CALENDAR ITEM
C42

A 26 08/09/16
PRC 8079.9
S 8 G. Kato

AMENDMENT OF LEASE

LESSEE:
City of Los Angeles
Department of Water and Power

AREA, LAND TYPE, AND LOCATION:
Sovereign land on the dry lakebed of Owens Lake, Inyo County.

EXISTING LEASE AND PROPOSED AMENDMENT:
On June 14, 1999, the Commission authorized the issuance of Lease No. PRC 8079.9, a General Lease – Public Agency Use (Lease), to the City of Los Angeles Department of Water and Power (City) for a period of 20 years, for the Owens Lake South Sand Sheet Air Quality and Sand Fence Effectiveness Monitoring System on Owens Lake in Inyo County. Since that time, the Commission has authorized 17 amendments to the Lease for the construction, operation, and maintenance of additional components of dust control. Exhibit C provides a summary of these amendments.

On June 28, 2016, the Commission authorized the 17th amendment to the Lease, which authorized the City to transition Dust Control Area (DCA) T18S from 1.82 square miles of shallow flooding to approximately 1.02 square miles of shallow flooding and 0.81 square miles of gravel cover. The City is now requesting an amendment to the Lease to authorize the implementation of the 2016 Owens Lake Dynamic Water Management Plan (Plan) to reduce the volume of water used on Owens Lake while still maintaining dust control. The concept of the Plan is that lakebed surface erosion does not behave uniformly in time or space due to the diverse soils and surface conditions present and that there may be areas for which the dust season, during which dust controls are required, may be modified to allow for reduced water usage. The standard dust season as defined in the 2008 State Implementation Plan is from October 16 to June 30 of the following year. The three modified dust seasons for this amendment would be:

- October 16 to April 30 of the following year
- December 1 to April 30 of the following year

- January 16 to April 30 of the following year

The earliest start of the modified dust seasons is October 16 for areas in which surface activity is regularly observed early in the dust year. These early start areas consist of coarser textured soils in the southern portion of the lakebed and just to the east of Bartlett Point. The second modified start date is December 1 and is recommended for areas in which the sand flux record shows that significant surface activity and erosion is not observed until December to early January. The third modified start date is January 16 for areas that do not become emissive until January or later. For areas irrigated with sprinklers, the Plan requires irrigation to start two weeks earlier in the beginning of the dust season and end one month later at the end of the dust season. Pursuant to the Plan, re-flooding will be conducted when an area deteriorates such that it is determined to be potentially emissive.

BACKGROUND:

Owens Lake (Lake) is located in southwest Inyo County, approximately 200 miles north of Los Angeles. The Lake was a natural and navigable waterway at the time of California's statehood and is thus sovereign land of the State. Wildlife, waterfowl, and the nearby residents depended on and benefited from the Lake, which covered approximately 110 square miles and was 50 feet deep in places. Early settlers diverted water from the Owens River to grow crops and irrigate pasture for livestock, and steamboats carried cargo across the Lake.

In 1908, the City commenced construction of an aqueduct to divert water from the Owens River north of the Lake. After completion of the Los Angeles Aqueduct in 1913, the Lake's water level rapidly declined. By 1930, the Lake was virtually dry with only a small brine pool remaining.

The diversion of water led to dust storms carrying away as much as four million tons (3.6 million metric tons) of dust from the lakebed each year, causing respiratory problems for residents in the Owens Valley. The U.S. Environmental Protection Agency designated the southern part of the Owens Valley as a Serious Non-Attainment Area for PM_{10}. PM_{10} is an abbreviated reference for suspended particulate matter (dust) less than or equal to 10 microns in mean aerodynamic diameter (approximately 1/10 the diameter of a human hair). The Great Basin Unified Air Pollution Control District (District) subsequently designated the Non-Attainment area as the "Owens Valley PM_{10} Planning Area."

The District determined that dust emissions from the dry lakebed of the Lake are responsible for causing the air in the Owens Valley PM_{10} Planning Area to exceed the PM_{10} national ambient air quality standards and that water diversions by the City caused the Lake to become dry and the lakebed to be in a condition that produces dust. The District has the authority to issue orders, known as Supplemental Control Requirements Determinations, to the City for dust control purposes.

California is facing one of the most severe droughts on record. The current drought has resulted in observations of new, record-high temperature and record low snowpack for California. The City has stated that it must significantly reduce its delivery of water to the Lake for dust control to meet its expected delivery demands in the years to come. With that in mind, it has proposed reducing overall water use on the Lake by at least 50 percent through implementation of the Owens Lake Master Project (Master Project).[1] The City has also stated that each project it proposes prior to completion of the Master Project process must be "water neutral" or reduce overall water use.

The Commission has approved several projects that meet the City's stated need to conserve water on the Lake, including Phase 8 (gravel cover), Phase 7a (allowed transition of shallow flood to hybrid), and Tillage with Best Available Control Measure backup. In addition, staff coordinated with the City in the fall of 2015 for implementation of a variance to achieve additional water savings on the Lake. This variance allowed for water releases to be delayed to areas identified by the District as not requiring a wetted surface to control dust until later in the year. To help offset potential impacts to wildlife due to drought and implementation of the variance, the City released water to the lakebed in late summer. This was the first time since beginning dust control operations that the City released water on the Lake outside of dust mitigation periods specifically for the benefit of birds. Staff is encouraged by the City's actions to provide habitat during these drought conditions and its recognition of the importance of preserving this Public Trust resource. The availability of water for the six identified bird guilds on the Lake is especially important now due to the lack of other available habitat.

STAFF ANALYSIS AND RECOMMENDATION:

Authority:

Public Resources Code sections 6005, 6216, and 6301; California Code of Regulations, title 2, section 2000, subdivision (b).

[1] The City released the Notice of Preparation for an EIR for the Master Project on June 23, 2015.

Public Trust and State's Best Interests Analysis:

As the Legislature's delegated trustee over the State's sovereign lands and resources at the Lake, the Commission has the responsibility to manage the dry lakebed in the best interests of the State and consistent with the common law Public Trust Doctrine, taking care to protect the identified Public Trust resources and values. The discretionary action to be taken by the Commission on the proposed amendment to authorize the Plan is ultimately a policy decision taking into account all relevant factors in determining whether the proposed project is in the State's best interests. Each time the Commission takes action to approve or reject a project, it is exercising its authority and responsibility as trustee of the State's Public Trust lands as authorized by law (Pub. Resources Code, §§ 6301 and 6216).

For years, the City has been diverting water from the Lake, which forever changed and almost eliminated the Public Trust resources at the Lake. However, since the City began implementing dust control measures at the Lake with shallow flooding and managed vegetation, the bird population of the Lake has increased significantly. The identified Public Trust resources at the Lake include wildlife habitat, public access, recreation, and aesthetic enjoyment among others. The areas subject to the proposed Plan are already under lease for dust control measures and will remain subject to the existing lease provisions which provide protections to Public Trust resources. Therefore, the only impacts to these Public Trust resources under the Plan will be to wildlife habitat from shortening the dust control season.

The City and stakeholders have developed the Habitat Suitability Model (HSM) as a tool to measure multiple parameters thought to be important indicators of habitat value, including water depth, water salinity, and water availability, to estimate the ability for the habitat to support one or more of the bird guilds occurring on the Lake. As part of the 15th amendment to the Lease, the Commission required that the City validate and update the HSM "in order to determine if the HSM parameters are effectively providing habitat for the target guilds." There has been 5 years of data collection since the HSM was first used on the Lake and that data can be used to evaluate to what extent the calculated model values accurately predict Habitat Value (as confirmed by bird use), and what modifications may need to be made. The City contracted with Point Blue Conservation Science (Point Blue) to review the bird survey data together with the HSM

and provide recommendations for refining the HSM. The Point Blue report concluded that, while the existing HSM generally showed a "good fit" with the bird use data, some adjustments to the parameter index values would better reflect habitat preferences and observations of the target guilds.

Below is a summary of the areas that would have modified dust seasons under the Plan:

Plan Season	Number of areas	Square Miles	Acres
October 16 -April 30	8	2.903	1,857.9
December 1 – April 30	5	1.164	745.0
January 16 – April 30	31	9.083	5,813.1
TOTAL	44	13.150	8,416.0

For areas irrigated with sprinklers, the Plan requires that irrigation start two weeks earlier in the beginning of the dust season and end one month later at the end of the dust season. The two-week adjustment at the beginning of the dust season allows for wetting of the surface prior to the start of the modified seasons in order to simulate a ramp-up as provided in conventional Shallow Flooding areas. Irrigation is required during the month of May, because, unlike conventional Shallow Flooding, dry down is immediate in sprinkler areas and there is little to no dust control once the water is shut off. Of the 44 proposed DCAs subject to the modification, seven utilize sprinklers (DCA's T1A-2, T10-1A, T37-2, T37-2a, T27-2b, T37-2c and T37-2d comprising of 983.2 acres).

Compared to the project analyzed in the City-certified EIR, the use of Dynamic Water Management would result in minor modifications to the periods when water is applied to certain DCAs. Commission staff finds that the proposed changes in water application, which are temporal only, would have no impacts to the environment. The impacts to Habitat Value incurred from DWM can be offset by adding water to high snowy plover use areas in DCA T13-1 after the end of the dust season until the end of the snowy plover breeding season, operating the pond in T17-1 and T17-2 from October until the required startup in January, applying flow to eight DCAs, and maintaining the planned operations of Phase 7a DCAs. By employing these strategies, Habitat Value for all five species guilds on Owens Lake will be maintained during implementation of DWM. The implementation of Dynamic Water Management would result in a

projected water savings of 534 acre feet of water in the Fall of 2016, and 2,855 acre feet in the Spring 2017 season.

Commission staff believes improving the reliability of the water supply to the City's customers and seeking to balance habitat maintenance with water conservation practices is in the public interest, particularly in light of climate change and drought. Further, the proposed amendment will not significantly impact the other Public Trust resources and values – public access, recreation, and aesthetic enjoyment – on the lakebed. For all the reasons above, Commission staff believes the issuance of this lease amendment is consistent with the common law Public Trust Doctrine and in the best interests of the State.

EXHIBITS:

A. Site and Location Map
B. Summary of Lease Amendments
C. Addendum to Environmental Impact Report (EIR)
D. 2016 Owens Lake Dynamic Water Management Plan

OTHER PERTINENT INFORMATION

1. Commission staff has participated in the Owens Lake Master Project processes starting in March 2010 with the City, the District, other public agencies, Native American tribes, non-governmental organizations, and other interested stakeholders to develop a framework to manage the variety of important resources on the lakebed while continuing to control dust. On June 23, 2015, the City released a Notice of Preparation for the Environmental Impact Report (EIR) for the Master Project. The Commission's consideration of the Master Project and a new lease is anticipated to occur following completion of the Master Project EIR and action by the City.

2. The proposed action is consistent with Strategy 1.1 of the Commission's Strategic Plan to deliver the highest levels of public health and safety in the protection, preservation, and responsible economic use of the lands and resources under the Commission's jurisdiction.

3. An Environmental Impact Report (EIR), State Clearinghouse No. 2014071057, was prepared for the project by Los Angeles Department of Water and Power and certified on June 2, 2015. Commission staff has reviewed this document prepared pursuant to the provisions of California

Environmental Quality Act (CEQA) (Pub. Resources Code, § 21081.6). Commission staff prepared an Addendum to the EIR and posted the Addendum on its website (Exhibit C).

4. This activity involves lands which have NOT been identified as possessing significant environmental values pursuant to Public Resources Code section 6370 et seq.; however, the Commission has declared that all lands are significant by nature of their public ownership (as opposed to environmentally significant). Since such declaration of significance is not based upon the requirements and criteria of Public Resources Code section 6370 et seq., use classifications for such lands have not been designated. Therefore, the finding of the project's consistency with the use classification as required by California Code of Regulations, title 2, section 2954 is not applicable.

RECOMMENDED ACTION:

It is recommended that the Commission:

CEQA FINDING:

Find that an Environmental Impact Report, State Clearinghouse No. 2014071057, and a Mitigation Monitoring Program were prepared by Los Angeles Department of Water and Power and approved on June 2, 2015, for the project and that Commission has reviewed and considered the information contained therein together with the Addendum as set forth in Exhibit C.

Find that in its independent judgment, none of the events specified in Public Resources Code section 21166 or State CEQA Guidelines section 15162 resulting in any new or substantially more severe significant impacts has occurred, and therefore, no additional CEQA analysis is required.

PUBLIC TRUST AND STATE'S BEST INTERESTS FINDING:

Find that the proposed lease amendment will not substantially interfere with the Public Trust needs and values at this location, is consistent with the common law Public Trust Doctrine, and is in the best interests of the State.

SIGNIFICANT LANDS INVENTORY FINDING:

Find that this activity is consistent with the use classification designated by the Commission for the land pursuant to Public Resources Code section 6370 et seq.

AUTHORIZATION:

Authorize the amendment of Lease No. PRC 8079.9, a General Lease – Public Agency Use, to authorize the implementation of the 2016 Owens Lake Dynamic Water Management Plan; all other terms and conditions of the lease will remain in effect without amendment.

NO SCALE

SITE

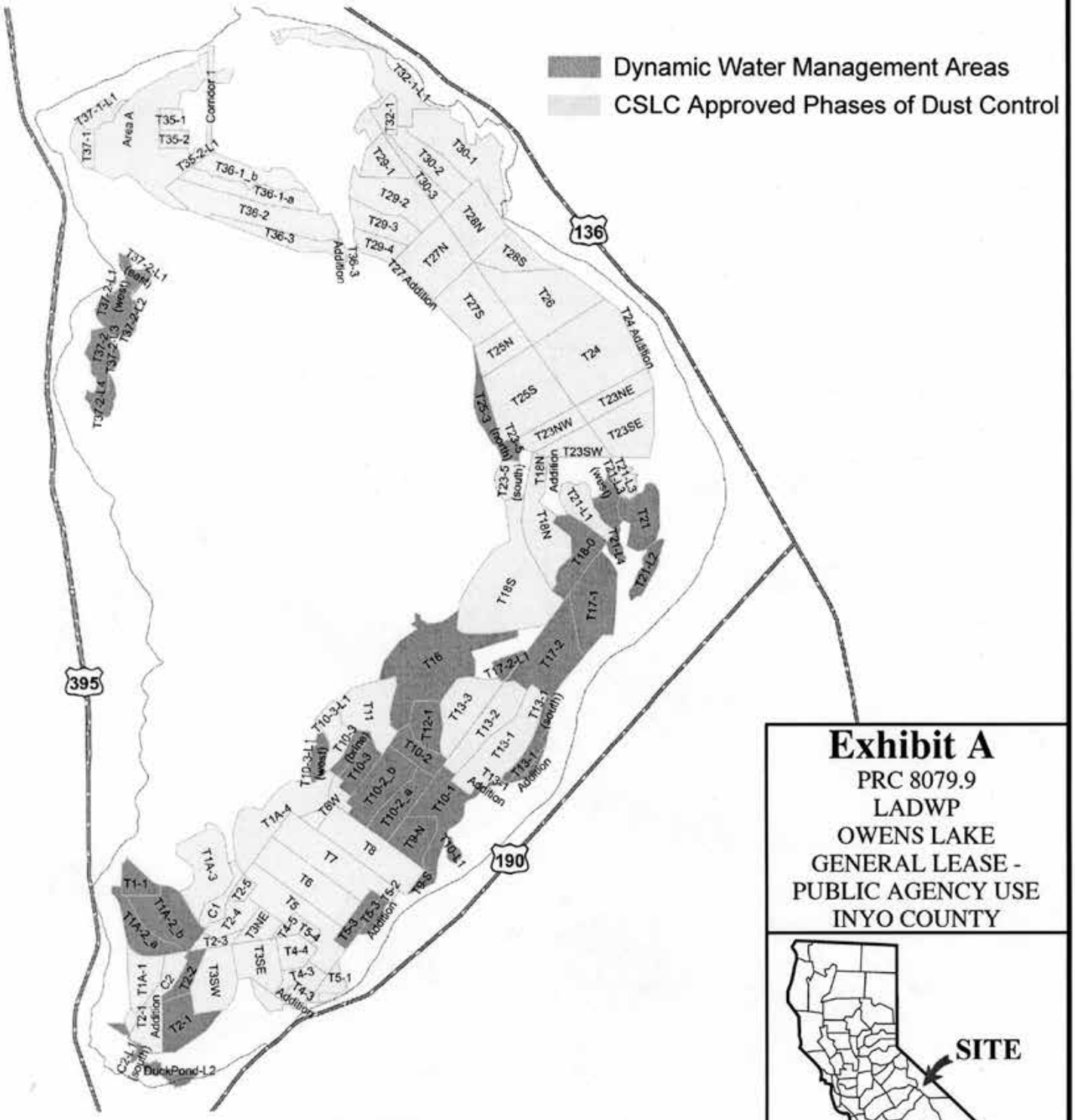

Exhibit A
PRC 8079.9
LADWP
OWENS LAKE
GENERAL LEASE -
PUBLIC AGENCY USE
INYO COUNTY

JAK 7/16

This Exhibit is solely for purposes of generally defining the lease premises, is based on unverified information provided by the Lessee or other parties and is not intended to be, nor shall it be construed as, a waiver or limitation of any State interest in the subject or any other property.

Exhibit B: Summary of Lease Amendments

Below is a summary of the amendments to Lease No. PRC 8079.9 which the Commission has approved to date.

Original Lease. Allowed the City to comply with dust mitigation requirements by installing a South Sand Sheet Air Quality and Sand Fence Effectiveness Monitoring System on the leased premises ("Premises"). (Approved: 6/14/1999; Available at: http://archives.slc.ca.gov/MeetingSummaries/1999Documents/06-14-99/Items/061499C06.pdf)

First Amendment. Allowed the City to construct and operate a Shallow Flooding project on 13.5 square miles in the North Sand Sheet area of the Premises. (Approved: 6/27/2000; Available at: http://archives.slc.ca.gov/MeetingSummaries/2000Documents/06-27-00/Items/062700C15.pdf)

Second Amendment. Permitted the implementation of the South Zone Dust Control Project on the Premises through the following dust mitigation measures ("DCMs"): (1) 6.4 square miles Managed Vegetation; (2) 1.7 square miles Shallow Flooding; and (3) approximately 40 acres Gravel Cover. (Approved: 11/26/ 2001; Available at: http://archives.slc.ca.gov/Meeting Summaries/2001 Documents/11-26-01/Items/112601C18.pdf)

Third Amendment. Authorized 154 acres of additional Shallow Flooding for the South Zone Dust Control Project. (Approved: 6/18/2002; Available at: http://archives.slc.ca.gov/MeetingSummaries/2002Documents/06-18-02/Items/060802C05.pdf)

Fourth Amendment. Allowed additional Shallow Flooding on the Premises for Phases IV and V of the Owens Lake Dust Control Project. (Approved: 6/26/2006; Available at: http://archives.slc.ca.gov/Meeting Summaries/2006 Documents/06-26-06/Items/062606C24.pdf)

Fifth Amendment. Allowed additional Shallow Flooding for Phase VII of the Owens Lake Dust Control Project. This included the construction of earthen roads and berms, several miles of pipeline, and other equipment installations. (Approved 8/22/2008; Available at: http://archives.slc.ca.gov/Meeting Summaries/2008 Documents/08-22-08/ITEMSANDEXHIBITS/C05.pdf)

Sixth Amendment. Allowed two earthen berms, two access roads, and two barrier gates on the Premises for Phase VII of the Owens Lake Dust Mitigation Project. (Approved 6/1/2009; Available at: http://archives.slc.ca.gov/Meeting Summaries/2009 Documents/06-01-09/ITEMSANDEXHIBITS/C23.pdf)

Seventh Amendment. Authorized drip irrigation components for Phase VII of the Owens Lake Dust Control Project. (Approved 10/22/2009; Available at: http://archives.slc.ca.gov/Meeting Summaries/2009Documents/10-22-09/ITEMS AND EXHIBITS/C17.pdf)

Eighth Amendment. Authorized sand fencing and irrigation facilities on area T1A-01 of the Premises. (Approved 12/17/2009; Available at: http://archives.slc.ca.gov/Meeting Summaries/2009 Documents/12-17-09/VotingRecord.pdf; Note: Recommendation modified; for actual approval, see: http://archives.slc.ca.gov/Meeting Summaries/2009 Documents/12-17-09/Minutes.pdf)

Ninth Amendment. Allowed: (1) the two new access roads; and (2) soil tillage of 3.12 square miles of land: (Approved: 6/28/2010; Available at: http://archives.slc.ca.gov/Meeting Summaries/2010 Documents/06-28-10/Voting Record.pdf)

Tenth Amendment. Allowed 2.03 square miles of Gravel Cover on 2.03 square miles and roadway expansion. (Approved: 12/10/2010; Available at: http://archives.slc.ca.gov/Meeting Summaries/2010Documents/12-10-10/Complete Items/50.pdf)

Eleventh Amendment. Allowed the placement of above-grade sprinklers in the Channel Area and area T1A-1. (Approved: 1/26/2012; Available at: http://archives.slc.ca.gov/Meeting Summaries/2012 Documents/01-26-12/Items and Exhibits/C43.pdf)

Twelfth Amendment. Extended the deadline for performing the soil tillage permitted under the Ninth Amendment. (Approved: 6/21/2013; Available at: http://archives.slc.ca.gov/Meeting Summaries/2013Documents/06-21-13/Items and Exhibits/C61.pdf)

Thirteenth Amendment. Permitted DCMs on 3.1 square miles of the Premises and transitioned DCMs on 3.4 square miles of the Premises. (Approved: 9/20 2013; Available at: http://archives.slc.ca.gov/Meeting Summaries/2013 Documents/09-20-13/Items and Exhibits/C82.pdf)

Fourteenth Amendment. Allowed the City to create a stockpile area on the Premises to store aggregate road base material. (Approved: 4/23/2014; Available at: http://archives.slc.ca.gov/MeetingSummaries/2014Documents/04-23-14/Items and exhibits/C55.pdf)

Fifteenth Amendment. Allowed the City conserve water by converting 4.12 square miles from Shallow Flooding to tillage with best available control measure backup. (Approved: 9/2/2014; Available at: http://archives.slc.ca.gov/MeetingSummaries/2014Documents/09-02-14/Items and exhibits/02.pdf)

Sixteenth Amendment. Approved Phase 9/10 project, excluding T18S, allowing 3.6 square miles of new dust control in 17 Dust Control Areas. (Approved 8/19/2015; Available at: http://archives.slc.ca.gov/Meeting Summaries/2015 Documents/08-19-15/Items and Exhibits/C61.pdf)

Seventeenth Amendment. Approved the transition of T18S from 1.82 square miles of shallow flooding to approximately 1.02 square miles of shallow flooding and 0.81 square miles of gravel cover. (Approved 6/28/2015; Available at: http://archives.slc.ca.gov/Meeting_Summaries/2016_Documents/06-28-16/Items_and_Exhibits/95.pdf)

State Clearinghouse No. 2014071057

ADDENDUM TO ENVIRONMENTAL IMPACT REPORT

OWENS LAKE DUST MITIGATION PROGRAM – PHASE 9/10 PROJECT

August 2016

Prepared by:
California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825

CEQA Lead Agency:
City of Los Angeles Department of Water and Power
111 North Hope Street
Los Angeles, CA 90012

MISSION STATEMENT

The California State Lands Commission provides the people of California with effective stewardship of the lands, waterways, and resources entrusted to its care through preservation, restoration, enhancement, responsible economic development, and the promotion of public access.

CEQA DOCUMENT WEBSITE

www.slc.ca.gov/Info/CEQA.html

Geographic Location (State Lands Commission Lease):

Latitude: N 36°26’12.80”
Longitude: W 117°57’35.50”

Cover Photo: Owens Lake, Inyo County California

OWENS LAKE DUST MITIGATION PROGRAM – PHASE 9/10 PROJECT ADDENDUM
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LIST OF ABBREVIATIONS AND ACRONYMS USED IN THIS DOCUMENT

#	2016 SIP	2016 Owens Valley Planning Area PM_{10} State Implementation Plan
B	BACM	Best Available Control Method (Gravel Cover, Shallow Flooding and Managed Vegetation)
C	CEQA	California Environmental Quality Act
D	DCA	Dust Control Area
	DEPM	Division of Environmental Planning and Management
	District	Great Basin Unified Air Pollution Control District
	DWM	Dynamic Water Management
E	EIR	Environmental Impact Report
G	GBUAPCD	Great Basin Unified Air Pollution Control District
H	HSM	Owens Lake Habitat Suitability Model
	HVA	Habitat Value Acre
L	LADWP	City of Los Angeles Department of Water and Power
O	OLDMP	Owens Lake Dust Mitigation Program
P	PM_{10}	Particulate matter less than or equal to 10 microns in diameter
S	SHW	Summer Habitat Water
	SIP	State Implementation Plan

1.0 INTRODUCTION

1.1 SUMMARY AND PROJECT OBJECTIVES

On June 14, 1999, the California State Lands Commission (Commission) authorized the issuance of Lease No. PRC 8079.9, a 20-year General Lease – Public Agency Use (Lease), to the City of Los Angeles Department of Water and Power (City or LADWP) for the Owens Lake South Sand Sheet Air Quality and Sand Fence Effectiveness Monitoring System on Owens Lake, which is located in southwest Inyo County, approximately 200 miles north of Los Angeles (Figure 1). Since that time, the Commission has authorized 17 amendments to the Lease for the construction, operation, and maintenance of additional components of dust control, including the use of Best Available Control Methods (BACM) to mitigate dust emissions on Owens Lake. Approved types of BACM include Shallow Flooding, Managed Vegetation, and Gravel Cover.

On June 2, 2015, the City, as lead agency under the California Environmental Quality Act (CEQA), certified an Environmental Impact Report (EIR) for the Owens Lake Dust Mitigation Program (OLDMP)—Phase 9/10 Project (Project; State Clearinghouse No. 2014071057). The City is proposing to implement the Phase 9/10 Project and expand and modify the existing system of dust control on the lake. As part of the OLDMP, the Project EIR contemplated implementation of Dynamic Water Management (DWM) to modify the dust season on approximately 12.07 square miles of Shallow Flood dust control areas (DCAs) on Owens Lake in order to conserve water. DWM uses delayed start dates and earlier end dates for Shallow Flooding in specific areas that have historically had low dust emissions during the modified time periods. The truncated dust control periods allow for water savings while achieving the required dust control. To help offset potential impacts to wildlife, LADWP would release water on the lake outside of dust mitigation periods for the benefit of birds; this is called Summer Habitat Water (SHW). While DWM is referenced in the City's certified EIR and included in the definition of Shallow Flooding BACM, this Addendum serves to clarify how DWM will be implemented.

1.2 ADDENDUM PURPOSE

The proposed DWM Plan requires Commission approval and therefore CEQA compliance. Pursuant to the State CEQA Guidelines section 15164, the lead agency or a responsible agency for a project shall prepare an addendum to a previously certified EIR if some changes or additions are necessary but no special conditions requiring a subsequent EIR (described in State CEQA Guidelines, § 15162) are present. Pursuant to State CEQA Guidelines section 15162, a subsequent EIR is not required unless:

(1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

(2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:

A. The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

B. Significant effects previously examined will be substantially more severe than shown in the previous EIR;

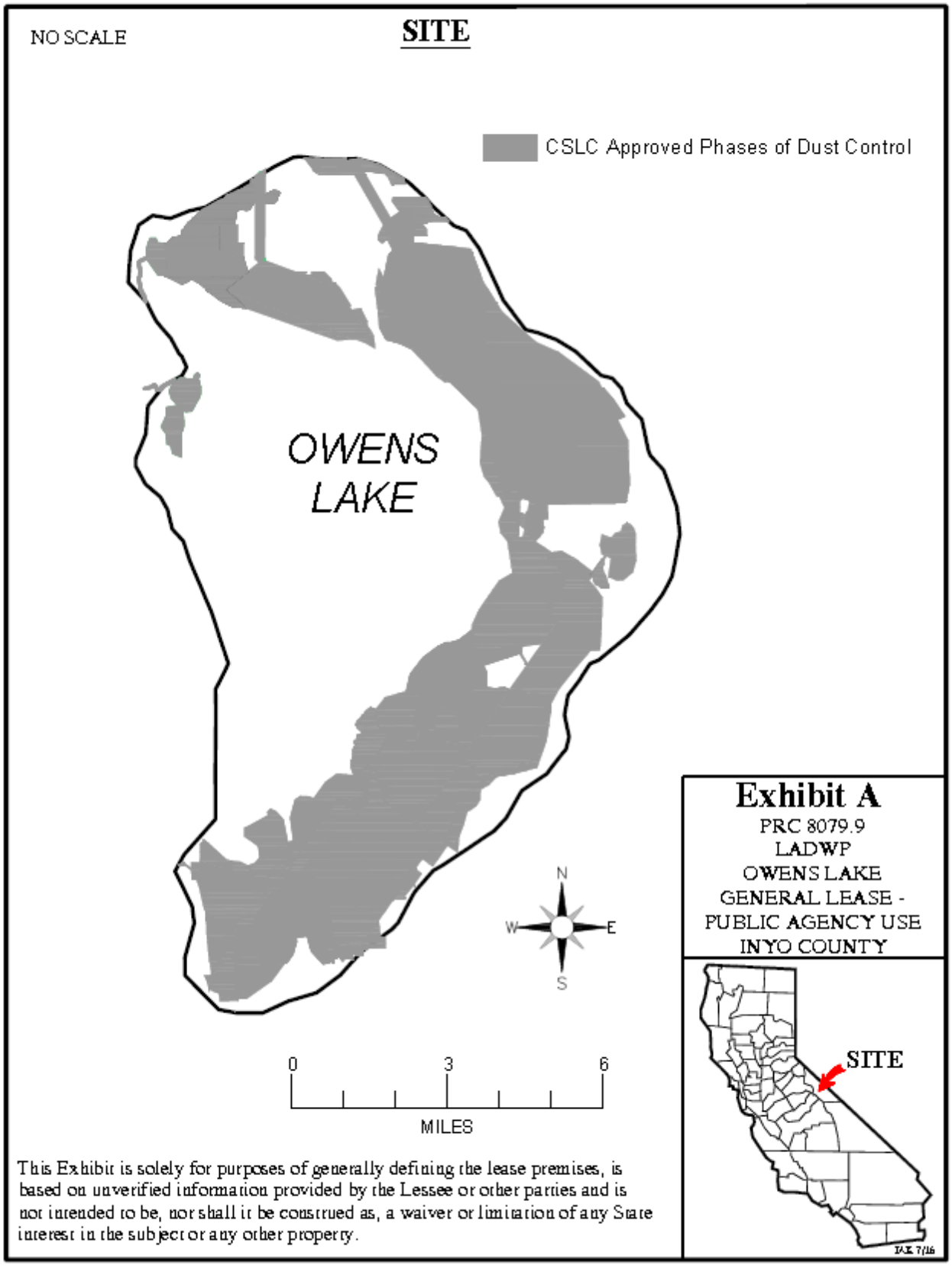
C. Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

D. Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

The City has submitted an application to the Commission to modify the dust control watering season for approximately 12.07 square miles of the Lake. Before approving such modification, the Commission must apply the standards outlined above to ensure that a subsequent EIR is not required. In reviewing the DWM plan, Commission staff identified two areas where there could be a potential for environmental impacts from the proposed actions: air quality and biological resources. After reviewing the existing environmental documents, application materials, and the DWM plan, and analyzing all relevant facts available, Commission staff has determined, on the basis of substantial evidence in light of the whole record, that:

- minor changes or additions to the previously certified EIR for the Owens Lake Dust Mitigation Program – Phase 9/10 Project are necessary;
- none of the conditions described in State CEQA Guidelines section 15162 calls for the preparation of a subsequent EIR; and
- an addendum is the appropriate CEQA document for analysis and consideration of the portion of the Project on lands under the jurisdiction of the Commission.

Figure 1. Project Location



Circulation of an addendum for public review is not required (State CEQA Guidelines, § 15164, subd. (c)); however, the decision-making body must consider the addendum in conjunction with the previously adopted EIR for the project (State CEQA Guidelines, § 15164, subd. (d)).

1.3 BACKGROUND

Owens Lake was a natural and navigable waterway at the time of California's statehood and is thus sovereign land of the State. Wildlife, waterfowl, and the nearby residents depended on and benefited from Owens Lake, which covered approximately 110 square miles and was 50 feet deep in places. Early settlers diverted water from the Owens River to grow crops and irrigate pasture for livestock, and steamboats carried cargo across the lake. In 1908, the City began construction of an aqueduct to divert water from the Owens River north of Owens Lake. After completion of the Los Angeles Aqueduct in 1913, the City began transporting river water to Los Angeles, causing Owens Lake water levels to rapidly decline. By 1930, the Lake was virtually dry with only a small brine pool remaining. Since then, dust storms have carried away as much as four million tons of dust from the lakebed annually, causing respiratory problems for residents in the Owens Valley.

The U.S. Environmental Protection Agency has designated the southern part of the Owens Valley as a Serious Non-Attainment Area for PM_{10} (suspended particulate matter [dust] less than or equal to 10 microns in mean aerodynamic diameter [about 1/10 the diameter of a human hair]). The Great Basin Unified Air Pollution Control District (GBUAPCD or District) subsequently designated the Non-Attainment area as the Owens Valley PM_{10} Planning Area. The District determined that dust emissions from the dry lakebed of Owens Lake cause air in the Owens Valley PM_{10} Planning Area to exceed the PM_{10} national ambient air quality standards, and that water diversions by the City caused Owens Lake to become dry and the lakebed to be in a condition that produces dust. The District has authority to issue Supplemental Control Requirements Determinations (Orders) to the City for dust control purposes and recently approved the 2016 Owens Valley Planning Area PM_{10} State Implementation Plan (2016 SIP) (GBUAPCD 2016a).

LADWP constructs and operates dust control measures (DCMs) on the lake in compliance with Orders from the District under the authority of California Health and Safety Code section 42316, legal settlement agreements with the District, lease agreements for use of state lands (administered by the Commission), and other regulatory approvals. LADWP has also developed, in coordination with Commission staff and other stakeholders, a Habitat Suitability Model (HSM) for the Lake that includes various physical parameters that can be objectively measured as a means of predicting and monitoring habitat suitability and ensuring maintenance of wildlife habitat and use on the Lake.

2.0 DESCRIPTION OF PROJECT MODIFICATION

As proposed by LADWP, DWM would modify the dust control season for some areas of Owens Lake in order to conserve water. DWM is referenced in the EIR and included in the definition of Shallow Flooding BACM defined by the GBUAPCD (2016a) in the 2016 Owens Valley Planning Area PM_{10} State Implementation Plan (2016 SIP). LADWP currently manages approximately 31 square miles of Shallow Flood on the Lake; of this, approximately 12.07 square miles is eligible for DWM.[1]

Shallow Flooding BACM consists of releasing fresh and/or recycled water into a DCA and allowing it to spread, wet the surface, and thereby suppress windborne dust. In order to meet GBUAPCD's goal of reducing dust emissions on the lake by 99 percent,[2] generally 72 percent of the surface must be wet or have saturated soil (75 percent wetness coverage is required for areas identified in the 2003 SIP).

Prior to the 2016 SIP, the coverage requirement for the 99 percent DCAs could be reduced progressively during the spring shoulder season (May 16 to June 30); 70 percent areal wetness cover from May 16 to May 31; 65 percent areal wetness cover from June 1 to June 15; and 60 percent areal wetness cover from June 15 through June 30. The fall shoulder season was defined as October 1 to October 15; prior to the 2016 SIP, full levels of dust control were not required until October 16. Under the 2016 SIP, DWM will modify the dust season for certain areas on Owens Lake. This was described in the EIR as:

> *An analysis of Owens Lake ambient air quality, meteorological and sand flux data along with lake bed field observations during the past 15 years has revealed that the Shallow Flood BACM dust season may be shortened for certain areas of the lake bed that have historically shown little dust activity in the early and/or late portions of the October through June dust season. In addition, wetness cover requirements to achieve the required Minimum Dust Control Efficiency may also vary depending on seasonal conditions that may affect salinity of the surface water and the formation of erosion-resistant brine crusts. Modifications to the dust season for certain areas are currently being considered by GBUAPCD and LADWP to address the commitment in the 2014 Stipulated Judgment to implement a Dynamic Water Management Plan in order to reduce water use on the lake bed. Dynamic Water Management could include modifications to the existing ramping schedules for flow operations and could apply to existing Shallow Flooding dust control areas (DCAs) as well as new areas of Shallow*

[1] The District's 2016 SIP and Board Order 160413-01 identify 44 DCAs or portions of DCAs totaling 13.15 square miles; however, several of these areas are Gravel Cover rather than Shallow Flood, and were removed from consideration by LADWP and CSLC for this analysis.

[2] The GBUAPCD requires the City to continuously operate and maintain any mix of approved BACM PM_{10} control measures to meet a 99 percent control efficiency level.

Flooding proposed under the Phase 9/10 Project (T10-1-L1, T37-2-L1, T37-2-L2, T37-2-L3, and T37-2-L4).[3]

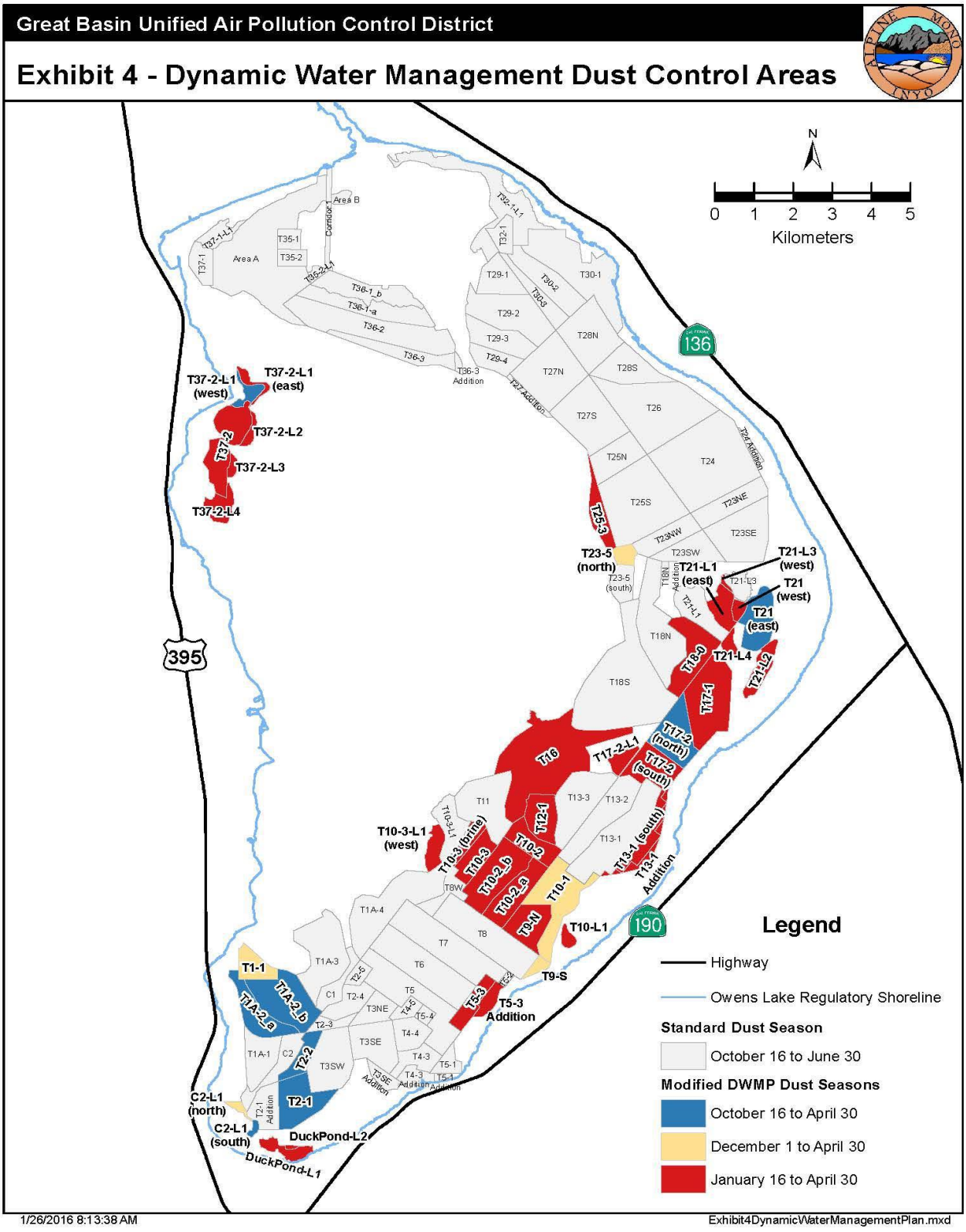
DWM is an operational modification to BACM Shallow Flooding that allows delayed start dates and/or earlier end dates required for Shallow Flooding in specific areas that have historically had low PM_{10} emissions with the modified time periods. The truncated dust control periods allow for water savings while achieving the required control efficiency level. If a DWM area becomes susceptible to wind erosion outside of the modified dust control period, the area will be flooded to meet the required control efficiency for that area. Following certification of the Phase 9/10 Project EIR and approval of the Project by the City in June 2015, the GBUAPCD (2016b) prepared a DWM Plan to define DWM with greater specificity.

Exhibit 4 of the DWM Plan (see Figure 2 below) depicts the recommended eligible DWM areas and notes the modified dust seasons for conventional pond and lateral Shallow Flooding areas. The dust season for DWM Plan areas irrigated with sprinklers would start 2 weeks earlier and end 1 month later than shown on Exhibit 4 of the DWM Plan. The standard dust season defined in the 2008 SIP was October 16 to June 30, with ramping of 99 percent control areas after May 15. Modified DWM Plan dust seasons are as follows (noted by DCA on Figure 2):

- October 16 to April 30;
- December 1 to April 30; and
- January 16 to April 30.

[3] Final EIR page 2-1, which expanded discussion of Draft EIR Section 3.1.8.4.

Figure 2. GBUAPCD Recommended Eligible DWM Areas



The following comparative analysis was undertaken to analyze whether DWM as proposed by the City would have any significant environmental impacts that were not addressed in the EIR certified by the City in 2015. The comparative analysis (1) discusses whether impacts are increased, decreased, or unchanged from the conclusions discussed in the EIR, and (2) addresses whether any changes to mitigation measures are required.

3.1 SUMMARY OF ENVIRONMENTAL ISSUE AREA ANALYSIS

Compared to the Project analyzed in the City-certified EIR, the use of DWM would result in minor modifications to the periods when water is applied to certain DCAs on Owens Lake. As discussed in this Addendum, the Commission finds that the proposed changes in water application, which are temporal only, would have no impacts to the environmental issue areas listed below; this determination is consistent with the analysis of the original project in the 2015 EIR.

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use/Planning
- Mineral Resources
- Noise
- Population/Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities/Service Systems

For example, with respect to aesthetics, Project modifications would not change the appearance of Owens Lake. Similarly, the Owens lakebed is openly accessible to the public for recreation; however, implementation of DWM will not alter the recreational amenities proposed as part of the Project or further impact public access to the lake during Project construction and operation. Because the proposed changes would have no effect on the above-listed issue areas, they are not discussed further in this document. Project changes would have the potential to affect two issue areas, air quality and biological resources; these were determined to have impacts that were less than significant under the EIR the City certified in 2015. As a result, Commission staff evaluated whether these effects would constitute a new significant impact, as required by CEQA (see generally Pub. Resources Code, § 21166; State CEQA Guidelines, § 15162). This evaluation and the Commission staff's conclusions are provided in detail below.

3.2 AIR QUALITY

Implementation of DWM will not result in additional construction activities and therefore will not increase air pollutant emissions related to project construction. Construction-

related emissions will remain less than significant. The specific change to the Project DWM contemplates is delaying the application of fall water and terminating early the application of water in the spring, thus shortening the time certain areas are wetted/flooded and potentially leading to dust emissions. Importantly, however, the DWM Plan incorporates the following conditions and restrictions:

- DWM will be implemented only in specific areas that have historically had low PM_{10} emissions within the modified time periods.
- DWM will be implemented in existing Shallow Flooding DCAs only if little dust activity in the early and/or late portions of the October through June dust season is observed.
- Re-flooding will be conducted when a DWM Plan area deteriorates such that the GBUAPCD determines it to be potentially emissive. When this determination has been made and a written re-flood order has been made by the Air Pollution Control Officer, then LADWP shall re-flood the DWM Plan area so as to re-establish fully compliant Shallow Flooding in accordance with the most current Shallow Flooding BACM requirements.

The above components of the DWM Plan ensure LADWP will continue to be compliant with its dust control responsibilities and that air quality will not be compromised. As such, this Project change does not involve a new significant impact not previously identified in the 2015 EIR and, therefore, a subsequent or supplemental EIR is not required.

3.3 BIOLOGICAL RESOURCES

Implementation of DWM will not result in additional construction activities and therefore will not increase the severity of impacts to biological resources related to construction, which the EIR identified as potentially significant and for which mitigation measures were incorporated. DWM modifies the original Project by delaying the application of water in the fall and terminating early the application of water in the spring in the Shallow Flooding DCAs identified in Figure 2, above (Exhibit 4 of the DWM Plan), thus shortening the time certain areas are wetted/flooded and potentially resulting in a loss of habitat value for one or more of the species guilds on the Lake. However, certain conditions and enhancements are also incorporated into the DWM Plan to ensure DWM will be implemented such that existing Lake wide habitat values will be enhanced or maintained overall within the OLDMP Area. DCAs constructed as part of Phase 7a (T1A-2, T37-2), Tillage with BACM-back-up (T2-2, T16), and Phase9/10 (T10-1a, T37-2[a-d]) will have water applied to meet habitat value goals in those projects (per Phase 7a FEIR, TWB2 EIR Addenda, Phase 9/10 FEIR). Therefore while implementing DWM in these DCAs habitat value will be maintained across these projects in their entirety. Other DCAs will have no impacts from DWM to habitat value in Spring due to the existing ponds remaining through the migration period in spring (e.g., T2-1) or currently being operated under Tillage with BACM-back-up (e.g., T12-1).

Changes in habitat value for each species guild (which includes the diving waterbird, breeding waterfowl, migrating waterfowl, breeding shorebird, migrating shorebird, and alkali meadow bird guilds) on Owens Lake during DWM were estimated using the Owens Lake HSM with draft recommendations from Point Blue Conservation Science incorporated. Habitat value was first estimated for 2016 assuming typical operations in DWM DCAs (Habitat Value Acre [HVA] ref). The most recently observed habitat parameter data available were for 2014 during normal operation. These were used for this estimate of habitat value prior to DWM studies in 2015.

Habitat value was then projected for each DWM DCA, or portions of DCAs, by estimating habitat parameters for implementation of DWM through the fall period as described in the 2016 SIP (HVA DWM). Most DCAs under DWM will have no water through the fall migration time period with full operation planned between December 1 and January 16 depending on the DCA. When possible, the habitat parameters observed during implementation of the DWM variance in 2015 were used to estimate habitat value through fall for water depth and monthly water availability. DCAs outside of DWM were assumed to have similar habitat value during the reference period due to typical operations. The resulting habitat value during DWM (HVA DWM) was then subtracted from habitat value estimates without DWM in each DCA (HVA ref), for each DCA. This was performed for habitat value for each guild (Table 1).

For spring DWM (turning off water supplied to DWM DCAs on April 30), most migrating birds have left Owens Lake, therefore only breeding shorebirds and waterfowl are potentially impacted. To maintain habitat value in that timeframe, DCAs with high numbers of snowy plover and high habitat value for breeding shorebirds would have water applied to wet the surface through sprinklers along lateral water pipelines that have been installed across each DCA (DCAs T17-1, T17-2, T13-1 and T10-1). These lateral sprinkler lines would operate as described in the EIR through the remainder of the dust season.

For fall DWM, two primary options to increase habitat value were explored: (1) in DWM DCAs, operate the pond portion of the DCA, potentially at a lower level than normal operations, while turning off lateral water pipelines through fall; and (2) in all DCAs, provide small amounts of water through the summer to provide perennial habitat for forage insects and shorebirds (referred to as Summer Habitat Water [SHW]). The former option provides habitat at a time when many migrating waterfowl and diving waterbirds are using Owens Lake. However, it assumes habitat is limiting which is unlikely given the observed variability in many DCAs. The latter option provides water at a time period when water is scarce and the amount of usable habitat during normal drydown is limited for shorebirds during their peak migration (August through September), but it also provides a refuge for forage insects to colonize the entire DCA once it is operational again in fall. This option helps to bolster the forage invertebrate population to make it through the normally dry summer to provide a greater food source for later in fall when diving waterbirds and waterfowl are most abundant on Owens Lake.

Table 1. Potential Habitat Value Lost

DCA	Habitat Value Lost (HVA)				
	Diving Waterbird	Migrating Waterfowl	Migrating Shorebird	Breeding Waterfowl	Breeding Shorebird
T10-1	98.0	106.1	167.8	14.6	27.1
T10-2N	38.8	63.6	81.9	6.2	15.6
T10-2S	100.4	350.9	431.6	28.9	55.9
T10-3E	4.8	21.0	45.8	2.4	8.0
T10-3W	0.1	0.0	0.7	0.0	0.0
T1-1	21.6	34.8	62.1	3.6	10.0
T13-1	141.7	191.0	125.1	19.8	16.1
T13-1 Add	0.0	0.3	4.5	0.6	1.1
T17-1	169.0	331.1	187.7	17.9	29.4
T17-2	226.0	47.3	114.9	33.1	33.4
T18-0	72.6	118.6	196.3	14.5	27.9
T21W	0.0	0.6	2.2	0.0	0.0
T25-3	0.0	0.3	2.9	0.0	0.0
T5-3	0.0	33.9	34.6	2.5	3.3
T5-3 Add	21.3	15.3	-5.8	0.0	0.0
T9	80.8	52.5	99.6	7.0	15.9
T1A-2	0.0	0.0	0.0	0.0	0.0
T2-1	0.0	0.0	0.0	0.0	0.0
T2-2	0.0	0.0	0.0	0.0	0.0
T10-1a	0.0	0.0	0.0	0.0	0.0
T12-1	0.0	0.0	0.0	0.0	0.0
T16	0.0	0.0	0.0	0.0	0.0
T21E	0.0	0.0	0.0	0.0	0.0
T23-5	0.0	0.0	0.0	0.0	0.0
T37-2	0.0	0.0	0.0	0.0	0.0
T37-2a	0.0	0.0	0.0	0.0	0.0
T37-2b	0.0	0.0	0.0	0.0	0.0
T37-2c	0.0	0.0	0.0	0.0	0.0
T37-2d	0.0	0.0	0.0	0.0	0.0
HVA needed	**975.1**	**1367.3**	**1551.9**	**151.1**	**243.7**

The presence of perennial water is second only to salinity in its importance to invertebrate abundance (Herbst 2001). Water persisting throughout the summer has historically been quite rare on Owens Lake in DCAs due to high evaporation rates and no requirement to apply water for dust control operation. This refuge for invertebrates has been shown to have a significant lag effect on habitat value where a little perennial water can produce significant increases in bird use in subsequent months in those cells.

This positive effect of SHW successfully demonstrated the increase in bird use during implementation of the DWM variance in 2015 (LADWP 2016) in DCAs T29-1, T29-2, T30-2, T36-2E. The effect was most obvious for the shorebird guild because they directly benefit from the addition of water during the August portion of their migration. For

example, 1.7 times the number of shorebirds were recorded in August 2015 during DWM in 2015 than under normal operations per the reference averages.

The diving waterbirds and waterfowl also responded to SHW. Bird counts in DCAs with SHW were higher than expected. Greater than expected bird numbers for both diving waterbirds and migrating waterfowl were encountered in 2015 in DWM DCAs with SHW applied compared to normally operated DCAs. In addition, many more birds were found in these DCAs than predicted by the HSM in 2015. The information on increases in actual bird use was incorporated into the habitat value predictions for summer water.

Summer Habitat Water Value Adjustment

To quantify the actual habitat value gained with application of SHW, the actual bird use data and modeled habitat value from 2015 (HVA2015) were used. HVA2015 was projected from estimates of 2015 environmental parameters which reflected when DCAs were operational. From linear regression analysis, a best-fit equation was generated to describe the relationship between habitat value in 2015 and observed bird counts in 2015. Using the linear equation, the habitat value needed to project the actual bird counts was calculated (HVASHW). The Value Adjustment multiplier was calculated as: HVASHW/HVA2015.

The effective multipliers are listed in Table 2 for each guild in DCAs that were shown to have actual bird increases during 2015 DWM SHW application (DCAs T29-1, T29-2, T30-2, T36-2E). The multipliers were applied to the habitat value projected by adding SHW in those four DCAs planned to have SHW in the future. For the remaining DCAs, the effective multipliers were not used in the habitat value outputs from the HSM with the management operations included.

Table 2. Effective Multipliers for Summer Habitat Water

Guild	Mean	Standard Error
Diving Waterbirds	1.34	0.04
Migrating Waterfowl	1.51	0.15
Migrating Shorebirds	1.85	0.1

Habitat value gained from various management options was calculated by adding different management operations until deficits were exceeded (HVA needed) from DWM implementation for migrating guilds (Table 3). The two breeding guilds have some modeled decreases in habitat value as part of DWM; however, these guilds have largely completed their breeding activity by October during fall DWM. Additionally, summer operation of Phase 7a is expected to result in Habitat Value gains above the amount required to achieve “maintenance” of habitat value under the Phase 7a transition project; this would likely result in a net gain (not reflected in Table 3) for breeding shorebirds and waterfowl.

Table 3. Habitat Value Gained by Operation of Various DCAs as Part of DWM

Operation	DCA	Habitat Value Gain (HVA)				
		Diving Waterbird	Migrating Waterfowl	Migrating Shorebird	Breeding Waterfowl	Breeding Shorebird
Plover Water	T13-1	27.8	109.7	90.4	19.8	16.1
SHW and Pond operation	T17-1	278.8	552.7	534.5	26.8	42.8
	T17-2	324.4	344.2	478.4	33.1	33.4
SHW	T25S	49.1	28.3	70.1	0.0	10.0
	T29-1	123.4	99.8	160.5	6.9	1.9
	T29-2	69.6	8.9	41.4	4.3	6.4
	T30-2	220.4	121.0	236.0	7.6	5.2
	T36-2E	146.8	66.3	194.2	5.0	5.2
	T5-3 Addition	27.1	66.7	94.0	0.0	0.0
GAIN		**1267.4**	**1397.7**	**1899.5**	**103.5**	**121.0**
LOSS (from Table 1)		**975.1**	**1367.3**	**1551.9**	**151.9**	**243.7**
BALANCE		**292.3**	**30.3**	**347.6**	**-48.4**	**-122.7**

Notes: DCA = Dust Control Area; DWM = Dynamic Water Management; HVA = Habitat Value Acre; SHW = Summer Habitat Water.

When compared with the overall availability of habitat on the Lake for these guilds, including Shallow Flood Areas not included in the DWM Plan, Commission staff believes that the small potential decrease in HVA for breeding waterfowl and breeding shorebirds (less than 1 percent of the available HVA for each guild) related to DWM implementation does not constitute a significant effect.

The impacts to habitat value incurred from DWM can be offset by adding water to high snowy plover use areas in T13-1 after the end of the dust season until the end of the snowy plover breeding season (Plover Water), operating the pond in T17-1 and T17-2 from October until the required startup in January, applying flow to eight DCAs (SHW), and maintaining the planned operations of Phase 7a DCAs. By employing these strategies, habitat value for all five species guilds on Owens Lake will be maintained or nearly maintained during implementation of DWM.

The above evaluation of the DWM Plan, including the application of plover and SHW, demonstrates that LADWP will continue to be compliant with its habitat value maintenance responsibilities. As such, this Project change does not involve a new significant impact not previously identified in the 2015 EIR, and therefore, a subsequent or supplemental EIR is not required.

4.0 CONCLUSION

Commission staff reviewed the changes proposed under the DWM Plan pursuant to Public Resources Code section 21166 and State CEQA Guidelines sections 15162 through 15164. As identified in Section 1, Introduction, pursuant to CEQA section 21166 and State CEQA Guidelines section 15162, a subsequent or supplemental CEQA document is not required unless one or more of the following three events occurs:

- Substantial changes proposed in the Project which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects (State CEQA Guidelines, § 15162, subd. (a)(1)); or
- Substantial changes that will occur with respect to the circumstances under which the Project is undertaken which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects (State CEQA Guidelines, § 15162, subd. (a)(2)); or
- New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified shows any of the following (State CEQA Guidelines, § 15162, subd. (a)(3)):
    - (A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration; or
    - (B) Significant effects previously examined will be substantially more severe than shown in the previous EIR; or
    - (C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
    - (D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

If the proposed changes do not involve a new or substantially increased significant impact resulting from a change in the project or a change in the circumstances under which a project will occur, but instead reflect minor modifications or additions, State CEQA Guidelines section 15164 directs lead or responsible agencies to prepare an addendum to the CEQA document. Pursuant to State CEQA Guidelines section 15164, subdivision (e), which states that lead or responsible agencies shall explain their decision not to prepare additional environmental analysis in a subsequent document, Commission staff

evaluated the operational changes to the identified DCAs proposed by LADWP and provides the required evaluation and explanation above.

As detailed in the analysis presented above, this Addendum to the EIR certified by the City on June 2, 2015, supports the conclusion that the changes to the overall OLDMP – Phase 9/10 Project due to implementation of the DWM Plan would not result in any new or substantially more severe significant environmental effects and do not represent a substantial change to the circumstances under which the Phase 9/10 Project is being carried out. In addition, Commission staff believes that no new information exists that would give rise to a new or substantially more severe significant environmental effect or that would affect the implementation or effectiveness of the previously adopted mitigation measures. In particular, the Project is consistent with State CEQA Guidelines section 15164 in that only minor changes have been made to the Project, and none of the conditions described in Public Resources Code section 21166 or State CEQA Guidelines section 15162 has occurred. Therefore, Commission staff recommends the Commission find that no subsequent or supplemental document is required.

5.0 ADDENDUM PREPARATION SOURCES AND REFERENCES

5.1 ADDENDUM PREPARERS

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5.2 REFERENCES

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APPENDIX A

HABITAT VALUE ASSESSMENT
OWENS LAKE DUST MITIGATION PROGRAM
DYNAMIC WATER MANAGEMENT
2016

(July 2016)

HABITAT VALUE ASSESSMENT
OWENS LAKE DUST MITIGATION PROGRAM
DYNAMIC WATER MANAGEMENT
2016

Prepared by

Watershed Resources

Los Angeles Department of Water and Power

July 2016

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Dynamic Water Management Projected Habitat Value Assessment

BACKGROUND

The goal of this assessment is to estimate changes in habitat value due to the implementation of Dynamic Water Management (DWM) and develop management options that offset these impacts and maintain reference levels of habitat value. Based on observations from DWM in 2015, a portion of these management options includes a quantification of additional habitat value that arises from the application of water in summer.

METHODS

The projections of habitat value in this assessment were generated using the Owens Lake Habitat Suitability Model (HSM). This version of the model incorporates the draft recommendations from Point Blue Conservation Science (Point Blue Conservation Science 2016).

Estimating Habitat Value

Habitat value was estimated for 2016 assuming normal operations in DWM DCAs (HVA_{ref}). These estimates were generated using habitat parameter data from 2014, the most recently observed data available.

Habitat value was then projected for each DWM DCA by estimating habitat parameters for non-operation through the fall period (HVA_{DWM}) as described in the 2016 SIP (Great Basin Unified Air Pollution Control District 2016). Most DCAs under DWM will have no water during this time until full operation begins between December 1 and January 16. Some DCAs (e.g. T17-2) will have only a portion of the DCA operated; based on past history of emissions only a section of the DCA was permitted to be dry during the dust control season. In these DCAs the habitat parameters estimates were developed with knowledge of typical operations and the constraints of existing infrastructure within each DCA. Generally, wetness was assumed to be 0 and water availability assumed to be “not available” during the DWM months. However, for deep water DCAs (i.e. T5-3 Addition) or partially operated DCAs (T13-1, T17-1, T17-2, and T9), water depth parameters were estimated from summer 2015 images or 2014 data as available.

DCAs included in the Phase 7a and TwB2 projects were excluded from assessing impacts resulting from DWM operations. Their changes in habitat value were analyzed separately Phase 7a EIR (T1A-2, T37-2) and Addenda TWb2 (T16 and T2-2) per their operations to maintain habitat value. T16 and T37-2 will have water reduced to the minimum needed to maintain

habitat value if not needed for dust control. While water will be reduced in these DCAs, per the agreements, habitat value will be maintained across both projects in their entirety.

The resulting estimated habitat value during DWM (HVA_{DWM}) was then subtracted from habitat value estimates without dynamic water management in each DCA (HVA_{ref}), where n = the number of DCAs as follows. This was performed for habitat value for each guild (Table 1).

$$HVA\ needed = \sum_{i=1}^{n} (\text{HVA REF} - \text{HVA DWM})$$

Table 1. Estimated Habitat Value lost resulting from Dynamic Water Management

DCA	Diving Waterbird Lost (HVA)	Migrating Waterfowl Lost (HVA)	Migrating Shorebird Lost (HVA)	Breeding Waterfowl Lost (HVA)	Breeding Shorebird Lost (HVA)
T10-1	98.0	106.1	167.8	14.6	27.1
T10-2N	38.8	63.6	81.9	6.2	15.6
T10-2S	100.4	350.9	431.6	28.9	55.9
T10-3E	4.8	21.0	45.8	2.4	8.0
T10-3W	0.1	0.0	0.7	0.0	0.0
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T13-1 Add	0.0	0.3	4.5	0.6	1.1
T17-1	169.0	331.1	187.7	17.9	29.4
T17-2	226.0	47.3	114.9	33.1	33.4
T18-0	72.6	118.6	196.3	14.5	27.9
T21W	0.0	0.6	2.2	0.0	0.0
T25-3	0.0	0.3	2.9	0.0	0.0
T5-3	0.0	33.9	34.6	2.5	3.3
T5-3 Add	21.3	15.3	-5.8	0.0	0.0
T9	80.8	52.5	99.6	7.0	15.9
HVA needed	**975.1**	**1367.3**	**1551.9**	**151.1**	**243.7**

Developing Offsets

To maintain lake-wide habitat value with DWM all DCAs within the Project area were examined for their potential to increase habitat value. Particular attention was paid to maintaining value for waterfowl because the majority of waterfowl are observed in fall, the time when the DWM DCAs will be offline.

For spring DWM (turning off water supplied to DWM DCAs on April 30) most migrating birds have left Owens Lake therefore only breeding shorebirds and waterfowl are potentially impacted. To maintain habitat value in that timeframe DCAs with high numbers of Snowy Plover and high habitat value for breeding shorebirds had lateral lines operated normally through the remainder of the dust season. These DCAs are T17-1, T17-2, T13-1 and T10-1.

For fall dynamic water management two primary options to increase habitat value were explored: 1) in DWM DCAs, operate the pond portion of the DCA, potentially at a lower level than normal operations, while turning off laterals through fall and 2) In any DCA, provide small amounts of water through the summer to provide perennial habitat for forage insects and shorebirds (referred to as Summer Habit Water or SHW).

The former option provides habitat at a time when many migrating waterfowl and diving waterbirds are using Owens Lake. However, this option assumes habitat is limiting in the fall for these guilds. Given the observed variability in many DCAs with appropriate habitat for these guilds this circumstance appears unlikely. The latter option provides water at a time period when water is scarce and the amount of usable habitat during normal drydown is limited for shorebirds during their peak migration (August –September) but it also provides a refuge for forage insects to colonize the entire DCA once it is operational again in fall. This option helps to bolster the forage invertebrate population through the normally dry summer and provide a greater food source later in fall when diving waterbirds and waterfowl are most abundant on Owens Lake. The presence of perennial water is second only to salinity in its importance to invertebrate abundance (Herbst, 2001). Water persisting throughout the summer has historically been quite rare on Owens Lake dust control due to high evaporation rates and no requirement to apply water for dust control operation. This refuge for invertebrates was shown to have a significant lag effect on habitat value use where a little perennial water can produce significant increases in bird use in subsequent months those cells (Point Blue Conservation Science 2016, LADWP 2016).

This positive effect of summer habitat water successfully demonstrated an increase in bird use during dynamic water management in 2015 (LADWP 2016). Four DCAs, T29-1, T29-2, T30-2, and T36-2E received SHW and had greater than expected bird use by all guilds. The effect was most obvious for the shorebird guild because they directly benefit from the addition of water

during August, the peak of their fall migration. Listed below in Table 2 are the shorebird numbers recorded in the 4 DCAs with SHW in August relative to reference averages for August. While T29-2 only had a slight increase (largely the same), the other 3 DCAs were proportionally higher than reference averages, and, T30-2 had an enormous increase, over 2200 birds where only 1 shorebird had been observed in August during all 3 years of the reference period (2012-2014).

Table 2. Shorebird counts in August in SHW DCAs relative to reference averages

DCA	Reference Average shorebirds observed (2012-2014)	2015 Shorebirds observed	Proportional Increase in bird numbers ((2015-Ref)/Ref)
T29-1	5.3	556	103.3
T29-2	159.3	365	1.3
T30-2	0.3	2204	6611
T36-2E	4.7	86	17.4

The diving waterbirds and waterfowl also responded to summer habitat water. While diving waterbirds and migrating waterfowl are not expected in August, a delayed effect, presumably due to the persistence of invertebrates through the late summer and early fall facilitating increased use was observed.

Actual bird use, when summer habitat water was applied, was greater than the expected use from modeling projections for all guilds (see Figures 1 -3). This information suggested that the model does not accurately weight the value of SHW. The actual increases in habitat value were quantified and incorporated into the habitat value predictions for 2016. These assessments, referred to as the Summer Habitat Water Value Adjustment are discussed below.

Summer Habitat Water Value Adjustment

A detailed example of this analysis is presented in Appendix 2.

To quantify the actual habitat value gained with application of summer habitat water, the actual bird use data and modeled Habitat Value from 2015 were used. Habitat Values (HVA_{2015}) were projected from estimates of 2015 environmental parameters. The input parameters incorporated offline DCAs included in the 2015 DWM by using water depth acreage value of 0 in the fall and water availability parameters to dry during fall months. From linear regression analysis a best-fit equation was generated to describe the relationship between habitat value in 2015 and observed bird counts in 2015. For all three guilds the DCAs with summer habitat

water strongly tended to have higher than projected bird counts which can be seen in Figures 1-3 by presence of the SHW DCAs (black dots) being most often above the best fit line.

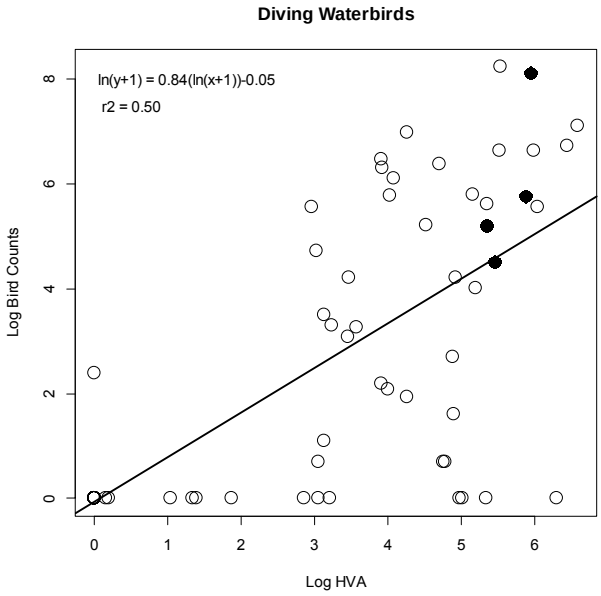

Figure 1. Regression analysis of Diving Waterbird HVA and observed diving waterbird counts in 2015. Filled circles (●) are DCAs with SHW, open circles (○) are DCAs without SHW.

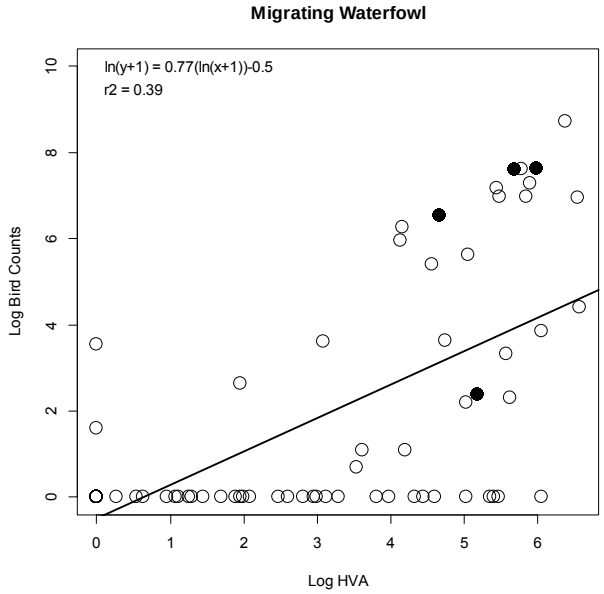

Figure 2. Regression analysis of Migrating Waterfowl HVA and observed migrating waterfowl counts in 2015. Filled circles (●) are DCAs with SHW, open circles (○) are DCAs without SHW.

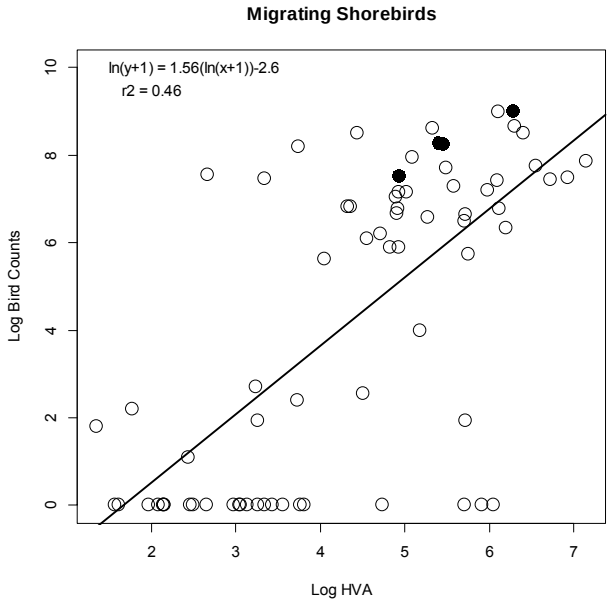

Figure 3. Regression analysis of Migrating Shorebirds HVA and observed migrating shorebird counts in 2015. Filled circles (●) are DCAs with SHW, open circles (○) are DCAs without SHW.

Using the linear equation, the habitat value needed to project the actual bird counts was calculated (HVA_{SHW}). The Value Adjustment multiplier was calculated as the following ratio, averaged across the DCAs with SHW:

$$HVA_{SHW}/HVA_{2015}$$

This ratio represents the degree to which the HVA calculated from the model (HVA_{2015}) needs to be multiplied by to project observed birds when summer habitat water is applied.

Several immediate concerns arose when assessing the accuracy of the Value Adjustment Multiplier:

1. The inherent variability of natural systems could lead to strongly over or underestimating the actual value of the multiplier.

2. If water presence was limiting bird use in 2015 the calculated Value Adjustment Multiplier may be inflated by a concentration of birds in wet areas.

Per the first concern, it was concluded that overestimating the multiplier would be more harmful to the ecology of the dust control area since this would result in the inadequate provision of actual habitat value; erring on the side of caution was deemed most sound. Per the second concern, from the analysis of 2015 bird data, no strong evidence of diving

waterbirds or waterfowl being exceptionally concentrated was found though the possibility was not ruled out. Shorebirds, however, historically have been water-limited on Owens Lake in August and a concentration effect likely does exist.

Given these issues an extremely conservative approach was taken with the following steps:

1. Outliers above the mean were removed
2. Multipliers were than capped within the constraints of the model such the habitat value predicted could not exceed the maximum value the model could predict (i.e., HSV must remain <= 1)
3. The multiplier was only applied to the fall data, effectively reducing the multiplier by half
4. To minimize overestimates due to the concentration effect, the multiplier was only applied to 6 DCAs assuming there would be diminishing returns of the benefits of SHW with more DCAs. Three additional DCAs, while receiving water in the summer, did not have the multiplier applied.

The 6 DCAs chosen to have the multiplier applied included 3 of the 4 DCAs that received SHW in 2015 (T29-1, T30-2, T36-2E). These DCAs have already demonstrated positive results across guilds. T29-2, a DCA with SHW in 2015, was not included because it is not well suited for waterfowl; it tends to have poor habitat for waterfowl which would not be augmented by SHW and indeed T29-2 waterfowl numbers were not above average in 2015 even with summer habitat water. Historically, bird density in T5-3 Addition has been extremely high when water was present in the summer. From 2012 to 2014 the average density was 23 birds/wet acre (± 3.1 SE), 25 birds/wet acre (± 10.2 SE), and 31 birds/wet acre (± 4.0 SE) for Diving Waterbirds, Migrating Waterfowl, and Migrating Shorebirds respectively or, the 1st, 3rd, and 7th highest density out of all DCAs. Since benefits beyond model projections are expected, the multiplier was also applied to this DCA. Finally, T17-1 and T17-2 also had the multiplier applied. In 2015 T17-1 was operated as pond-only with some application of summer water. All guilds were more abundant than expected. However, waterfowl were especially abundant in T17-1 in 2015 (6176 birds compared to the 85 expected). T17-2, an adjacent DCA, has similar habitat to T17-1 therefore it was assumed this DCA would perform similarly and, anticipated bird numbers are more accurately projected with the multiplier.

Since the degree of increase resulting from the multiplier depends on initial habitat suitability values, each SHW DCA has a slightly different effective multiplier. The mean value of the multipliers is listed below in Table 2.

Table 3. Effective Multipliers for Summer Habitat Water

Guild	Mean	se
Diving Waterbirds	1.34	0.04
Migrating Waterfowl	1.51	0.15
Migrating Shorebirds	1.85	0.10

RESULTS

To maintain Habitat Value, the habitat gained from various management options was calculated by adding different management options until deficits incurred from DWM for migrating guilds were exceeded (HVA_{needed}). The two breeding guilds have some modeled decreases in Habitat value as part of DWM. However the breeding guilds have largely completed their breeding activity by October during fall DWM. They also have substantial increases in Habitat Value as part of Phase 7a therefore these guilds will have more habitat available to them in 2016 than they did during the reference period of 2012-2014, prior to completion and operation of Phase 7a (Table 3).

Table 4. Habitat value (HVA) gained by operation of various DCAs as part of DWM

Operation	DCA	Diving Waterbird Gain (HVA)	Migrating Waterfowl Gain (HVA)	Migrating Shorebird Gain (HVA)	Breeding Waterfowl Gain (HVA)	Breeding Shorebird Gain (HVA)
Plover Water	T13-1	27.8	109.7	90.4	19.8	16.1
SHW and Pond operation	T17-1	278.8	552.7	534.5	26.8	42.8
SHW and Pond operation	T17-2	324.4	344.2	478.4	33.1	33.4
SHW	T25S	49.1	28.3	70.1	0.0	10.0
SHW	T29-1	123.4	99.8	160.5	6.9	1.9
SHW	T29-2	69.6	8.9	41.4	4.3	6.4
SHW	T30-2	220.4	121.0	236.0	7.6	5.2
SHW	T36-2E	146.8	66.3	194.2	5.0	5.2
SHW	T5-3 Addition	27.1	66.7	94.0	0.0	0.0
Current operations for summer water	Phase 7a				313.0	716.0
HVA Gain		**1267.4**	**1397.7**	**1899.5**	**416.5**	**837.0**
Balance		**292.3**	**30.3**	**347.6**	**265.4**	**593.3**

Plover water = operation of laterals in high Snowy Plover use area until the end of the nesting season; SHA = application of Summer Habitat Water through summer until the start of the dust season to maintain a refuge for forage invertebrates.

CONCLUSION

The impacts to Habitat Value incurred from DWM can be offset by adding water to high Plover use areas in T13-1 after the end of the dust season until the end of the Snowy Plover breeding season (Plover Water), operating the pond portions of both T17-1 and T17-2 from October until the required start-up in January, applying flow to eight DCAs (SHW), and maintaining the planned operations of Phase 7a DCAs. By employing these strategies, Habitat Value for all five species guilds on Owens Lake will be maintained during implementation of DWM.

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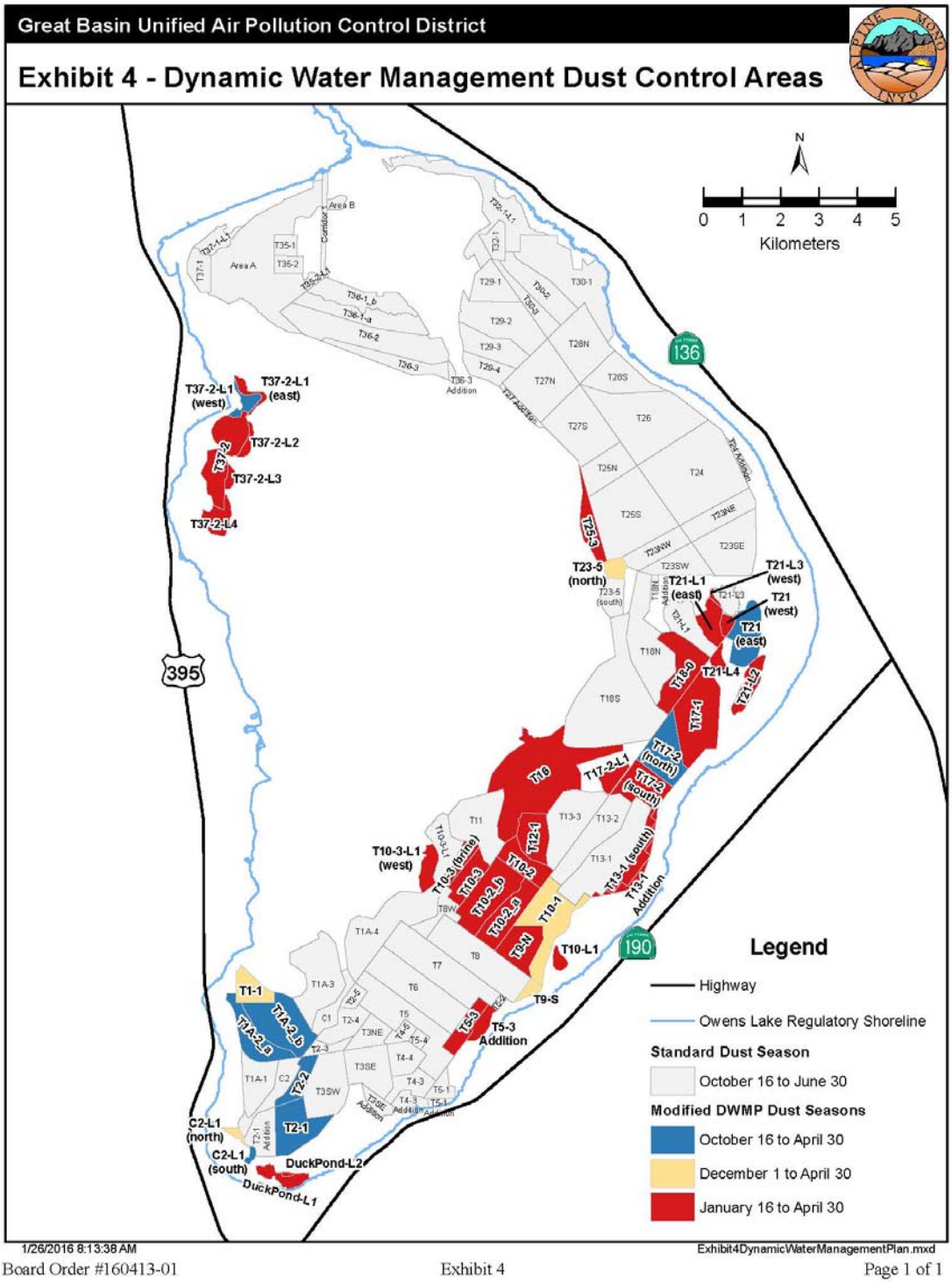
Herbst, D. B. 2001. An evaluation of aquatic habitats formed by irrigation and drainage of managed vegetation tracts and shallow flooding in the Owens Lake playa, Inyo County, California. Great Basin Unified Air Pollution Control District, Bishop, CA

Los Angeles Department of Water and Power. 2016. Owens Lake Dust Mitigation Program 2015 Lake-wide Avian Surveys Report Prepared by LADWP Watershed Resources published May 2016.

Point Blue Conservation Science. 2016. Owens Lake Habitat Suitability Model Validation and Refinements. Draft Report to Los Angeles Department of Water and Power. Petaluma, CA

Appendix 1. Dust Control Areas in DWM



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Appendix 2- Example of the Summer Habitat Value Adjustment Analysis using T29-1 and Diving Waterbird counts.

Following regression analysis of Habitat Value Acres and Diving Waterbird, the following best-fit line was generated:

$$Ln(y+1) = 0.84(ln(x+1)) – 0.05$$

where x is the projected habitat value acres for 2015 (HVA_{2015}) and y is the bird counts from 2015. The habitat value required (HVA_{shw}) for the actual bird counts observed was calculated using this equation. For T36-2E, the actual bird count was 178 or following a log transformation 5.2 (see Fig. 4, blue arrow). Using the equation, HVA_{shw} for T29.1 is 482 or 6.2 after transformation (see Fig.4, red arrow). Therefore the ratio of HVA_{shw} /HVA_{2015} = 2.3. In other words, what the HSM predicts needs to multiplied by 2.3 in order to accurately predict the actual bird counts observed.

This was performed for all DCA's with SHW (filled circles) to get estimates of actual habitat value gained for each guild per description on page7.

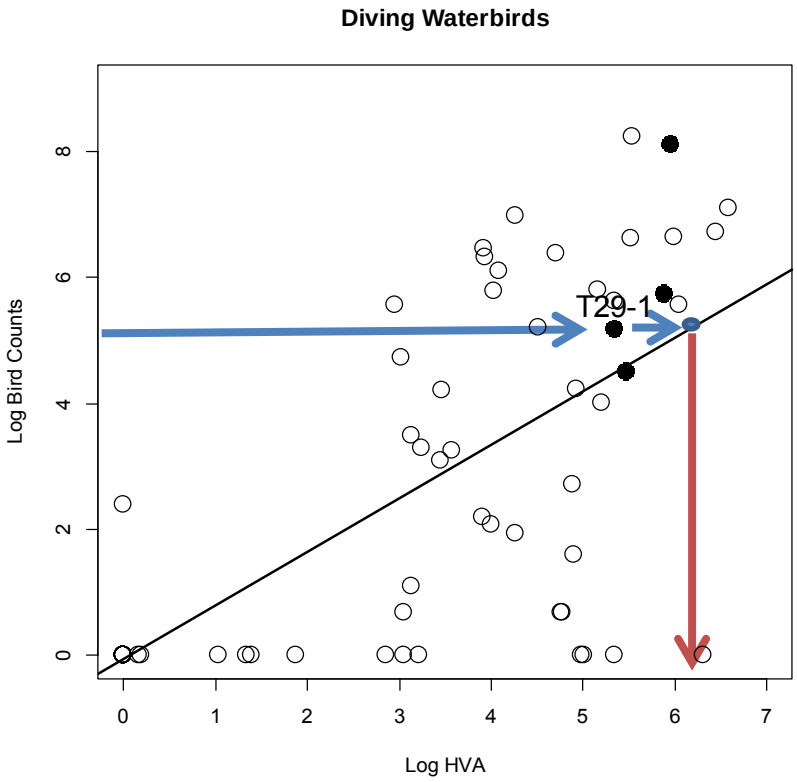


Figure 4. Regression analysis of Diving Waterbird HVA and observed Diving Waterbird counts in 2015. Filled circles (●) are DCAs with SHW, open circles (○) are DCAs without SHW. T29-1 labeled. Blue arrow indicates the actual bird counts and the red arrow indicates the habitat value required to predict the actual bird counts.

2016 Owens Lake

Dynamic Water Management Plan

Great Basin Unified Air Pollution Control District

January 2016

1.0 BACKGROUND AND INTRODUCTION

Article 7 of the 2014 Stipulated Judgement between the Great Basin Unified Air Pollution Control District (District) and the Los Angeles Department of Water and Power (LADWP) commits the parties to work together to develop a Dynamic Water Management Plan (DWMP). The goal of the DWMP is to reduce the volume of water used on Owens Lake while still maintaining required dust control. The reasoning behind the concept of a DWMP is that lake bed surface erosion does not behave uniformly in time or space due to the diverse soils and surface conditions present and that there may be areas in which the dust season, during which dust controls are required, may be modified allowing for reduced water usage.

The dust season in the 2008 SIP (GBUAPCD, 2008) is defined as extending from October 16 to June 30 of the following year. During this 8 ½ month period dust control areas must meet the requirements as defined in the 2008 SIP. In recognition that the emissivity of areas are generally less at the end of the dust season, Shallow Flooding areas which are operated to achieve 99% control are permitted to follow a designated ramp down schedule which starts on May 15 and extends to June 30.

The October 16 to June 30 dust season was originally designated in the mid-1990's prior to any dust control implementation on the lake bed based on the overall timing of PM_{10} exceedances measured at air monitoring stations located around Owens Lake. Until now, with the development of the DWMP, there was only one standard dust season applied to Owens Lake dust controls such that there were no modifications made to better fit the spatial and temporal timing of dust activity on different portions of the lake bed.

In 1999 and 2000, the District implemented a sand motion monitoring network on Owens Lake as part of the Owens Lake Dust Identification Program (Dust ID) in order to better characterize the surface wind erosion activity on the lake bed causing PM_{10} violations at the 3,600 foot elevation regulatory shoreline. The sand motion monitoring network has been in place for over 15 years progressively changing as more is learned about the lake bed and dust control areas have been implemented.

This technical report was prepared as an analysis of the sand flux data from the Owens Lake Dust Identification (Dust ID) program as part of the development of the Dynamic Water Management Plan. The primary basis for this analysis is an evaluation of the sand flux data record collected for the past 15 years. The main goal of this analysis is to identify areas on the lake bed where surface activity starts later in the beginning of the dust year and/or ends earlier at the end of the dust year. This analysis evaluates if the dust season of the Shallow Flooding BACM areas can reasonably be modified to have a delayed start in the beginning of the dust season and/or an early end at the end of the dust season without jeopardizing air quality and causing violations of the NAAQS for PM_{10} at the regulatory shoreline.

2.0 DATA EVALUATION METHOD AND ANALYSIS CRITERIA

Over 300 sand flux monitoring (SFM) sites (also called Sensist sites[1]) have been operated as part of the Dust ID program since 2000. The data record from these sites was included in this analysis to determine the timing, frequency and magnitude of the source area activity. The Sensit network has been dynamic over the years such that not all of the 300+ sites have been operated simultaneously. The Sensit network is evaluated regularly and adjustments are made, as needed, to best represent the source areas on the lake bed.

At the beginning of the Dust ID program, the lake bed had no dust controls in place and sites were installed on the lake bed in a grid pattern with 1 km spacing between Sensit sites. Starting in 2001 and 2002, as dust control measures were constructed on the lake bed and began operation, many of the original sites were removed. In other portions of the lake bed additional Sensit sites were added to the network as new dust sources became active. Most of the new sites were installed at locations to best represent the identified source area and were not located on a regular grid. At its peak, the Sensit network included over 200 sites operating at one time. In the 2015-2016 dust year, there are approximately 170 Sensit sites operating in the network.

[1] A sand flux monitoring site consists of a sand trap (called a Cox sand catcher or CSC), a Sensit (an electronic sand motion monitor) and a datalogger system. The overall site is generally termed a “sand flux” or “Sensit” site.

The method of collection and processing of the data from each Sensit site follows a detailed procedure given in the Dust ID protocol (GBUAPCD, 2016a). The data record from each Sensit site contains both 5-minute and hourly sand flux values. The purpose of collecting the sand flux data is for input into the Dust ID air quality model in order to determine which areas on the lake bed cause violations of the Federal PM_{10} standard at the regulatory shoreline. However, the data in this analysis are being used to evaluate the spatial and temporal sand motion patterns on the lake bed. For this analysis, the hourly sand flux data was totaled for each day. Graphs of the cumulative daily sand flux for each year for each site in the Dust ID network were plotted in order to determine the pattern of sand flux both in the fall during the beginning of the dust season and in the spring at the end of the dust season. The graphs for areas in the DWMP areas are provided in GBUAPCD (2016b).

Criteria were established upon which to evaluate the sand flux data in the development of the DWMP. A list of the criteria is provided below:

Data Analysis Criteria:

- 5 years or more of data record from before dust control implementation
- Date of first sand flux $\geq$5 g/cm^2/day
- Date of last sand flux $\geq$5 g/cm^2/day
- Frequency in number of years in which 5 g/cm^2/day thresholds were measured in the beginning and end portions of the dust season
- Surface condition behavior of dust control areas operated under Variance Order Docket No. GB15-01

A minimum of 5 years of data from before dust control implementation was considered important for each area due to the dynamic nature of the lake bed and varied climatic conditions. An area with a representative SFM site with at least 5 years of data is considered to have experienced a full range of conditions that occur on the lake bed such that the emissivity of the surface is well characterized. A frequency of 1 or more in 5 years that the 5 grams/cm^2/day threshold sand flux value was measured during the beginning and end portions of the dust season was considered significant. If elevated sand flux occurred at a frequency of less than 1 in 5 years (for example: 1 in 6 or more years) during the beginning and end portions of the dust season it was considered as not a regular condition of the lake bed surface at that location.

In July 2015, the Hearing Board of the Great Basin Unified Air Pollution Control District granted a regular variance for specific dust control areas from the requirement to meet the required Shallow Flooding wetness cover starting October 16 per the 2008 SIP Board Order (Docket No.

GB15-01, GBUAPCD, 2015). The variance along with the necessary permits and approvals from California Department of Fish and Wildlife (CDFW) and California State Lands Commission (CSLC) allowed LADWP to postpone wetting of the lake bed surface on 7.46 square miles (4,774.4 acres) of Shallow Flooding areas. The DCAs were selected through a combination of a technical analysis of the sand flux history and soil type and the habitat value allowing LADWP to save water on the lake bed. The delayed Shallow Flooding start also served as a precursor test of the proposed DWMP.

During the delayed start of the DCAs in the variance, the District conducted visual observations of surface conditions within each area to determine if the areas were behaving as expected based on the sand flux history analysis and were not deteriorating and becoming potentially emissive. In November and December 2015, two of the DCAs (T17-2 and T21) in the variance were observed to be sources of significant dust. The active source areas were mapped using GPS and video from the dust camera network. Based on the observed dust activity the beginning portion of the dust season for portions of these two DCAs areas was not modified but kept as October 16 (see discussion of these areas in GBUAPCD, 2016b). Other DCAs included in the variance remained stable and did not become active dust sources.

The areas on the lake bed included in this analysis consist of areas that are either currently controlled using Shallow Flooding BACM or areas that are currently uncontrolled but will have controls implemented as part of the upcoming dust control construction (i.e. Phase 9/10 areas). Additionally, areas which are part of the brine testing or are controlled with a variation of Shallow Flooding such as Tillage With BACM Back-Up (TwB2) were also included in this analysis.

Areas included in analysis

- Existing Shallow Flooding control areas
- Phase 9/10 areas
- TwB2 areas
- Phase 7a areas (excluding completed gravel areas)
- Brine areas

Areas NOT included in analysis

- Existing Gravel areas (Phase 8, T35, T1A-3)
- Managed Vegetation area in T5 through T8 (Farm)
- Sand Fence area (T1A-1)
- Channel Area

The following maps are provided to help the reader with the data analysis.

Figure 1: Index map of the dust control areas on Owens Lake.
Figure 2: Map of areas included in the Dynamic Water Management analysis.
Figure 3: Map of the different phases of dust control implementation.
Figure 4: Map of the recommended eligible Dynamic Water Management Plan areas.

Figure1. Index map of dust control areas on Owens Lake.

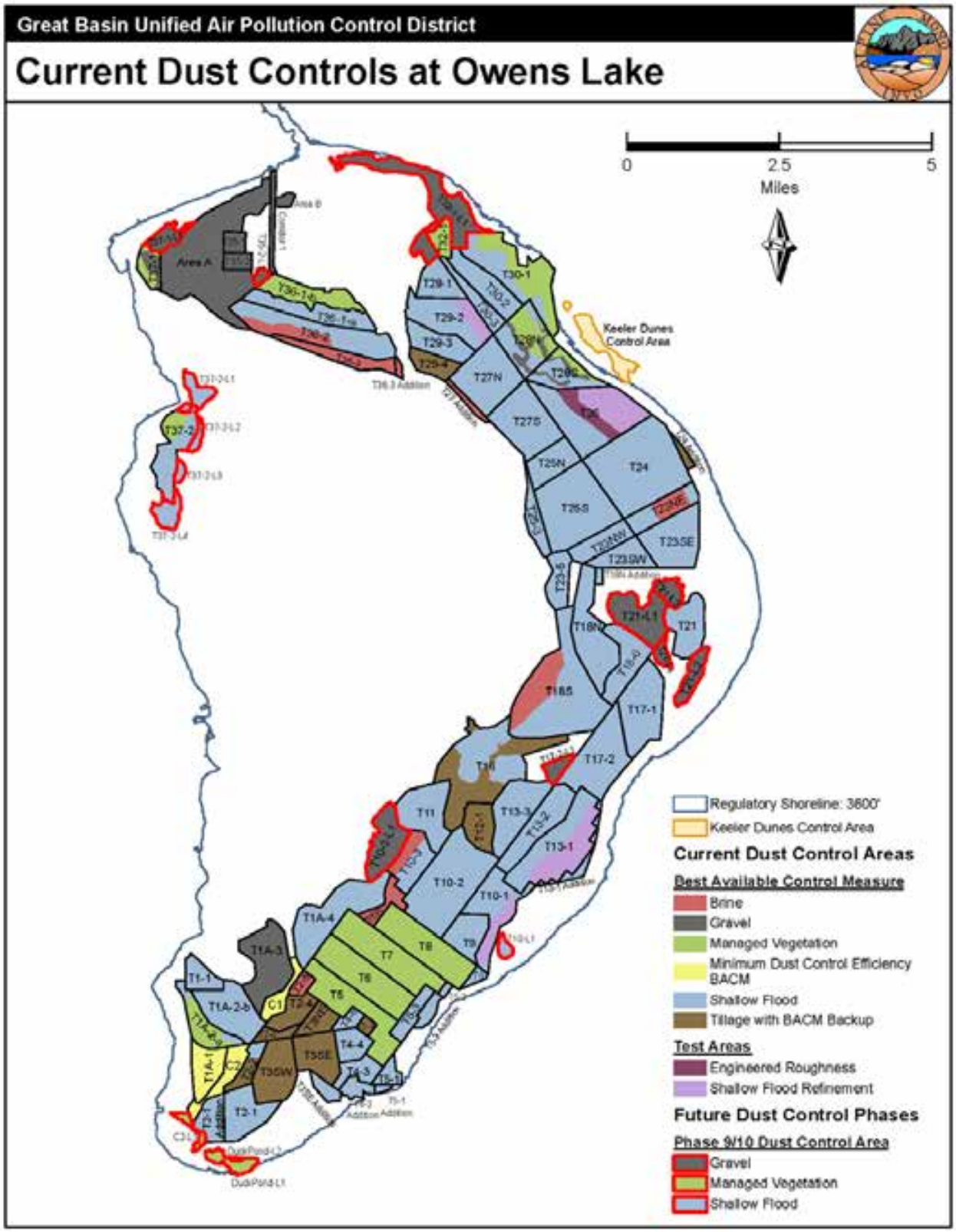


Figure 2. Map of areas included in the Dynamic Water Management analysis.

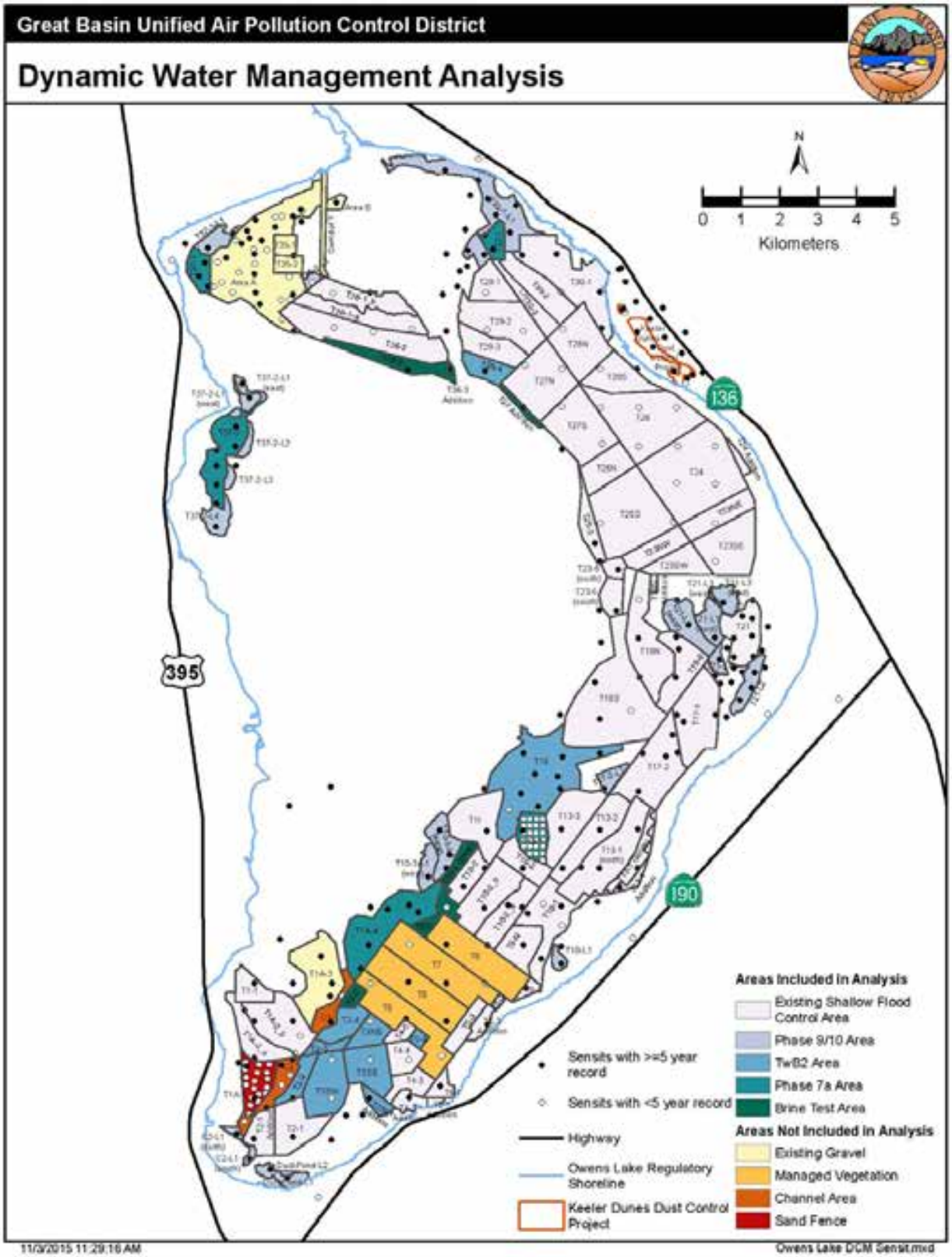


Figure 3. Map of the phases of dust control implementation on Owens Lake.

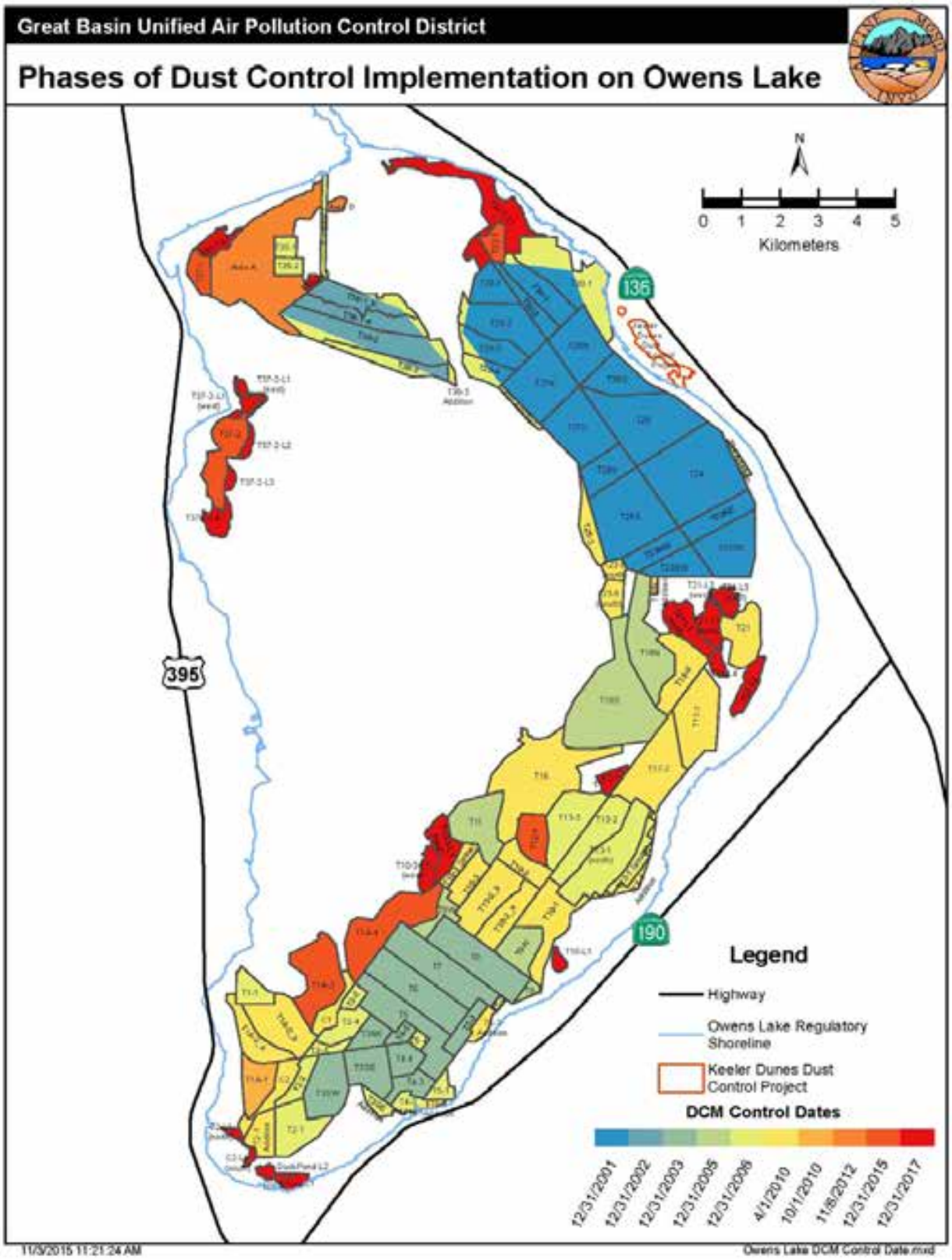
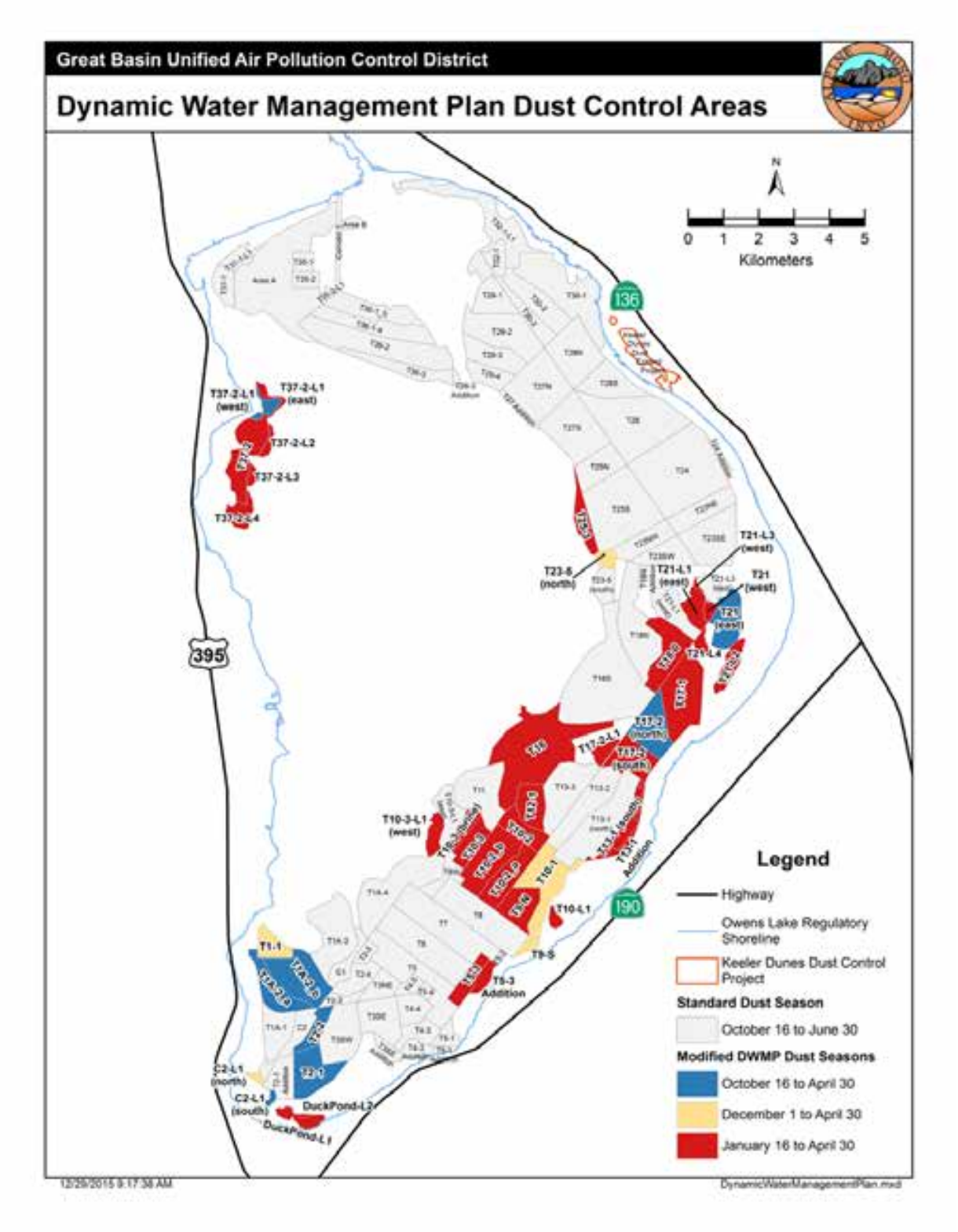


Figure 4. Map of the recommended eligible Dynamic Water Management Plan areas. The modified DWMP seasons are shown for conventional pond and lateral Shallow Flooding areas. The dust season for DWMP areas irrigated with sprinklers shall start two weeks earlier and end one month later than shown on the map (see Section 3.1.1).



3.0 SUMMARY AND RECOMMENDATIONS FOR THE DYNAMIC WATER MANAGEMENT PLAN

3.1 Modified Dust Seasons

Based on the pattern of surface erosion across the lake bed three modified dust seasons have been identified for the DWMP for Shallow Flooding areas. The modified dust seasons are in addition to the standard dust season provided in the 2008 SIP (GBUAPCD, 2008). The modified dust seasons for the DWMP have three different start dates in the beginning of the season that reflect the timing of the start of source area activity across the lake bed.

Standard Dust Season (as defined in the 2008 SIP)

October 16 to June 30 (with ramping of 99% control areas after May 15)

Modified Dust Seasons for Dynamic Water Management Plan

1) October 16 – April 30
2) December 1 – April 30
3) January 16 – April 30

The earliest start of the modified dust seasons is October 16 for areas in which surface activity is regularly observed early in the dust year. These early start areas consist of coarser textured soils in the southern portion of the lake bed and just to the east of Bartlett Point. The second modified start date is December 1 and is recommended for areas in which the sand flux record shows that significant surface activity and erosion is not observed until December to early January. The third modified start date is January 16 for areas that do not become emissive until January or later. The DCAs in this January 16 start group primarily consist of fine textured soils in which significant surface activity and dust emissions are delayed until the surface conditions break down in the winter months (mid-January or later).

All three modified dust seasons for the DWMP end on April 30. For these eligible DCAs, the sand flux record showed that significant sand motion and dust emissions ceased by the end of May or earlier. It is recommended that wetting of these DCAs continue through April 30 at which time water inflows for dust control may end and that due to gradual dry down of areas throughout the month of May sufficient dust control will be provided.

3.1.1 Adjustments for Sprinkler Irrigation Areas

Since the dates of the modified DWMP seasons assumes that there is an initial ramp-up of water at the beginning of the dust season and gradual drying of the DCAs at the end of the dust season, the modified DWMP seasons (as given in Section 3.1, above) only apply to eligible areas

where conventional Shallow Flooding is in place. Conventional Shallow Flooding areas are those that are wetted through ponding or irrigation laterals and bubblers.

For eligible areas that are Shallow Flooded with sprinkler irrigation, the modified DWMP seasons shall be adjusted to provide water two weeks earlier in the beginning of the dust season and one month later at the end of the dust season. The adjustments to the DWMP seasons for sprinkler irrigated Shallow Flooding areas are provided below.

Modified Dust Seasons Adjusted for Sprinkler Irrigated Shallow Flooding Areas

1) October 16 – May 31
2) November 16 – May 31
3) January 1 – May 31

The two week adjustment at the beginning of the dust seasons allows for wetting of the surface prior to the start of the modified seasons in Section 3.1 in order to simulate a ramp-up as provided in conventional Shallow Flooding areas. Irrigation is required during the month of May, since, unlike conventional shallow flooding area, dry down is immediate in sprinkler areas such that there is little to no dust control provided at the end of the dust season within a sprinkler area once the water is shut off.

3.2 Dynamic Water Management Plan Implementation

The recommendations provided here for the modified DWMP dust seasons are based on sand flux data from prior to dust control implementation in an area. Thus it represents the best estimate of what the surface activity might be should dust controls be removed from an area. However, it is unknown if and how the operation of dust controls within an area may change the nature of the surface activity both in time and space.

A test of the DWMP concept was conducted on 7.46 square miles of Shallow Flooding areas included in the fall 2015 variance Docket No. GB15-01 (GBUAPCD, 2015) allowing a delay in achieving full wetness cover from October 16 to either December 1 or January 16. During the variance period, portions of two DCAs (T17-2 and T21) became emissive in November and December 2015 such that the LADWP rewetted them early upon the request of the District. The active portions of these two areas were removed from the modified early dust season start in the DWMP (GBUAPCD, 2016b). The remaining DCAs in the variance remained stable and did not become emissive dust sources.

All areas operating with modified DWMP dust seasons must be monitored and observed as part of the District's Dust ID program and through use of the Induced Particulate Emission Test (IPET) methodology developed as part of the Tillage With BACM Back-Up (TwB2) monitoring

and enforcement protocol (see Attachment C of 2014 Stipulated Judgement). Furthermore, it is required that the modified dust seasons for the DWMP have the provision that an area must be re-wetted (re-flooding) quickly if monitoring and observations show that the surface conditions within an area deteriorate such that they become potentially emissive. The goal of re-flooding is to bring an area back into fully compliant dust control such that there are no exceedances caused by emissions from an identified area.

3.2.1 Re-Flooding Order

Re-Flooding will be required when a DWMP area deteriorates such that it is determined to be potentially emissive. When this determination has been made and a written re-flood order has been made by the APCO, then LADWP shall, re-flood a DWMP area so as to re-establish fully compliant Shallow Flooding in accordance with the most current Shallow Flooding BACM requirements. The wetness cover requirement shall be determined by the Shallow Flooding wetness cover curve[2] that shows the relationship between wetness cover and control efficiency for Shallow Flooding BACM areas.

The length of time to achieve full wetness cover is dependent on the amount of area that must be re-flooded and the method of irrigation.

For DCAs with conventional Shallow Flooding irrigated with laterals or ponds:
If the total amount of DWMP area that needs to be re-flooded is less than 25% of the total extent of area being operated under the DWMP then re-flooding must occur within 15 calendar days of a re-flood order being issued. If the total amount of DWMP area that needs to be re-flooded is 25% or more of the total extent of area being operated under the DWMP then the re-flooding must occur within 21 calendar days of a re-flood order being issued. This re-flooding compliance schedule is set with the goal of achieving fully compliant dust control as soon as possible and with the recognition of the limitations in the existing water delivery infrastructure.

For DCAs with sprinkler Shallow Flooding:
Shallow Flooding areas irrigated with sprinklers shall be re-flooded within 15 calendar days of a re-flood order being issued regardless of the amount of DWMP area that is ordered.

A re-flooding order shall be issued for entire or partial DWMP areas based on the results of monitoring and testing. For example, if only a portion of a DWMP area fails the testing and

[2] The Shallow Flooding wetness cover curve may be refined through testing. Any approved refinement of this curve can be used to determine the wetness cover required should a DWMP area be ordered for re-flooding.

monitoring conditions (items 1-3 summarized below and described in Section 3.3) then only that portion of the area associated with the monitoring and testing shall be included in the re-flooding order. The APCO will determine the areas associated with monitoring and testing results, in consultation with LADWP. Re-flooding orders are not appealable by the LADWP to the District Governing Board, Hearing Board, or any other agency.

Conditions that may trigger a re-flood order by the APCO are given below. The primary basis for a re-flooding order will be the results of sand flux monitoring and/or IPET testing. Details of how each item will be monitored are provided in Section 3.3.

1) Sand flux at a sand flux monitoring (SFM) site within a DWMP area exceeds 5 grams/cm^2/day.

2) Deterioration of the lake bed surface in a DWMP area such that it is a potentially emissive state. A potentially emissive state will be determined by using the TwB2 monitoring and enforcement protocol (see Level 3 – Mitigation Action as described in Attachment C to the 2014 Stipulated Judgement).

3) Dust plume and surface integrity observations. Dust plume and surface integrity observations will be used in conjunction with sand flux monitoring and/or IPET testing to determine if an area is deteriorating and requires re-flooding.

3.2.1.1 Re-Flooding Order More than Once in a Rolling 6 Year Period

Once an entire or partial DWMP area has been ordered for re-flooding more than once in a rolling 6 year period, that entire or partial area subject to the re-flood order may no longer operate with a modified DWMP dust season and must operate under the standard October 16 to June 30 dust season. The foundation for eligibility of an area in the DWMP is that an area is not emissive during the modified start or end periods of the dust season. If an area is identified for re-flooding multiple times within a continuous rolling six year period then the basis for inclusion in the DWMP is broken and the area will be required to revert back to the standard October 16 to June 30 dust season.

3.2.1.2 Re-Flooding Order Less than Once in a Rolling 6 Year Period

Should a re-flooding order be issued by the APCO for a DWMP area less than once in a rolling six year period, that re-flooding order shall only apply to the modified start or end period upon which the area was identified for re-flooding and not to the entire dust year. Examples include:

i. Re-Flooding Order in Modified Fall Season: If the surface of a DWMP area, scheduled to be in full compliance by January 16, deteriorates in November causing a re-

flooding order to be issued by the APCO, that area must then be re-wetted according to the schedule provided in Section 3.2.1 for the remainder of the fall period but that DWMP area will be allowed to shut down for the modified spring season.

ii. Re-Flooding Order in Modified Spring Season: If the surface of a DWMP area deteriorates in the modified spring season causing a re-flooding order to be issued by the APCO, that area must re-wetted according to the schedule provided in Section 3.2.1 for the remainder of the dust year (until June 30), however, the date for wetting in the fall period would not change.

3.3 Monitoring and Testing of Dynamic Water Management Plan Areas

The District will use the monitoring tests set forth below to ensure DWMP areas provide the emission reduction required on the Owens Lake bed. The District acknowledges that the performance criteria set forth below may be more stringent than is necessary to meet the percent emission reduction requirement, however, DWMP did not go through the BACM development process set forth in the 2008 Owens Valley PM_{10} State Implementation Plan (GBUAPCD, 2008). Therefore, in order to provide assurance that DWMP areas will provide the high level of public health protection required for BACM, the District will initially require that DWMP areas pass the following monitoring thresholds. During the first year of DWMP operation, the District will meet regularly with the LADWP to review and evaluate DWMP performance. After one full year of DWMP operation experience, the APCO will consider revising the DWMP performance criteria.

3.3.1. Sand Flux Test

a) Each DWMP area will be instrumented by LADWP with sand flux monitoring (SFM) sites (Sensit and CSCs) during the modified start and end periods. The locations of SFM sites at the modified start and modified end periods of the dust season are anticipated to be different due to the variation in the pattern of existing wetness during these two periods. The locations of SFM sites shall be determined by the LADWP in coordination with the District.

i) The number of SFM sites at the modified start of the dust season will be proportional to the areal extent of the DWMP area. All DWMP areas will require at least one SFM site. Proportionally more SFM sites are required for DWMP areas greater than 160 acres such that there is approximately one SFM site per 160 acres of DWMP area.

ii) During the modified end period of the dust season, the LADWP shall install SFM sites incrementally in stages as a DWMP area dries. The number of SFM sites is provided in Table 1 below.

Table 1. Number of SFM sites required per DWMP area during the modified end of the dust season.

Drying Stage	Exposed Lake bed	Number of SFM sites
1	Less than 50 acres	0
2	50 – 160 acres	1
3	>160 acres	1 per every 160 acres

b) LADWP will pair CSCs with Sensits, radio equipment and dataloggers programmed to record 5-minute sand motion data. All Sensit data will be reported electronically daily to the District. Sand catches from the SFM sites will be weighed and reported to the District within 7 calendar days of collection in the field. Sand motion data from the CSCs and Sensits will be processed to calculate the sand flux history of a site per the protocol set forth in the 2016 Dust ID Protocol (GBUAPCD, 2016a).

c) During the modified start of the dust season all sand flux monitoring equipment will be installed and operational by LADWP no later than October 16. During the modified end of the dust season all SFM sites will be installed and operational by LADWP within 7 calendar days of reaching each drying stage. LADWP shall inform the District of all SFM site installations within 7 days of installation. Failure to deploy monitoring equipment may result in notices of violation and/or re-flood orders from the APCO.

d) SFM sites installed for monitoring in the modified start of the dust season may be removed from a DWMP area once the modified dust season has started for each DWMP area or once the site location is endanger of getting flooded. The LADWP shall inform the District of all SFM site removals within 7 calendar days of their removal date. SFM sites installed for monitoring of the modified end of the dust season may be removed from a DWMP area after June 30.

e) All SFM sites shall be installed, operated and maintained according to the 2016 Dust ID Protocol (GBUAPCD, 2016a).

f) The APCO may issue a partial or full DWMP area re-flood order if sand flux exceeds 5.0 $g/cm^2/day$ at any sand flux site within a DWMP area.

g) The APCO acknowledges that the sand flux triggers may be conservative for DWMP areas located away from the regulatory shoreline. The APCO may adjust the sand flux trigger value on a case-by-case basis for each DWMP area based on its distance from the regulatory shoreline or other factors.

h) The APCO reserves the right to adjust the above criteria based on supporting data and after consultation with LADWP.

3.3.2. Induced Particulate Emission Test (IPET)

a) The District will utilize the Induced Particulate Emission Test (IPET) method developed for monitoring of TwB2 to determine if DWMP area surfaces are starting to become emissive during the modified start and modified end seasons and to advise LADWP with erosion potential alerts.

b) IPET testing will follow procedures provided in Attachment C of the 2014 Stipulated Judgement (2014 SJ).

c) The District will give LADWP field operations staff at least 24 hour notice of the time and place for RCWInD runs in order to allow LADWP staff an opportunity to observe those tests. LADWP staff does not need to be present for RCWInD testing to be used to call erosion alerts.

d) Three erosion alert levels are set using the IPET method: 1) an <u>early warning</u> of possible surface stability deterioration, 2) a <u>warning</u> level to alert LADWP of a potential breakdown of the surface stability and to advise voluntary maintenance efforts, and 3) a <u>mitigation</u> action level to require re-flooding of all or part of a DWMP Area. The IPET method will be used to determine erosion alert levels as follows:

   i. Level 1 – An erosion <u>early warning</u> is indicated when any visible dust is observed to be emitted from a surface or particles are dislodged when the RCWInD is flown at a height below one half of H_t. Voluntary mitigation may be appropriate to prevent further surface degradation.

   ii. Level 2 – An erosion <u>warning</u> is indicated when any visible dust is observed to be emitted from a surface when the RCWInD is flown at a height below H_t and above one half of H_t. Voluntary mitigation is advised to prevent further surface degradation.

iii. Level 3 – Mitigation action is required if visible dust is observed to be emitted from a surface when the RCWInD is flown at a height of H_t or higher. If ordered by the APCO, LADWP must re-flood all or part of a DWMP area that triggers a Level 3 alert.

The APCO acknowledges that warning and mitigation triggers may be conservative. The warning and mitigation trigger values may be adjusted on a case-by-case basis by the APCO for each DWMP area based on its distance from the regulatory shoreline or other considerations. After one year of experience with DWMP and the IPET test, LADWP and the District will meet to discuss the results of the testing and consider adjustments to the triggers.

e) The APCO reserves the right to adjust the IPET criteria based on supporting data and after consultation with LADWP.

3.3.3. Dust Plume Observations and Surface Integrity Observations

a) The District will conduct regular inspection of DWMP areas and conduct dust plume observations on DWMP areas to determine if DWMP area surfaces are starting to become emissive during the modified start and modified end seasons.

b) Dust plumes will be observed by a combination of visual observation, photography, or video following procedures provided in the 2016 Dust ID Protocol (GBUAPCD, 2016a).

c) Surface Integrity observations will be conducted monthly or as needed during the modified start and modified end dust seasons to document the condition and potential emissivity of DWMP areas. Conditions including, but not limited to, the presence or absence of loose soil deposits and salt efflorescence will be used to evaluate the overall stability of DWMP areas.

d) Dust plume observations and surface integrity monitoring will be used in conjunction with the above described sand flux and IPET tests as a basis for an APCO re-flood order.

3.4 Relationship of DWMP to Brine BACM and TwB2 Areas

Due to the slow changes observed within DCAs that are operated with the newly defined Brine BACM, it is reasonable to expect adequate control prior to the beginning and after the end of the modified dust season such that they may operate under the provisions of the DWMP. Brine BACM areas may follow testing and monitoring provisions required for Brine BACM areas instead of those provided here in Section 3.3.

DCAs operating under the provisions for Tillage With BACM Back-up (TwB2) may not participate in the DWMP even if designated as potential candidates based on the analysis presented in GBUAPCD (2016b). All areas being operated as TwB2 areas must follow all operation, maintenance, monitoring and testing protocols for TwB2. If a TwB2 area is ordered for re-flooding, it may participate in the DWMP once it has achieved fully compliant wetness coverage as long as the tillage features have been flattened and the area smoothed prior re-flooding such that the soils are reconsolidated and provided written approval by the APCO.

3.5 Summary of DWMP Areas

A summary table of the recommended dust season for each of the 44 DCAs in the DWMP is given in Table 2. An overall summary of the number of areas and the areal extent in each DWMP season is provided in Table 3. The total extent of the areas recommended for modified dust season as part of the DWMP is 13.15 square miles (8,416 acres). The supporting analysis of the data from the Sensit sites within each DCA and graphs of the cumulative daily sand flux plotted for each year of data before dust control implementation is available in the supporting technical report for the Dynamic Water Management Plan (GBUAPCD, 2016b).

The recommended dust season is primarily based on the analysis of sand flux data from before dust control implementation within each dust control area as well as the surface conditions and stability observed in areas included in variance Docket No. GB15-01. Recommendations are given in Table 2 for change to the beginning of the dust season as well as to the end of the dust season. The recommendations for DWMP dust season modifications are given for conventional Shallow Flooding and Brine BACM areas. For areas irrigated with sprinklers, the DWMP season shall be further adjusted so that irrigation starts two weeks earlier in the beginning of the dust season and end one month later at the end of the dust season.

Ten of the DCAs were split into two parts such that the recommended dust season is different in either side of the split (shown with grey cells in Table 2). If the operation of these DCAs cannot be split to accommodate the different dust seasons then the entire DCA must be operated to the longer of the two dust seasons.

As many of the existing and potential dust control areas on the Owens Lake bed fall under the jurisdiction of the California State Lands Commission and other responsible agencies, the LADWP must secure the appropriate approvals, leases and permits prior to implementing the modified dust seasons in the Dynamic Water Management Plan. Nothing in this report is intended to give any responsible agency any authority beyond their authority under law. Therefore, listing of these eligible areas in Table 2 should be considered as a preliminary step to seeking full approval for implementation of the DWMP.

Table 2: Summary table of recommended dust season modifications for eligible DCAs in the DWMP. DCAs split with two seasons are shown in grey.

	Label	Recommended DWMP start	Recommended DWMP end	Square Miles	Acres
1	C2-L1 (south)	16-Oct	30-Apr	0.035	22.1
2	C2-L1 (north)	1-Dec	30-Apr	0.044	28.3
3	DuckPond-L1	16-Jan	30-Apr	0.158	101.3
4	DuckPond-L2	16-Jan	30-Apr	0.014	9.2
5	T1-1	1-Dec	30-Apr	0.242	155.0
6	T1A-2_a	16-Oct	30-Apr	0.399	255.3
7	T1A-2_b	16-Oct	30-Apr	0.693	443.5
8	T2-1	16-Oct	30-Apr	0.521	333.2
9	T2-2	16-Oct	30-Apr	0.209	133.9
10	T5-3	16-Jan	30-Apr	0.221	141.4
11	T5-3 Addition	16-Jan	30-Apr	0.123	78.4
12	T9-N	16-Jan	30-Apr	0.388	248.2
13	T9-S	1-Dec	30-Apr	0.070	44.6
14	T10-1	1-Dec	30-Apr	0.699	447.5
15	T10-2	16-Jan	30-Apr	0.307	196.7
16	T10-2_a	16-Jan	30-Apr	0.442	282.8
17	T10-2_b	16-Jan	30-Apr	0.644	412.3
18	T10-3	16-Jan	30-Apr	0.279	178.6
19	T10-3 (brine)	16-Jan	30-Apr	0.159	101.8
20	T10-3-L1 (west)	16-Jan	30-Apr	0.169	108.1
21	T10-L1	16-Jan	30-Apr	0.064	41.1
22	T12-1	16-Jan	30-Apr	0.343	219.4
23	T13-1 (south)	16-Jan	30-Apr	0.238	152.6
24	T13-1 Addition	16-Jan	30-Apr	0.125	79.7
25	T16	16-Jan	30-Apr	1.680	1075.3
26	T17-1	16-Jan	30-Apr	0.826	528.8
27	T17-2 (north)	16-Oct	30-Apr	0.508	325.0
28	T17-2 (south)	16-Jan	30-Apr	0.426	272.9
29	T17-2-L1	16-Jan	30-Apr	0.119	76.1
30	T18-0	16-Jan	30-Apr	0.529	338.5
31	T21 (east)	16-Oct	30-Apr	0.431	275.6
32	T21 (west)	16-Jan	30-Apr	0.064	40.8
33	T21-L1 (east)	16-Jan	30-Apr	0.216	138.3
34	T21-L2	16-Jan	30-Apr	0.216	138.5
35	T21-L3 (west)	16-Jan	30-Apr	0.019	11.9
36	T21-L4	16-Jan	30-Apr	0.086	55.3
37	T23-5 (north)	1-Dec	30-Apr	0.108	69.3
38	T25-3	16-Jan	30-Apr	0.261	167.3
39	T37-2	16-Jan	30-Apr	0.590	377.8
40	T37-2-L1 (east)	16-Jan	30-Apr	0.074	47.1

42	T37-2-L2	16-Jan	30-Apr	0.065	41.6
43	T37-2-L3	16-Jan	30-Apr	0.049	31.3
44	T37-2-L4	16-Jan	30-Apr	0.188	120.1

Table 3. Summary of DWMP areas by modified dust season.

DWMP Season	Number of areas	Square Miles	Acres
October 16 - April 30	8	2.903	1,857.9
December 1 - April 30	5	1.164	745.0
January 16 - April 30	31	9.083	5,813.1
TOTAL	**44**	**13.150**	**8,416.0**

4.0 REFERENCES

2014 SJ. Stipulated Judgement for Respondent and Defendant Great Basin Unified Air Pollution Control District. Superior Court of the State of California, County of Sacramento. December 19, 2014.

2014 SJ, Attachment C. Protocol for Monitoring and Enforcing Owens Lake Tillage with BACK Backup. Found In: Stipulated Judgement for Respondent and Defendant Great Basin Unified Air Pollution Control District. Superior Court of the State of California, County of Sacramento. December 19, 2014.

GBUAPCD, 2008. 2008 Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan, Great Basin Unified Air Pollution Control District, Bishop, CA, January 2008.

GBUAPCD 2015. Findings and Order Granting Regular Variance For Shallow Flood Areas on Owens Lake. Variance Order - Docket No. GB15-01 by the Hearing Board of the Great Basin Unified Air Pollution Control District. Hearing date July 22, 2015.

GBUAPCD 2016a. 2016 Owens Lake Dust Source Identification Program Protocol. Great Basin Unified Air Pollution Control District. 2016.

GBUAPCD 2016b. Technical Report, 2016 Owens Lake Dynamic Water Management Plan. Great Basin Unified Air Pollution Control District. 2016.

Exhibit 4 - Dynamic Water Management Dust Control Areas

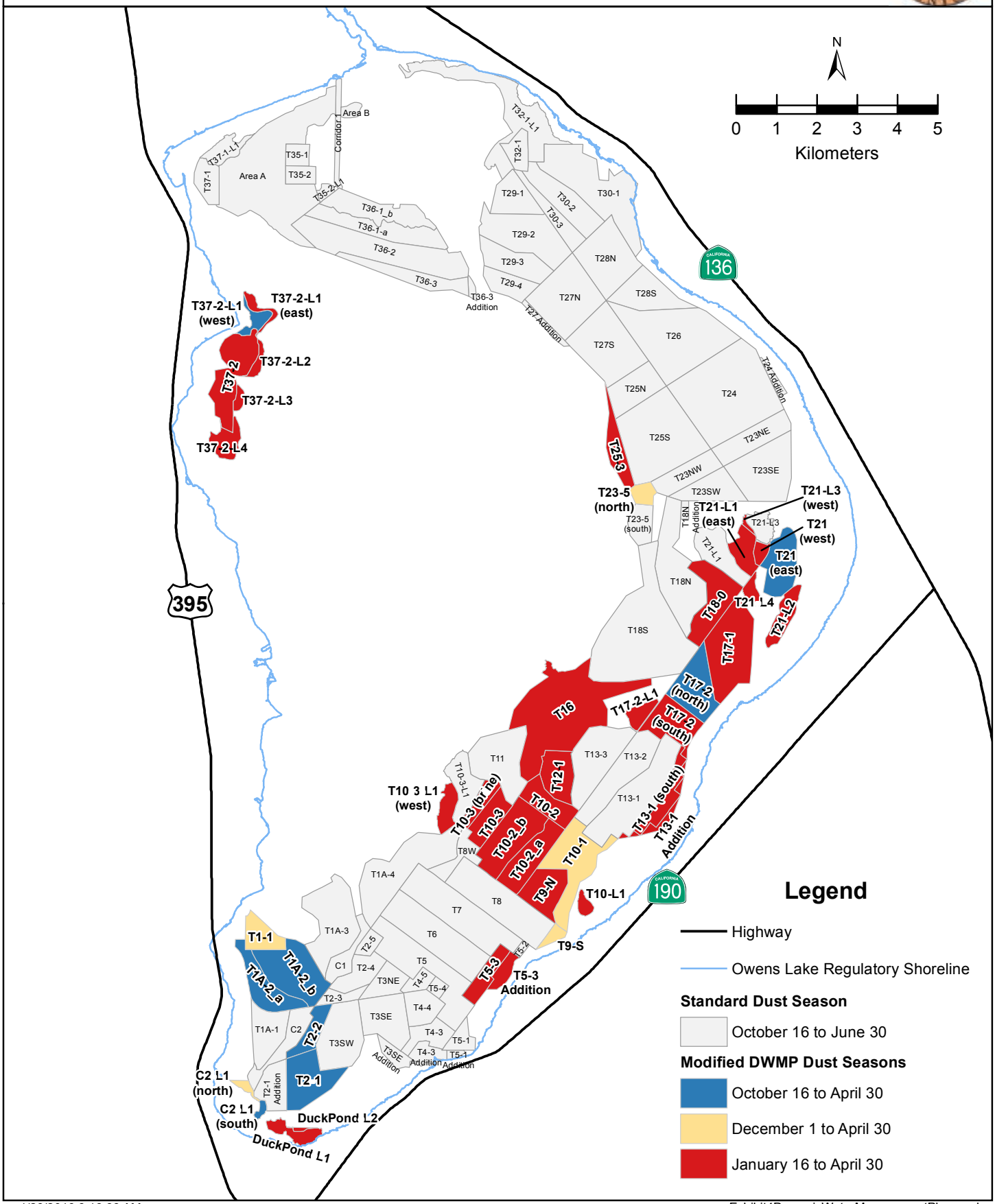


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Figure 2. DCA T16 Pond Shallow Flooding

Figure 3. Aerial Photo of Sprinkler Irrigated Shallow Flooding Areas