vol. II, Section 1.1.2.1, p. 7-35, that the amount of the SHF must be as set forth in LORP FEIR Charts 2-1 and 2-2. That paragraph states: *"FEIR Charts 2-1 and 2-2 clearly specify the SHF amounts and schedule. CDFW through more than a decade of annual consultation is well aware of the SHF procedure as is the Standing Committee. Once the Eastern Sierra Runoff Forecast is completed, if there is no deviation from the SHF policy specified by the FEIR, then CDFW and the Standing Committee members should be notified that the SHF has been set according to Charts 2-1 and 2-2. SHF flows could then begin one week after the Standing Committee and CDFW have been notified and as water temperatures dictate."*

We do not believe that the amount of the SHF must be as set forth in the LORP FEIR. The 1997 MOU provides (p. 12) that the Standing Committee will set the amount of the SHF, in consultation with DFG, and based on the MOU Consultants' LORP Plan *"which will recommend the amount, duration and timing of flows necessary to achieve the goals for the system under varying hydrologic scenarios."* Such direction would not be needed in the MOU if the Parties expected the MOU Consultants recommendation to be the last word on what the amount of the SHF should be in any given year. In fact, the MOU provides that there be consultation with

DFG (now CDFW) and the final decision each year lies with the Standing Committee. The MOU and the LORP Plan also make it clear that Adaptive Management is a very important element in implementation of the LORP. This also supports the argument that the Standing Committee could modify the recommendation in the MOU Consultants' LORP Plan. Such flexibility should be retained in any proposal to transfer authority to set the amount of the SHF from the Standing Committee to the Technical Group. A provision for a real opportunity for consultation with CDFW also should be retained in any proposal. Please include in any proposal how the process would work if the Technical Group cannot agree on the timing and amount of the SHF.

Recommendation regarding Riverine Aquatic Habitat and Recreational Fishery Goals (p. 7-96)
"It is recommended that an electroshocking fish survey be conducted by CDFW at various locations in the Lower Owens River to estimate current species composition." We concur with this recommendation.

Recommendations regarding Delta Habitat Area (pp. 7-97, 7-98)
"It is recommended to implement a modified flow regime in the DHA for 5 years on an interim basis to further improve habitat conditions." We understand this proposal would reduce flows to the DHA in the summer and increase flows in fall and spring with the goals of arresting conversion of meadow to marsh, maintain more open habitat, and provide more water during bird migratory and overwintering periods. It would do this while complying with the 1997 MOU requirement (p. 15) for an annual average flow to the DHA of 6 to 9 cfs (not including water that is not captured by the pump station during periods of the SHF). We concur with this recommendation. This sounded like a good idea when we heard it discussed at the 2014 LORP Summit and we have supported it since then.

This change in flow management is recommended as a 5 year interim project. It is stated (p.7-68) that *"A program to evaluate the effectiveness of this flow strategy in enhancing habitats will be developed. After a five-year period, an assessment will be conducted to determine the effectiveness of the proposed flow refinements."* To properly evaluate the effectiveness of the change in flow management, habitat mapping should be done at least at the beginning and the end of the 5 year interim period. It appears that the most recent mapping of the DHA habitats was done in 2017 (pp. 7-57, 7-58), so new mapping should be done in 2020.

Please consider in developing the plan a provision for possible active intervention in the event that the plan works to actually reduce the extent of tall marsh vegetation (hopefully it will at least stop further expansion). If significant marsh vegetation actually dies, please consider a controlled burn or discing with a tractor in the area of the dead marsh or other measures to facilitate conversion to meadow.

Recommendation for modifying the flooding regime at the Blackrock Waterfowl Habitat Area (pp. 7-98, 7-99)
This recommendation proposes that *"The LORP Scientific Team will develop a five-year interim management plan for the BWMA that describes a proposed seasonal flooding regime for improved habitat conditions."* Elements of the proposed plan are described in Section 1.3.1 and

are much like the ideas that were discussed at the 2014 LORP Summit. We concur with this recommendation. This sounded like a good idea in 2014 and we have supported it since then. We would welcome a written proposal for changing the MOU to allow implementation of such an interim plan.

In developing the details of the plan we think consideration should be made to keep some open water available for waterfowl year-round, perhaps some 10 to 20 acres, to benefit resident waterfowl. Also, consideration of the timing of spring drawdowns needs to take into account the needs of waterfowl chicks and fledglings.

Recommendation regarding Off-River Lakes and Ponds (p. 7-99)
"It is recommended that an electroshock fish survey be conducted by CDFW at the ORLP to provide an estimate of current species composition." We concur with this recommendation.

Recommendations for Recreation, Grazing, and Noxious Species Management (p. 7-100)
We concur with these recommendations.

This concludes our comments at this time. We appreciate the lengthy evaluation done in this annual report and will provide additional comments by March 2.

Sincerely,

Mark Bagley

Mark Bagley
For Owens Valley Committee and Sierra Club

cc: Mary Roper, OVC President
Lynn Boulton, Sierra Club Range of Light Group Chair
Don Mooney, OVC Attorney
Larry Silver, Sierra Club Attorney

VIA EMAIL

Date: March 6, 2020

From: Owens Valley Committee
Mary Roper, President
P.O. Box 77
Bishop, CA 93515

Sierra Club
Mark Bagley, 1997 MOU Representative
Lynn Boulton, Range of Light Group Chair
P.O. Box 1973
Mammoth Lakes, CA 93546

To: Aaron Steinwand, Ph.D.
Water Director
Inyo County Water Department
P.O. Box 337
135 S. Jackson St.
Independence CA 93526

Mr. Clarence Martin
Manager of Aqueduct
Los Angeles Department of Water and Power
300 Mandich Street
Bishop, CA 93514-3449

Subject: Draft Lower Owens River Project 2019 Annual Report Comments

Dear Dr. Steinwand and Mr. Martin,

This second comment letter on behalf of the Owens Valley Committee (OVC) and Sierra Club provides our comments and some questions on the Draft LORP 2019 Annual Report, including on a few recommendations contained in the 2019 LORP Evaluation Report, Volume II, that we did not comment on in our first letter of Feb. 25, 2020.

OVC and Sierra Club are very concerned about the lack of habitat diversity in the riverine-riparian system. We are very concerned with the over abundance of marsh vegetation, with tules (bullrush and cattails) impeding channel flows, and with the decline in riparian forest habitat. We are very concerned with water quality issues in the river that threaten the fishery and other aquatic biota. We are very concerned that the current flow regime in the river will not attain LORP goals. We are very concerned with the lack of implementation of adaptive management to address these concerns. We are very concerned about the recreational opportunities that the LORP has so far not provided. We are very concerned that the LORP Habitat Conservation Plan has not be completed and implemented. And we are very concerned that the extraordinarily large 2017 emergency water releases into the LORP area have benefited the expansion of saltcedar and perennial pepperweed and that the response to deal with it may be inadequate due to lack of funding.

2.0 HYDROLOGIC MONITORING

2.3 Flows to the Delta (p. 2-4): In this section it is stated that *"The releases to the Delta for the 2018-19 water year resulted in an average of 11.5 cfs flow to the Delta."* On its face this statement indicates that this includes the water released during the SHF period. However, the 1997 MOU states that the amount of water that will be released below the pumpback station *"will be an annual average of approximately 6 to 9 cfs (not including water that is not captured by the station during periods of seasonal habitat flows)."* (p. 15)

What was the average annual flow to the Delta, not including the water released during the SHF period? How much water (in acre-feet) was released to the Delta during the SHF period?

2.11 Seasonal Habitat Flow (p. 2-13): Because 2019 had a runoff forecast of 137%, *"Flows from the LORP Intake were ramped up to a peak of 200 cfs over a period of seven days, before ramping down over another seven days."* According the Appendix 2, River Flow Tables (p. 2-23) the flow at the Below River Intake measuring station was 190.0 cfs on 5/15/2019, the highest in the SHF period.

Please explain why this was not 200 cfs. If a peak flow of 200 cfs was actually reached here, how long was the duration at that flow and how does that comport with the SHF hydrograph in the LORP EIR?

3.0 LAND MANAGEMENT

Utilization (p. 3-32): The Annual Report concludes *"The Islands lease will continue to operate below normal stocking rates due to riparian pastures still being continually inundated. Past and current flow management has perpetuated this problem beyond the Islands lease and is now affecting portions of the Blackrock lease. Continued loss of meadow habitat and stressed woody species has increased on both Islands and Blackrock leases."*

The 1997 MOU provides in the main goal of the LORP for *"the continuation of sustainable uses including recreation, livestock grazing, agriculture and other activities"* (MOU Section II.B.). The continual inundation of riparian pastures has greatly affected the Islands lease and has more recently begun affecting the Blackrock lease. The inundated area appears to be increasing over time and we expect to see greater and greater effects in those two leases if there is no change in the LORP flow regime.

This has been a problem for some time and for some time OVC and Sierra Club have been asking for change. At the 2014 MOU Party LORP "Summit" meeting, we discussed opening the channel on the east side of the Islands to improve flow through and decrease the spreading. This is something that the Islands lessee had been proposing for several years. We also discussed improving the water conveyance from the Alabama Gates to the river to augment flows in the reaches below the Islands so that flows reaching the Islands could be lowered. We were told that Inyo and LA would study both of those issues. Neither study has been done and the problem of extensive loss of meadow habitat, replaced by tule marsh, has only gotten worse and is now affecting portions of the Blackrock lease. The goals of the project are certainly not being achieved in the Islands reach and the MOU requires that adaptive management measures be identified and implemented.

Bassia (p.3-32): The recommendation to increase utilization to 65% on certain pastures where Bassia abundance has not decreased is something we support on a trial basis. During this trial careful monitoring of its effect on Bassia and on overall range condition must be conducted.

Tamarisk Beetles (p.3-34): *"The northern tamarisk beetle (Diorhabda carinulata) was*

observed on the LORP Area in 2017 and has increased its presence across the entire LORP Project area. During the summer of 2019, widespread herbivory was observed, increasing the likelihood of large scale tamarisk mortality. The LORP Scientific Team should develop a management strategy to address the beetle." It is good news that the beetles have increased and spread and that widespread herbivory was observed. However, monitoring of tamarisk (saltcedar) mortality due to the beetle needs to be conducted and effective control of tamarisk by the beetles needs to be established before there is any slow down in the current efforts at tamarisk control.

Prescribed Fire (p.3-36): *"Given the lag time between burn preparation and actually getting fire on the ground by CalFire, mowing instead of discing should be the first choice for future preparation for prescribed burns."* We agree with this recommendation and believe that carefully controlled burns can, along with mowing and high intensity short duration grazing, reduce shrub encroachment and increase native perennial grass cover and density in both riparian and upland management areas. Prescribed fire should also be investigated as a means in some riparian areas where it might create favorable habitat for seedling tree willows and cottonwoods by exposing bare soils. This would likely need to be used in conjunction with some other methods where there is existing dense herbaceous vegetation to kill persistent rhizomes.

4.0 LORP SALTCEDAR TREATMENT

We are pleased to see that LADWP has continued its saltcedar (tamarisk) control program and hope that it continues with this effort. However, we did not see any analysis in the 2018 or 2019 LORP Annual Reports about saltcedar expansion or establishment as a result of the very high 2017 emergency releases in the LORP area, both in the river and into spreading basins. We expect that there would have been significant establishment of saltcedar due to those emergency flows. LADWP should fund surveys to determine if and where new saltcedar has become established due to the emergency releases in the LORP area. Because those releases were not part of the LORP, they were an emergency action to meet other LADWP operational needs, they should not be considered part of the post-implementation costs that Inyo County contributes to. If, as we expect, significant saltcedar establishment has occurred, treatment for that should likewise not be considered part of the post-implementation costs. It should be considered mitigation for the effects of LADWP's emergency actions.

As noted on p. 4-1 and in our comment above on the tamarisk beetle *"the current effect of the beetle on the LORP invasive saltcedar populations is unknown. The landscape-level control of saltcedar through this biocontrol agent is a worthwhile area of study and/or monitoring."* We request such monitoring be included in the 2020 LORP Work Plan.

5.0 LORP WEED REPORT

Perennial pepperweed (*Lepidium latifolium*), along with saltcedar, is the most concerning weed in the LORP area. We were pleased to see that a Rapid Assessment Survey focusing on pepperweed was conducted in 2019. We are concerned with the observation that the density of pepperweed detections has increased in recent years. (p. 5-3) We strongly agree with the statement that *"The LORP workplan for the 2020 fiscal year should identify the necessary*

resources required to adequately monitor any undesirable spread downstream from the two problem areas described above." (p. 5-3)

The Inyo and Mono Counties Agricultural Commissioner's Office (CAC) report in Section 5.1.3 stated that the most significant management difficulty is *"maintaining adequate staffing for effective management of such a large project"* and that *"If additional funding could be acquired, the dedication of seasonal staff to work solely within the LORP project area would be preferred in future years, allowing greater focus and progress on the project."* (p. 5-9) It is stated that given available resources their focus is *"on treating to gain control and prevent the geographic spread of weeds."* (p. 5-9) We recommend that in the 2020 LORP Work Plan additional funding be provided to CAC so they can dedicate seasonal staff to work only in the LORP area. Because the very high 2017 emergency releases in the LORP area resulted in the expansion of pepperweed and because the releases were not a part of the project (they were not released to benefit the project, rather as an emergency action to meet other LADWP operational needs), LA should fund an increase in perennial pepperweed eradication efforts as a mitigation for its emergency releases. Additionally, as part of the 2020 LORP Work Plan, grant proposals should be prepared to try to secure outside funding for this effort.

6.0 LORP WATER QUALITY OBSERVATIONS

It should be noted that the water quality figures show a significantly higher DO at the Pumpback Station compared to DO at a similar position on the flow curve at the Reinhackle flow station. Is this likely due to water quality improving as the flow slows down and spreads out through the extensive marsh in the Islands?

7.0 LORP 2019 EVALUATION, VOLUME I

Please include a link to where the various legal documents can be found on the internet.

Introduction: It is stated in the Introduction to Volume I of the LORP 2019 Evaluation that *"The biological and ecological processes that shape the project appear to have reached a more or less stable condition. The question we need to explore is, is this LORP satisfactory— does it meet the goals assigned the project? If not, what initial presumptions, found to be fully unattainable can we dispense with; and/or what reasonable actions can be taken to achieve goals?"* No, it does not meet all the goals assigned to the project. How can it be determined if any of the "initial presumptions" are "fully unattainable" if substantive adaptive management has not been implemented?

2.5 2005 Court Order (7-6): This section is inadequate as a summary of the project history related to this lawsuit. A more complete summary of the case should include that the presiding judge found that LA had been in violation of CEQA for over 30 years; that the judge enjoined LA from using the Second LA Aqueduct to export water from the Owens Valley; that the judge stayed that injunction if LADWP met a series of conditions which included the $5,000 per day penalty mentioned in the annual report which was in effect until the LORP was implemented. The judge's conditions also included deadlines for LADWP to initiate Phase 1 river flows and to initiate full base flows; restricted LADWP's groundwater pumping by about a third of what they

had planned; and ordered LADWP to spread 1,600 acre-feet of water per year in the Owens Valley to recharge groundwater until the project was implemented. Finally, if LADWP did not meet all of the conditions of the stay, the judge would permanently shut down the Second LA Aqueduct. This more complete summary needs to be included in this section.

2010 LORP Second Revised EIR Addendum for Augmentation of Seasonal Habitat Flows: This EIR Addendum and the lawsuit that resulted in it was left out of the Section 2, Project History and Legal Guidance. This is an important part of the legal guidance and must be included in the Final 2019 LORP Annual Report. The judge in this case found that LADWP was in violation of the 1997 MOU because they specifically stated in the LORP EIR project description that the 200 cfs SHF would only be released from the Intake and did not include augmentation from downstream sources as a potential adaptive management measure. This was a violation of the MOU because the MOU Consultants had included augmentation in the LORP Ecosystem Management Plan, which the MOU required to be the basis for the EIR project description. The EIR Addendum changed the EIR to allow augmentation of SHFs of up to 200 cfs at the Pumpback Station.

7.0 LORP 2019 EVALUATION, VOLUME II

Included here are our comments on the recommendations that we did not address in our first comment letter on Feb. 25, 2020.

Recommendation to conduct focal species analysis in the riverine-riparian area (p. 7-96)
We concur with this recommendation.

Recommendation to discontinue CWHR assessment in the riverine-riparian area (p. 7-96)
We concur with this recommendation so long as the avian habitat model that is developed is based on local factors and will be an improvement on the more generalized CWHR assessment.

Recommendation to conduct avian surveys during migration periods in the riverine-riparian area (p. 7-96)
This would be conducted to *"better quantify the use of the LORP as stopover habitat for migrants traveling along the Pacific Flyway. Surveys will be conducted based on staff availability."* This is a good idea, but given probable staffing constraints we recommend outreach to involve citizen scientists who might be able to help conduct the surveys.

Recommendation to discontinue CWHR assessment in the BWMA (p. 7-98)
We concur with this recommendation so long as an avian monitoring protocol is established that is geared to monitoring the effectiveness of the modified flooding regime.

Recommendations to meet water quality objectives (p. 7-101)
We concur with the recommendation to request that LRWQBC amend its beneficial use designation for the LORP as a cold water fishery since it is managed as a warm water fishery.

The recommendation to release high flows during cooler months to reduce the potential for hydrogen sulfide releases, may conflict with the goal of having the SHF timed with release of

cottonwood and willow seeds. We support this recommendation as it will protect the fishery, which is also a goal of the project. However, it may necessitate some active management measures to encourage establishment of cottonwoods and willows.

8.0 MOU CONSULTANTS' ADAPTIVE MANAGEMENT RECOMMENDATIONS

Consultants' Ten Adaptive Management Recommendations: In the Final 2019 LORP Annual Report Inyo and LA should provide their rationale for accepting or not accepting each of the consultants' ten recommendations.

River Flow Management vs. Active Management Options: The MOU Consultants try to make the case that essentially the MOU Parties should give up on trying to modify the Lower Owens River flow regime. They write about "uniform base flows" and "insurmountable constraints" and make the case that it is time to consider other approaches, including some active management.

We disagree that the base flows are uniform. To read the consultants' remarks one would think the 40 cfs base flow is uniform throughout the river over the whole year, with the exception of the SHF. In fact, the 40 cfs legal requirement is for a minimum base flow throughout the river year round. A look at the Hydrological Monitoring Appendix 1 graphs makes it clear that the base flows are significantly higher for about 4 months in the growing season. However, below the Mazourka Canyon Road flow station the difference in the growing season flows are attenuated to where the flows at the Pumpback Station are not so different seasonally. This effect is likely due to the fact that the great majority of the base flow is released from the intake with the goal to maintain the 40 cfs base flow at the Pumpback Station, that in the Islands (Reach 4) the flow is greatly decreased while flow losses are increased, and the lower reaches of the river are gaining in the winter.

Very little in the way of adaptive management of river flows has been attempted so far. Adaptive management is supposed to be a major feature for management of the LORP, but has been little used in the riverine-riparian system. OVC and Sierra Club continue to support modification to the LORP flow regime through adaptive management, as the current flow regime clearly has not and will not attain LORP goals. The river flow constraints in the legal documents may not be "insurmountable constraints". We recommend that the MOU Parties meet to discuss river flows when the Parties meet to address the MOU changes needed to implement some of the recommendations that Inyo and LA have proposed in Volume II of the 2019 LORP Evaluation Report.

We realize that some of the "insurmountable constraints" noted by the MOU Consultants are infrastructure constraints where Inyo County roads and bridges cross the river, and infrastructure concerns on the Owens Lake playa where LA has ~~its~~an extensive dust control project. We recommend that studies be conducted to actually determine the constraints imposed by the desire to protect the existing infrastructure. We were told at the Annual Report public meeting that the 2017 flows of 300-325 cfs damaged roads and bridges at some of the river crossings. But those high flows were maintained for an extended period of time. The question remains, what is a safe limit for the roads during a short duration high pulse flow, say 300 or 400 cfs or even higher,

ramped up and down over a one or two week period? What is a safe limit for dust control infrastructure for a similar short duration high pulse flow past the pumpback station?

Given the current situation that after about 13 years of implementation of the LORP, there exists a great abundance of bullrush and cattails (tules) and a marked decline of trees in the riverine-riparian system, we firmly believe that adaptive management through active management measures such as tree planting and channel clearing of tules in selected areas must be implemented. We recommend that pilot projects for these activities be developed in the 2020-2021 LORP Work Plan and implemented in the following year.

MOU Consultants: The 1997 MOU sets forth the MOU Consultants: *"As used in this MOU, the word "Consultants" means Ecosystem Sciences, or their successors."* (p. 3) Selection of Successor to Consultants is the topic of Section V of the 1997 MOU (p. 33) in which it is stated *". . . should Ecosystems Sciences and/or one of its principal scientists (Mr. Mark Hill and Dr. Bill Platts) become unavailable, the Board of Water and Power Commissioners will choose a successor or successors . . ."* For some time Ecosystem Sciences has not been contracted to act as the MOU Consultants. Mr. Hill and Dr. Platts have been contracted as individuals to work in that capacity.

OVC and Sierra Club reiterate a recommendation made by OVC in 2014: the MOU Parties should consider retiring the current MOU Consultants (memo to MOU Parties, Sept. 7, 2014). Mr. Hill and Dr. Platts have been involved with this project since before the MOU was finalized and it may be time for new consultants with a fresh look at the issues. The 2018-2019 budget for the consultants was $52,456 (p. 7-16), but it is not apparent to us that the value of products received from the consultants are worth the expense. For example, Inyo and LADWP staffs do the fieldwork and reporting and nearly all of the consultants' adaptive management recommendations in the past 5 or 6 years, except for some related to grazing management, have not been implemented by Inyo and LA. This indicates to us a lack of confidence in their work. The MOU parties may consider options for directing the saved money into scientific research and data collection and analysis, and OVC and Sierra Club suggest this be done as a cooperative effort.

LORP ADAPTIVE MANAGEMENT

The MOU provided that a program for data collection, analysis, and reporting be developed as part of the plan and that *"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**."* (emphasis added, MOU Section II.E Monitoring And Reporting Plan - Adaptive Management, p. 18)

Adaptive management was supposed to be a major component of LORP management, but it has been little used to date even though it has been clear that some MOU goals are not being met nor are even on a trajectory toward reaching the goal. We are pleased to finally see adaptive management being planned for the BWHA and DHA. We will focus our comments on adaptive management in the riverine-riparian system because improving the quality of the river and

adjoining habitat are the most important parts of the project. The river needs to be healthy for future generations.

Riverine-Riparian System: As noted above (under River Flow Management vs. Active Management Options), OVC and Sierra Club continue to support modification to the LORP flow regime through adaptive management, as the current flow regime clearly has not and will not attain LORP goals. The river flow constraints in the legal documents may not be "insurmountable constraints" as suggested by the MOU Consultants. We recommend that the MOU Parties meet to discuss river flows when the Parties meet to address the MOU changes needed to implement some of the recommendations that Inyo and LA have proposed in Volume II of the 2019 LORP Evaluation Report.

As previously stated in this letter and in past years, OVC and Sierra Club also support adaptive management through active management measures such as tree planting and channel clearing of tules in selected areas.

Some of the problems in the riverine-riparian system that should be addressed through adaptive management include:

- Tules (bullrush and cattails) impeding channel flows.
- Lack of habitat diversity, including an over abundance of tule marsh and a decline in tree habitat by 259 acres from 449 acres in 2000 to 190 acres in 2017. (Table 6, p. 7-47)
- *"Riparian trees and shrubs are a necessary component of the habitat for many of the habitat indicator species as they provide foraging opportunities, nest sites, perch sites, and cover. Although wetland land types have increased in response to LORP, the current trajectory of vegetation succession in the LORP is toward the development of an elongated marsh, and a continued decline of riparian trees as recruitment is not keeping pace with the loss of woody riparian vegetation due to fire, beaver activity, and mortality from continuous inundation."* (p. 7-49)
- Water quality issues, primarily low dissolved oxygen (DO), in the river in warmer months that threaten the fishery and other aquatic biota.
- Release of SHF during cooler months to reduce the potential for stressful or lethal low levels of DO and/or releases of hydrogen sulfide, may often conflict with the goal of having the SHF timed with release of cottonwood and willow seeds. This protection for the fishery may necessitate some active management measures to encourage establishment of cottonwoods and willows, which have not done well even when SHF has been released at the time of their seed fly.
- The continual inundation of riparian pastures in the Islands lease has caused extensive loss of meadow habitat, replaced by tule marsh, and stressed woody species. Tule marsh continues to expand reducing livestock stocking rates. This has greatly affected the Islands lease and more recently has begun affecting the Blackrock lease.
- Invasive non-native weed species, perennial pepperweed and saltcedar, continue to be persistent problems. LADWP's emergency 2017 water releases into the LORP area appear to have exacerbated those problems.

- It appears that the current flow regime in the river will not attain LORP goals.
- It is unknown what the upper limit is for a safe peak river flow that would protect road infrastructure in the LORP in a short duration high pulse flow event.
- It is unknown what the upper limit is for a safe peak flow past the pumpback station that would protect dust control infrastructure on the Owens Lake playa in a short duration high pulse flow event.

The Lower Owens River has been divided into 6 distinct reaches. Adaptive management should try to tailor river flows and any active management to the primary goals for each river reach. Now that the LORP has been implemented for 13 years we should determine what the goals should be and what the potential is for each reach. We list goals for each reach below and our suggestions for adaptive management approaches to address problems in the riverine-riparian system :

- Reaches 1 and 2 have an incised channel. There are three flow augmentation points in Reach 2. Some of the best riparian tree establishment has occurred in these two reaches. Because of the incised channel, SHFs will not reach the old flood plain and the potential for riparian trees is for narrow bands of tree cover. A reasonable goal here would be to establish, maintain and enhance the bands of riparian tree cover and maintain good water quality for a healthy warm water fishery. Shade from the trees helps keep the water temperature down in the summer, thus helping address the problem of low DO.
- Reach 3 does not have a deeply incised channel and SHFs can reach the adjacent flood plain. There are two flow augmentation points in Reach 3. There are a fair amount of mature trees that predate the LORP. However, due to channel aggradation moving northward from the Islands continual inundation causing expansion of tule marsh and threatening tree survival has begun affecting the Blackrock lease in Reach 3. A reasonable goal here would be to halt the continual inundation and maintain the riparian trees. If that can be done, then expansion of the riparian trees, maintenance of the existing riparian meadows, and maintenance of good water quality for a healthy warm water fishery are additional reasonable goals.
- Reach 4 is the Islands where the river gradient flattens and LORP flows do not follow a distinct channel. Flows slow down and spread out inundating a wide area which has killed most of the riparian trees that pre-dated the LORP and converted much meadow habitat into tule marsh. A reasonable goal here would be to reduce the extent of tule marsh, at the to least to halt its expansion, and to hopefully get back some of the meadow and riparian trees that were overtaken by the marsh expansion.
- Reaches 5 and 6 occur below the Islands down to the Pumpback Station. The only flow augmentation point is from the Alabama Gates, which can release flows into the upper part of Reach 5. Portions of these reaches have the best potential for development of a broad riparian forest that potentially could provide habitat for the Western yellow-billed cuckoo, a Habitat Indicator Species, and other riparian forest dependent birds. A reasonable goal here would be to manage for the development of riparian forest in the appropriate portions of the reach and to manage flows to maintain good water quality for a healthy warm water fishery.

- A good place to start with potential adaptive management measures for riverine-riparian system is in the Islands (Reach 4). We support opening the channel on east side of the Islands to improve flow through and decrease water spreading. Given the flatness in the Islands a feasibility study needs to be conducted to determine if improved flow is possible. However, it has been more than five years since Inyo and LA said they would look into having that study done. Perhaps it is time to conduct an empirical experiment and divert some water into the channel and monitor what happens. The goal is to reduce the extent of tule marsh or to at least halt its expansion. This would hopefully halt the expansion of marsh northward into Reach 3 and if flow through is improved it would provide higher flows to Reaches 5 and 6.
- Decrease flows into the Islands during the growing season to decrease water spreading. The goal is to reduce the extent of tule marsh or at least halt its expansion. This would hopefully halt the expansion of marsh northward into Reach 3. To do this, releases from the Intake would be reduced so that instead of flows of 60-80 cfs at Reinhackle Springs from late June to mid September (see pp. 2-24 to 2-27) a target flow of say 40 or 50 cfs would be maintained. This would necessitate augmenting flows below the Islands into Reaches 5 and 6 from the Alabama Gates. This would bring flows back up in those reaches to a target flow that would help meet the goals for those reaches. This in turn would necessitate improving the water conveyance from Alabama Gates to the river and a new flow gauging station below the Islands. An improved conveyance system from the Alabama Gates to the river is essential because water releases now sheet flow to the river where its temperature increases significantly as does its organic material content, thereby decreasing water quality and adding to the potential low DO problem in the river in the warmer months.
- The proposed decrease in releases from the Intake, above, would reduce mid June to early September releases from about 80-99 cfs (see pp. 2-24 to 2-27) to about 60-75 cfs based on observed losses between the Intake and Reinhackle Springs and with the minimal flow augmentation below the intake that occurred in 2019. If under this scenario of reduced growing season flows in Reaches 1, 2 and 3 there is a problem with water quality (low DO) that may be mitigated by augmentation of the base flow at one or more of the five augmentation points between the Intake and Reinhackle Springs. Normal rivers have tributary streams that feed it, augmentation of the base flow would make the Lower Owens River a little more like a real river.
- The reduced growing season flows in Reaches 1, 2 and 3 could help reduce the expansion of tule marsh in Reach 3 and help protect the riparian trees there. Ground water levels should be monitored in Reach 3 to determine if the level is high enough to support trees. Although we don't expect this to be a problem, it nonetheless should be monitored. Annual SHFs help to maintain the high ground water in the flood plain where the trees occur.

The key to the above scenario for improving the riverine-riparian system is in the Islands. If a channel can be opened up to improve flow through and if flows into the islands can be reduced to decrease the area of continual inundation so as to reduce the tule marsh habitat then releases from the Intake can be lowered. This may also have beneficial effects in Reach 3 where

continual inundation is increasing. With compensating augmentation of base flows from the Alabama Gates more targeted flows can be delivered to Reaches 5 and 6. SHF augmentation from the Alabama Gates would give more flexibility in delivering targeted flows into Reaches 5 and 6.

IMPORTANT TOPICS NOT ADDRESSED IN THE DRAFT 2019 LORP ANNUAL REPORT

The following topics need to be included in the Final 2019 LORP Annual Report.

The first two topics are related to recreation, a topic that has consistently been ignored in the LORP annual reports. Once again we object to this omission and point out that the 1997 MOU provides in the main goal of the LORP for *"the continuation of sustainable uses including **recreation**, livestock grazing, agriculture and other activities"* (MOU Section II.B, emphasis added).

Recreational fishery goal in the riverine-riparian system: Providing a healthy warm water recreational fishery is an important part of the MOU goals for the LORP riverine-riparian system as discussed in Section 1.1.5 of the 2019 LORP Evaluation Report, Volume II. (p. 7-38) That section concludes with the statement that *"The goals of creating and sustaining a healthy warm water fishery in the riverine riparian portion of the LORP are being met."* However one of the goals is a warm water **recreational** fishery (emphasis added). That means more than just having healthy fish in the river. Based on anecdotal evidence, we believe that the recreational fishery has declined due to the expansive tules and marshes that effectively block human access to much of the river and some of the off-river lakes and ponds. How this recreational fishery goal is being met should be addressed in the final report. Perhaps some investigation into this should be conducted in 2020 and included in next year's annual report.

The Owens River Water Trail Project: The only mention in the Annual Report of the Water Trail project is in the MOU Consultants Adaptive Management Recommendations (Section 8) where they refer to it as a proposed active intervention because of the mechanical tule clearing in the proposed project. (Section 8, pp. 17, 24-25)

Some channel clearing has already been conducted by volunteers under the direction of Inyo County Water Department staff in order to test its feasibility. Clearly the proposed project would improve channel flow in the relatively short stretch of the river included in the project. OVC and Sierra Club strongly support the Owens River Water Trail project. The channel-clearing portion of the project should be considered a test of an adaptive management measure that could potentially improve channel flow, water quality, and river habitats in other portions of the riverine-riparian system. LADWP's position that this is strictly a recreation project that is not part of the LORP, is untenable as it has an adaptive management component and sustainable recreation is included in the LORP goals set forth in the 1997 MOU.

The current status and description of the work done on this project in 2019 needs to be included in the Final 2019 Annual Report.

LORP Habitat Conservation Plan: A key element of the LORP Ecosystem Management Plan is a Habitat Conservation Plan (HCP). As stated in Attachment A of the 1997 MOU (p. 6), *"This plan will identify conservation areas within the Planning Area which will be managed to facilitate restoration of threatened and endangered species to viable populations. The intent of this element is ultimately to achieve sufficient recovery of these species to warrant delisting them, while providing for the continuation of sustainable uses, including recreation, agriculture, and aqueduct operations."* Threatened and endangered species are defined in the MOU as *"all native plant and animal species listed as such under federal or state laws and regulations adopted pursuant to such federal or state laws."* (p. 6)

Threatened and endangered species that are included on the list of LORP Habitat Indicator Species are:

- Owens tui chub
- Owens pupfish
- Swainson's hawk
- Western yellow-billed cuckoo
- Willow flycatcher

At the request of LADWP, the MOU Parties agreed to delay this HCP so that LADWP could incorporate it into a larger HCP that they would do for all of their lands in the Eastern Sierra once they completed the LORP FEIR. Therefore, it was not developed as part of the LORP Ecosystem Management Plan nor in the 2004 FEIR for the LORP.

In 2015, a draft LADWP HCP was prepared and submitted to U.S. Fish and Wildlife Service (USFWS), which is the agency that has to prepare and certify the final HCP. It is still unfinished in the hands of USFWS. It has now been more than fifteen years since the 2004 LORP FEIR was completed and certified by the LADWP Board of Water and Power Commissioners. It time for an HCP for the LORP to be completed, approved, and implemented. Perhaps a comprehensive HCP on all of LADWP's lands in the Eastern Sierra was too ambitious. This delay in preparation of the LORP HCP raises compliance issues with respect to the requirements of the 1997 MOU. Perhaps it is time to do a separate LORP HCP as originally contemplated in the 1997 MOU.

Mention of the LORP HCP should to be included in the summary of the project history presented in the 2019 LORP Evaluation Report, Volume I.

The LORP 2019 Annual Report should include a section that provides the public and the MOU Parties an update on the status of the HCP and a schedule for its completion.

PUBLIC ENGAGEMENT

We will reiterate comments that OVC has presented for several years that we hope will be addressed next year. Steps need to be taken to enhance the quality of public engagement for the LORP Annual Report meeting:

1. Schedule meetings at hours convenient to the general public, i.e. in the evenings after the average workday.
2. Rotate meeting locations to Lone Pine and/or Independence so residents of southern Owens Valley, where the LORP is located, have a better chance to attend, ask questions and provide input. Why shouldn't the Inyo County Water Department host the meeting in Independence or Lone Pine at least every other year?
3. We once again request that future LORP comment periods not coincide with the December-New Year holiday season. We appreciate that this year the Draft Annual Report and comment period came out after the holidays.

This concludes our comments. We are thankful for the additional time provided to submit these comments.

Sincerely,

Mark Bagley
For Owens Valley Committee and Sierra Club

cc: Mary Roper, OVC President
Lynn Boulton, Sierra Club Range of Light Group Chair
Don Mooney, OVC Attorney
Larry Silver, Sierra Club Attorney

8.2.2 California Department of Fish and Wildlife

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region 6
3602 Inland Empire Boulevard, Suite C-220
Ontario, CA 91764
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

January 29, 2021

Adam Perez
Los Aneles Aqueduct Manager
Los Angeles Department of Water and Power
300 Mandich Street
Bishop, CA 93514

Dr. Aaron Steinwand
Director
Inyo County Water Department
P.O. Box 337
Independence, CA 93526

Subject: LOWER OWENS RIVER PROJECT 2020 DRAFT ANNUAL REPORT COMMENTS

Dear Mr. Perez and Dr. Steinwand:

The California Department of Fish and Wildlife (CDFW) appreciates the opportunity to provide comments on the Lower Owens River Project (LORP) 2020 Draft Annual Report. CDFW continues to support the adaptive management recommendations provided in CDFW's previous 2015, 2017, 2018 and 2019 Draft Annual Report comment letters, but due to the lack of response to CDFW's adaptive management recommendations, this letter specifically focuses on the challenges of implementing adaptive management recommendations provided by CDFW, Sierra Club, and Owens Valley Committee to implement the 1997 Memorandum of Understanding (MOU) between the City of Los Angeles Department of Water and Power, the County of Inyo, the California Department of Fish and Game, the California State Lands commission, the Sierra Club, and the Owens Valley Committee (MOU Parties). CDFW recognizes that Inyo County (County) and Los Angeles Department of Water and Power (LADWP) are planning to work on several adaptive management actions in this fiscal year and CDFW is supportive of active efforts to implement adaptive management. This is a positive step that will hopefully set the stage for continued cooperation and adaptive management actions. However, CDFW believes that the adaptive management process is not currently functioning in way that will allow for the significant adaptive management necessary to reach the LORP goals.

ADAPTIVE MANAGEMENT PROCESS AND IMPLEMENTATION

CDFW understands that adaptive management may require early consultation and planning with all MOU Parties representatives. However, CDFW does not believe that the County and LADWP have made sufficient efforts to implement the adaptive management process and have not sufficiently engaged with the MOU Parties representatives to develop and implement adaptive management approaches. Draft Annual Report comments provided by some of the MOU Parties once a year have proven insufficient to make meaningful adaptive changes to the LORP. Additionally, the unilateral limitation on adaptive management imposed by LADWP that requires adaptive management actions to be "water neutral" impedes many potential adaptive management actions and is not a requirement of the MOU. CDFW seeks a commitment

by the County and LADWP to actively implement an adaptive management process and to develop and implement an adaptive management regime acceptable to the MOU Parties with actions to begin in 2021 or 2022.

MEETINGS AND COMMUNICATION

Regular and engaged communication between the County, LADWP, and the other MOU Parties has not occurred recently and CDFW recommends that the County and LADWP actively schedule LORP strategy sessions with all the MOU Parties, including workshops and planning meetings, with the goal of collaboratively evaluating and discussing LORP goals, adaptive management options and other relevant topics to ultimately implement adaptive management to meet LORP goals. CDFW is supportive of making changes to the flow regime and believe meetings with all the MOU Parties is pertinent and necessary to determine adaptive management actions and changes and if necessary, amend the MOU to accomplish LORP goals. Without further meaningful communication and interaction, making progress towards achieving the LORP goals and making adaptive management decisions will continue to be very difficult and insufficient.

SCIENTIFIC TEAM EFFECTIVENESS

The Scientific Team's composition does not match the description in the 2008 *Lower Owens River Monitoring, Adaptive Management and Reporting Plan* (MAMP). In addition, it is apparent that the Scientific Team is not taking on the roles and responsibilities as described in the MAMP and has not been successful at guiding the LORP and MOU Parties and providing for adaptive management implementation. The MAMP describes many roles that the Scientific Team should play that are crucial for guiding decision-making processes and implementing adaptive management including, recommending and determining management changes or additions, making scientific evaluations and determinations, and providing resource management prescriptions to the Standing Committee. Without these adaptive management recommendations from the Scientific Team, the Standing Committee has implemented limited and selective adaptive management. LORP decisions should be made at least annually and even more frequently, which will require sound scientific judgement based on scientific studies. It is evident that the Scientific Team should be a major factor in attaining the success of the LORP goals. A functioning and objective Scientific Team to provide expertise to the MOU Parties and the Standing Committee, is essential to inform and implement meaningful adaptive management and achieve the LORP goals agreed upon in the MOU. CDFW believes that the Scientific Team should be composed of third-party scientists, instead of County and LADWP staff.

NEXT STEPS

CDFW is supportive of the management changes at Blackrock Waterfowl Management Area that have been in development for six years and recommends additional adaptive

management actions to meet the goals and objectives set for the in MOU and other LORP documents. Specifically:

- The County and LADWP actively implement the adaptive management process and develop and implement an adaptive management regime acceptable to the MOU Parties with actions to begin in 2021 or 2022.
- Regular and engaged communication between the County, LADWP, and the other MOU Parties to ultimately implement meaningful adaptive management that will make progress towards achieving LORP goals.
- A functioning and objective Scientific Team to provide expertise to the MOU Parties and the Standing Committee. Create a Scientific Team that is composed of third-party scientists, instead of County and LADWP staff.
- Lastly, CDFW requests the County and LADWP consult with CDFW on potential adaptive management projects that may trigger notification under Fish and Game Code Section 1602, such as the Blackrock Waterfowl Management Area or changes to the Delta Flow Regime, to ensure that protective measures to fish and wildlife resources associated with lakes and streams are implemented.

CDFW looks forward to engaging with all MOU Parties to implement effective adaptive management actions and meet MOU goals. If you have any questions regarding this letter, please contact Alyssa Marquez at (760) 567-0332 or at Alyssa.Marquez@Wildlife.ca.gov.

Sincerely,

DocuSigned by:
Scott Wilson
8091B1A9242F49C...

Scott Wilson
Environmental Program Manager

cc: Chron
Scott Wilson, CDFW
Nancee Murray, CDFW, Office of General Counsel
Nick Buckmaster, CDFW
Alyssa Marquez, CDFW
1997 MOU Parties Representatives:
Grace Kato, California State Lands Commission (Grace.Kato@slc.ca.gov)
Mark Bagley, Sierra Club (markbagley02@gmail.com)
Mary Roper, Owens Valley Committee (marya@qnet.com)