Agenda

County of Inyo
Board of Supervisors

Board of Supervisors Room
County Administrative Center
224 North Edwards
Independence, California

All members of the public are encouraged to participate in the discussion of any items on the Agenda. Anyone wishing to speak, please obtain a card from the Board Clerk and indicate each item you would like to discuss. Return the completed card to the Board Clerk before the Board considers the item (s) upon which you wish to speak. You will be allowed to speak about each item before the Board takes action on it.

Any member of the public may also make comments during the scheduled "Public Comment" period on this agenda concerning any subject related to the Board of Supervisors or County Government. No card needs to be submitted in order to speak during the "Public Comment" period.

Public Notices: *(1)* In Compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting please contact the Clerk of the Board at (760) 878-0373. (28 CFR 35.102-35.104 ADA Title II). Notification 48 hours prior to the meeting will enable the County to make reasonable arrangements to ensure accessibility to this meeting. Should you because of a disability require appropriate alternative formatting of this agenda, please notify the Clerk of the Board 72 hours prior to the meeting to enable the County to make the agenda available in a reasonable alternative format. (Government Code Section 54954.2). *(2)* If a writing, that is a public record relating to an agenda item for an open session of a regular meeting of the Board of Supervisors, is distributed less than 72 hours prior to the meeting, the writing shall be available for public inspection at the Office of the Clerk of the Board of Supervisors, 224 N. Edwards, Independence, California and is available per Government Code § 54957.5(b)(1).
Note: Historically the Board does break for lunch, the timing of a lunch break is made at the discretion of the Chairperson and at the Board's convenience.

January 17, 2012

8:00 a.m. ***INVOCATION*** by Supervisor Richard Cervantes

PLEDGE OF ALLEGIANCE

1. ***PUBLIC COMMENT***

CLOSED SESSION

2. ***PERSONNEL [PURSUANT TO GOVERNMENT CODE §54957]*** - Public Employee Appointment - Title: Director Public Works.

3. ***CONFERENCE WITH LABOR NEGOTIATOR (Pursuant to Government Code §54957.6)*** – Instructions to Negotiators re: wages, salaries and benefits – Title: Director Public Works – Negotiator – as designated by the Board of Supervisors.

◆ ***It is anticipated that the open session portion of today's meeting will begin at approximately 10:00 a.m., subject to the duration of closed session.***

COMMENT (Portion of the Agenda when Board takes comment from the public and County staff)

4. ***PUBLIC COMMENT***

5. ***COUNTY DEPARTMENT REPORTS*** *(Reports limited to two minutes)*

CONSENT AGENDA (Approval recommended by the County Administrator)

COUNTY ADMINISTRATOR

6. ***Emergency Services*** – Request Board continue the local emergency as a result of the Inyo Complex Oak Creek Mud Flows.

HEALTH AND HUMAN SERVICES

7. ***Health Services*** – Request Board ratify the Maternal Child and Adolescent Health (MCAH) Allocation funding between the County of Inyo and the California Department of Public Health in the amount of $63,000 for the period of July 1, 2011 through June 30, 2012 and authorize the Chairperson to sign the Agreement Funding Application Policy Compliance and Certification.

PUBLIC WORKS/ROAD DEPARTMENT

8. ***Public Works*** - Request Board approve the plans and specifications for the Water Department Building Window Replacement Project and authorize the Interim Public Works Director to advertise for bids for the project.

9. ***Road Dept.*** – Request approval for the Road Commissioner to close a portion of Pa Ha Lane for sewer-line installation from approximately January 16, 2012 through January 20, 2012, with specific times and dates to be set by the Road Commissioner.

10. ***Road Dept.*** – Request approval for the Road Commissioner to close Movie Road for filming around February 2, 2012, with the exact dates and time of the closure to be approved by the Road Commissioner.

DEPARTMENTAL (To be considered at the Board's convenience)

11. ***CORONER*** - Request your Board:

A) approve Amendment #1 to the contracts between the County of Inyo and the following, and authorize the Chairperson to sign, contingent upon the appropriate signatures being obtained and the Board's adoption of future budgets:

(a) Medtox Laboratories, Inc., for toxicology services, amending the term date to July 1, 2011 thru December 31, 2012;

(b) William D. Stinnett, for personal services, amending the term date to July 1, 2011 thru December 31, 2012 and increasing the contract amount by $8,150.00 for a contract amount not to exceed $23,350.00;

(c) Jason Molinar, for personal services, amending the term date to July 1, 2011 thru December 31, 2012 and increasing the contract amount by $10,400.00 for a contract amount not to exceed $19,400;

(d) Jeffrey E. Mullenhour, for personal services, amending the term date to July 1, 2011 thru December 31, 2012 and increasing the contract amount by $8,150.00 for a contact amount not to exceed $23,350.00;

(e) Milton R. Jones, M.D. for autopsy services, amending the term date to July 1, 2011 thru December 31, 2012 and increasing the contract amount by $15,225.00 for a contract amount not to exceed $51,125.00; and

B) amend the Coroners FY 2011/2012 Budget Unit 023500 by increasing expenditures in Salaried Employees *(Object Code #5001)* by $1,000 and Retirement and Social Security *(Object Code #0521)* by $77 for a net County increase of $1,077.00 *(4/5ths vote required)*.

12. ***CORONER*** – Request Board discuss and provide direction on a salary increase from $1,600 to $2,000 per month for the Coroner; and if appropriate direct staff to prepare the Elected Officials Ordinance regarding salary change.

13. ***HEALTH AND HUMAN SERVICES – Social Services*** –Request Board find that consistent with the adopted Authorized Position Review Policy: A) the availability of funding for the requested position exists as certified by the Health and Human Services Director, and concurred with by the County Administrator and the Auditor-Controller; B) where internal candidates meet the qualifications for the position of Social Worker, the position could possibly be filled through an internal recruitment, however an open recruitment would be more appropriate to ensure a sufficient number of qualified applicants apply; and C) approve the hiring of one Social Worker II at Range 64 ($3,590 – $4,363) or III at Range 67 ($3,852 - $4,676) depending upon qualifications.

14. ***PLANNING*** – Request approval of the correspondence to the Bureau of Land Management (BLM) regading the Supplement to the Solar Energy Development Programmatic Environmental Impact Statement (PEIS); and authorize the Chairperson to sign.

15. ***PLANNING*** – Request Board review the Draft Owens Lake Master Plan and approve correspondence to the Stakeholder Committee for the Owens Lake Master Plan regarding the Draft Plan and authorize the Chairperson to sign.

16. ***WATER DEPARTMENT*** – Request Board receive an update on Inyo-Mono Integrated Regional Water Management Plan (IRWMP) activities and provide direction concerning the January 25, 2012 IRWMP Management Group Meeting.

17. ***CLERK OF THE BOARD*** – Request approval of the minutes of the January 3, 2012 Board of Supervisors Meeting.

TIMED ITEMS **(Items will not be considered before scheduled time)**

CORRESPONDENCE - ACTION

18. ***U.S. FOREST SERVICE*** – Request Board consider an invitation to submit candidates to serve on a newly-formed National Advisory Committee for Implementation of the National Forest System Land Management Planning Rule.

BOARD MEMBERS AND STAFF REPORTS

COMMENT **(Portion of the Agenda when the Board takes comment from the public and County staff)**

19. ***PUBLIC COMMENT***

CLOSED SESSION

20. ***CONFERENCE WITH LABOR NEGOTIATOR [Pursuant to Government Code §54957.6]*** - Instructions to Negotiators re: wages, salaries and benefits - Employee Organization: Law Enforcement Administrators Association (LEAA) - Negotiators: CAO Kevin Carunchio and Labor Relations Administrator Sue Dishion.

21. ***CONFERENCE WITH LABOR NEGOTIATOR [Pursuant to Government Code § 54957.6].*** – Instructions to Negotiators re: wages, salaries and benefits – Employee Organization: Inyo County Probation Peace Officers Association (ICPPOA) – Negotiators: CAO Kevin Carunchio and Labor Relations Administrator Sue Dishion.

REPORT ON CLOSED SESSION AS REQUIRED BY LAW

CORRESPONDENCE - INFORMATIONAL

22. ***TREASURER-TAX COLLECTOR*** – Treasury Status Report for the Quarter Ending December 31, 2011.

For Clerk's Use Only:
AGENDA NUMBER

6

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

☒ Consent ☐ Departmental ☐ Correspondence Action ☐ Public Hearing

☐ Scheduled Time for ☐ Closed Session ☐ Informational

FROM: Kevin D. Carunchio, County Administrator

FOR THE BOARD MEETING OF January 17, 2012

SUBJECT: Continuation of declaration of local emergency

DEPARTMENTAL RECOMMENDATION: - Request Board continue the local emergency as a result of the Inyo Complex Oak Creek Mud Flows.

SUMMARY DISCUSSION: - During your August 5, 2008 Board of Supervisors meeting your Board took action to continue the local emergency, which was a result of the Inyo Complex Oak Creek Mud Flows. Since the circumstances and conditions relating to this emergency persist, your Board directed that the continuation of the declaration be considered on a week-to-week basis. The recommendation is that the emergency be continued until the permanent diversions are in place. LADWP has notified your Board that the completion of the project is expected for sometime this fall. Therefore, it is recommended that your Board continue the emergency.

ALTERNATIVES: N/A

OTHER AGENCY INVOLVEMENT: N/ A

FINANCING: N/A

APPROVALS	
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the board clerk.)* Approved: _____ Date_____
AUDITOR/CONTROLLER:	ACCOUNTING/FINANCE AND RELATED ITEMS (M*ust be reviewed and approved by the auditor-controller prior to submission to the board clerk.)* Approved:_____ Date_____
PERSONNEL DIRECTOR:	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.) Approved:_____ Date_____

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received)_____ Date:_____
(The Original plus 20 copies of this document are required)

For Clerk's Use Only:
AGENDA NUMBER

1

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

X Consent ☐ Departmental ☐ Correspondence Action ☐ Public Hearing

☐ Scheduled Time for ☐ Closed Session ☐ Informational

FROM: Health and Human Services-Public Health

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: 2011/2012 Maternal Child and Adolescent Health Allocation

DEPARTMENTAL RECOMMENDATION:

Request the Board ratify the Maternal Child and Adolescent Health (MCAH) Allocation funding between the County of Inyo and California Department of Public Health in the amount of $63,000.00 for the period of July 1, 2011, through June 30, 2012 and authorize the Chairperson to sign the Agreement Funding Application Policy Compliance and Certification contingent upon future budgets.

CAO RECOMMENDATION:

SUMMARY DISCUSSION:

This grant is coming to the Board at this time due to staffing changes and shortages within the MCAH core group responsible for development of the newly revised Scope of Work.

The Maternal Child and Adolescent Health program funds public health staff to ensure coordination and access to services for women, adolescents and children. In collaboration with service providers, private and public agencies and community residents, the MCAH Director works towards the goal of assuring access and availability of a complete spectrum of services to women, infants, children and adolescents in our communities. Based on the 2008/09 five year MCAH community assessment, five problems were identified and a core group of MCAH staff are working with community stakeholders and medical professionals to address these areas. Under the leadership of the MCAH core group, a collaborative effort will design, implement and evaluate strategies addressing the five areas which are access to dental services, childhood obesity, promotion of teen health, early entry into prenatal care and healthcare access.

ALTERNATIVES:

This funding has been available to public health staff for many years. Not accepting the funding would eliminate the State funding contribution for several health staff members. It would eliminate the county health planning and program development role of the Clinical Services Director. Declining the funding would mean that the County would still have to provide mandated administrative services without state or federal support.

OTHER AGENCY INVOLVEMENT:

None

FINANCING:

Funding for this contract is from State and Federal Funding and Health Realignment. This funding would be brought in as revenue to the MCAH Budget (641611). No County General Funds.

APPROVALS	
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the board clerk.)* Approved: yes Date 12/20/2011
AUDITOR/CONTROLLER:	ACCOUNTING/FINANCE AND RELATED ITEMS (M*ust be reviewed and approved by the auditor-controller prior to submission to the board clerk.)* Approved: Date 12/27/11
PERSONNEL DIRECTOR:	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.) Approved: ✓ Date 1/4/12

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received) Jean Turner Date: 1-4-12

FY 2011 - 2012 AGREEMENT FUNDING APPLICATION (AFA) CHECKLIST

Agency Name: Inyo County
Agreement Number: 2009-14

These forms are required each Fiscal Year →	
	☒ **AFA Checklist with ORIGINAL signature** ☒ **A Completed Agreement Funding Application Update Form with ORIGINAL signatures** ☐ **AB 629 Attestation of Compliance with the Sexual Health Education Accountability Act of 2007** ☐ **Annual Inventory – Form CDPH 1204** ☐ **Local Health Officer approval letter to conduct FIMR (FIMR only)**
	If a document has not changed from the previous year, check the "no" box. If a document has changed then check the "yes" box and **submit** with your AFA package.

YES	NO	
☒	☐	**Program Profile Narrative** of the applicable programs (Integrate into one narrative): ☒ MCAH/SIDS ☐ BIH ☐ AFLP ☐FIMR
☒	☐	**Budget Summary Page and Detail Pages** listing all staff (by position) and costs (including projected salaries and benefits) for each of the applicable programs: ☒ MCAH/SIDS ☐ BIH ☐ AFLP
☒	☐	**Budget Justifications** (J-Pers, J-Oper, J-Capl and J-Other worksheets) are complete. Personnel justification is consistent with the Duty Statements and Organizational Charts for each of the applicable programs: ☒ MCAH/SIDS ☐ BIH ☐ AFLP
☐	☒	**Duty Statements** for all staff (numbered according to the Personnel Detail Page and Organizational Chart) listed on the budgets for each of the applicable programs: ☐ MCAH/SIDS ☐ BIH ☐ AFLP ☐FIMR
☒	☐	Copies of applicable **Waiver/Approval Letters** for the key positions are included: ☐ MCAH Director ☐ AFLP Director ☐ BIH Coordinator ☒ Other MCAH Coordinator
☒	☐	**Organizational Chart(s)** of the applicable programs, identifying all staff positions on the budget (w/line item #) and its relationship to other services for women and children, the local health officer and overall agency: ☒ MCAH/SIDS ☐ BIH ☐ AFLP ☐FIMR ☐ Other _____
☒	☐	**Scope of Work (SOW)** documents are completed and included for each of the applicable programs: ☒ MCAH/SIDS ☐ BIH ☐ AFLP ☐FIMR ☐ LAMH ☐ Preconception Care
☒	☐	**Budget and SOW document(s)** are provided in an **electronic format** (e-file acceptable) for each of the applicable programs: ☒ MCAH/SIDS ☐ BIH ☐ AFLP ☐FIMR ☐ LAMH ☐ Preconception Care
☐	☒	**Subcontractor(s) Agreement Packages** (required for all subcontracts $5,000 or more) are included and provided in **electronic format** (e-file acceptable) for each of the applicable programs: ☐ MCAH/SIDS ☐ BIH ☐ AFLP ☐FIMR

The undersigned has checked this application for completeness and accuracy:

Name: Tamara A. Cohn
Telephone Number: 760-873-7868

Signature: Tamara A Cohn
Date: 12/6/2011

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
MATERNAL, CHILD AND ADOLESCENT HEALTH (MCAH) DIVISION

FUNDING AGREEMENT PERIOD
FY 2010-11 to 2012-13 (LHJs) / FY 2005-06 to 2011-12 (CBOs)

AGREEMENT FUNDING APPLICATION (AFA)/UPDATE FORM *

At the beginning of each fiscal year Agencies are required to submit this AFA Form along with their AFA Package, which requires certification signatures (original signatures, no stamps allowed). This form should also be used when submitting updates that occur during the fiscal year. Update submissions do not require certification signatures.

The Agency Identification Information section must be completed each time this form is submitted.

*** Note: Agreement refers to Allocations for LHJs or Grants for CBOs.**

AGENCY IDENTIFICATION INFORMATION

Any program related information being sent from the CDPH MCAH Division will be directed to the MCAH and/or AFLP Director.

Please check the applicable "Program" boxes below: changes being submitted:
MCAH ☒ AFLP ☐ BIH ☐ FIMR ☐

Fiscal Year: 2011 - 2012 Update Effective: _____ (only required when submitting updates)

Agreement Number:	2010-11/14		
Federal Employer ID#:	95-600445		
Complete Official Agency Name:	Inyo County Health & Human Services/Public Health		
Business Office Address:	P.O. Drawer H Independence, California 93526		
Agency Phone:	760-873-7868	Agency Fax:	760-873-7800
Agency Website Address:	www.countyofinyo.us/publichealth		

1 AGENCY DIRECTOR

Name:	Jean Turner				
Title:	Health and Human Services Director				
Mailing Address:	P.O. Drawer H				
City:	Independence			Zip:	93526
Phone:	760-878-0242	Ext.		FAX:	760-878-0266
E-Mail Address:	jturner@inyocounty.us				

Revised May 2011

Agency Name: Inyo County HHS/Public Health

Agreement #: 2011-12/14 Fiscal Year: **2011 - 2012**

2	BOARD INFORMATION				
	Clerk of the Board ☒		Chair Board of Supervisors ☐		
Title:					
Mailing Address:	P.O. Drawer N				
City:	Independence			Zip:	93526
Phone:	760-878-0373	Ext.		FAX:	760-878-2241
E-Mail Address:	pgunsolley@inyocounty.us				

3	OFFICIAL AUTHORIZED TO COMMIT AGENCY				
Name:	Susan Cash				
Title:	Chairperson of the Board of Supervisors				
Mailing Address:	P.O. Drawer N				
City:	Independence			Zip:	93526
Phone:	760-878-0373	Ext.		FAX:	760-878-2241
E-Mail Address:	pgunsolley@inyocounty.us				

4	FISCAL OFFICER				
Name:	Denelle Carrington				
Title:	Fiscal Director				
Mailing Address:	P.O. Drawer H				
City:	Independence			Zip:	93526
Phone:	760-878-0246	Ext.		FAX:	760-878-0266
E-Mail Address:	dcarrington@inyocounty.us				

5	MCAH DIRECTOR (Please check box if MCAH and AFLP Director are the same) ☐				
Name:	Tamara Cohn				
Title:	Clinical Services Director				
Mailing Address:	207A West South Street				
City:	Bishop			Zip:	93514
Phone:	760-873-7868	Ext.		FAX:	760-873-7800
E-Mail Address:	tcohn@inyocounty.us				

Agency Name: Inyo County HHS/Public Health

Agreement #: 2011-12/14 Fiscal Year: **2011 - 2012**

6	MCAH COORDINATOR (Only list if different from previous)					
Name:	Nel Hecht					
Title:	Public Health Nurse					
Mailing Address:	207A West South Street					
City:	Bishop				Zip:	93514
Phone:	760-873-7868	Ext.		FAX:	760-873-7868	
E-Mail Address:	nhecht@inyocounty.us					

7	MCAH BUDGET CONTACT					
Name:	Teri Barbella					
Title:	Fiscal					
Mailing Address:	P.O. Drawer H					
City:	Independence				Zip:	93526
Phone:	760-878-0231	Ext.		FAX:	760-878-0266	
E-Mail Address:	tbarbella@inyocounty.us					

8	MCAH INVOICE CONTACT (Only list if different from above)					
Name:						
Title:						
Mailing Address:						
City:					Zip:	
Phone:		Ext.		FAX:		
E-Mail Address:						

9	PERINATAL SERVICES COORDINATOR (PSC)					
Name:	Mary Miller					
Title:	Public Health Nurse					
Mailing Address:	207A West South Street					
City:	Bishop				Zip:	93514
Phone:	760-873-7868	Ext.		FAX:	760-873-7800	
E-Mail Address:	mmiller@inyocounty.us					

Agency Name: Inyo County HHS/Public Health

Agreement #: 2011-12/14

Fiscal Year: **2011 - 2012**

10	AFLP DIRECTOR (Only list if different from MCAH Director)				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

11	AFLP COORDINATOR (Only list if different from above)				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

12	AFLP BUDGET CONTACT				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

13	AFLP INVOICE CONTACT (Only if different from above)				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

Agency Name: Inyo County HHS/Public Health

Agreement #: 2011-12/14 Fiscal Year: **2011 - 2012**

14	BLACK INFANT HEALTH (BIH) COORDINATOR				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

15	BIH BUDGET CONTACT				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

16	BIH INVOICE CONTACT (Only list if different from above)				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

17	FETAL INFANT MORTALITY REVIEW (FIMR) COORDINATOR				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

Agency Name: Inyo County HHS/Public Health

Agreement #: 2011-12/14 Fiscal Year: **2011 - 2012**

18	SUDDEN INFANT DEATH SYNDROME (SIDS) COORDINATOR / CONTACT				
Name:	Tamara Cohn				
Title:	Clinical Services Director				
Mailing Address:	207A West South Street				
City:	Bishop			Zip:	93514
Phone:	760-873-7868	Ext.		FAX:	760-873-7800
E-Mail Address:	tcohn@inyocounty.us				

19	OTHER				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

20	OTHER				
Name:					
Title:					
Mailing Address:					
City:				Zip:	
Phone:		Ext.		FAX:	
E-Mail Address:					

Agency Name: Inyo County HHS/Public Health

Agreement #: 2011-12/14 Fiscal Year: **2011 - 2012**

AGREEMENT FUNDING APPLICATION
POLICY COMPLIANCE AND CERTIFICATION

The undersigned hereby affirms that the statements contained in the Agreement Funding Application (AFA) are true and complete to the best of the applicant's knowledge.

I certify that this Maternal, Child and Adolescent Health (MCAH) related program will comply with all applicable provisions of Article 1, Chapter 1, Part 2, Division 106 of the Health and Safety code (commencing with section 123225), Chapters 7 and 8 of the Welfare and Institutions Code (commencing with Sections 14000 and 142), and any applicable rules or regulations promulgated by CDPH pursuant to this article and these Chapters. I further certify that this MCAH related program will comply with the MCAH Policies and Procedures Manual, including but not limited to, Administration, Federal Financial Participation (FFP) Section. I further certify that this MCAH related program will comply with all federal laws and regulations governing and regulating recipients of funds granted to states for medical assistance pursuant to Title XIX of the Social Security Act (42 U.S.C. section 1396 et seq.) and recipients of funds allotted to states for the Maternal and Child Health Service Block Grant pursuant to Title V of the Social Security Act (42 U.S.C. section 701 et seq.). I further agree that this MCAH related program may be subject to all sanctions or other remedies applicable if this MCAH related program violates any of the above laws, regulations and policies with which it has certified it will comply.

Original Signature of Official authorized to commit the Agency to an MCAH Agreement	Title
Name (Type or Print)	Date

Original Signature of MCAH/AFLP Director	Chairperson of the Board of Supervisors Title
Susan Cash Name (Type or Print)	Date

Inyo County
Maternal, Child, and Adolescent Health
FY 2011-2012

Narrative Summary

Inyo County is a rural, geographically isolated county located on the east side of the Sierra Nevada, between the mountains and the California-Nevada border. It is the second largest county in California with a total area of 10,227 square miles. It encompasses the deepest valley in North America, the Owens Valley; the highest elevation point in the lower 48 states, Mt. Whitney (14,495 feet); the lowest elevation point, Bad Water (-282 feet). Most of the land within the county is under federal ownership (92%). Less than 2% of the land is in private ownership.

Inyo County is sparsely populated. The most recent census indicated a population of 17,136 spread across the small towns of the Owens Valley with approximately 2 persons per square mile. The largest town is Bishop with approximately 3457 residents within the city limits and 10, 300 residents in the surrounding area. While over half of the population lives in Bishop area, the US Census Bureau does not consider them to be living in an urbanized area, in sharp contrast to the population of California, which over 90% urban.

The county's population base is changing in ways that parallel to the state. The percentage of the population that is white is estimated to have declined from 81% in 1990 to 78% in 1998 and finally to 69% in 2008. This shift is due to the aging of the white population. The fastest growing population group is Hispanic due to a steady level in migration and a younger population in which births exceed deaths. The number of Hispanic residents increased from 8.4% in 1990 to 10.6% in 1998 to 17% in 2008. The number of English learners in Inyo County Schools has steadily increased from 185 students in 1995 to 333 students in 2008. There are five recognized tribal entities in Inyo County located in Bishop, Big Pine, Independence, Lone Pine and Furnace Creek. The Native American population grew slightly from 9.3% in 1998 to 11% in 2008.

The Inyo County Department of Health & Human Services implements an MCAH Program with the primary focus on the public health functions of assessment, policy development and a commitment to assuring that the health care needs of the childbearing women, children and adolescents are optimally addressed. A key component of the MCAH activities is the collaboration with service providers, private and public agencies and community residents.

The 5 year Community assessment indentified 5 problem areas. They reflect the current MCAH concerns and emerging public health issues. The following are the problems to be addressed in the next five years and are listed in their prioritized order.

1. Childhood Obesity
2. Dental Care Access
3. Teen Healthcare Access
4. Prenatal Healthcare and associated issues
5. Healthcare Access

Over the next several years, Inyo County will continue to address the identified MCAH problem areas to develop and refine a methodical approach to addressing each area.

In addition, Inyo County will work with our local resources and professionals to increase their understanding and response strategies in working with families and communities affected by SIDS.

California Department of Public Health CDPH
Maternal, Child and Adolescent Health Division

BUDGET SUMMARY PAGE	FISCAL YEAR	BUDGET	BASE MCF %		TITLE V BALANCE		% Personnel Matched
	2011-2012	Original	58.5%				65.86%

Version 1.3a

Program:	Maternal, Child and Adolescent Health	UNMATCHED FUNDING					NON-ENHANCED MATCHING (50/50)		ENHANCED MATCHING (75/25)			
Agency:	201114 Inyo	MCAH-TV			AGENCY		MCAH Cnty-N		MCAH Cnty-E			
SubK:		(1)	(2)	(3)	(6)	(7)	(10)	(11)	(14)	(15)	(16)	(17)
EXPENSE CATEGORY		TOTAL FUNDING	%	Federal Title V	%	Local* Revenue	%	Combined* Fed/Agency	%	Combined* Fed/Agency		
(I) PERSONNEL		192,453	28.55%	54,939	5.55%	10,687	32.78%	63,089	33.12%	63,739	100%	
(II) OPERATING EXPENSES		10,516	35.14%	3,695	23.24%	2,444	41.62%	4,377			100%	
(III) CAPITAL EXPENDITURES												
(IV) OTHER COSTS												
(V) INDIRECT COSTS (10% MAX.)	10.00%	12,834	34.02%	4,366			65.98%	8,468			100%	
TOTALS*		215,803	29.19%	63,000	6.08%	13,131	35.19%	75,934	29.54%	63,739	100%	

Maximum Amount Payable from State and Federal resources:	$148,772	ACTIVE

	STATE FUNDING		SMALL COUNTY PROJECT	BUDGETED	BALANCE	% of Budget
Total Title V	53,000		10,000	63,000		29%
Total Agency General Fund				67,033	n/a	31%
Total Matching Title XIX				85,771	n/a	40%
Totals	53,000		10,000	215,804		100%

WE CERTIFY THAT THIS BUDGET HAS BEEN CONSTRUCTED IN COMPLIANCE WITH ALL MCAH ADMINISTRATIVE AND PROGRAM POLICIES.

Tamara A Colm — MCAH/PROJECT DIRECTOR'S SIGNATURE — DATE

Kevin Babbella — AGENCY FISCAL AGENT'S SIGNATURE — 12-5-11 DATE

* These amounts contain local revenues submitted for information and matching purposes. MCAH does not reimburse for Agency contributions.

State Use Only	PCA Codes	MCAH-TV 53107				MCAH Cnty-N 53118		MCAH Cnty-E 53117	
(I) PERSONNEL		54,939				31,545		47,804	
(II) OPERATING EXPENSES		3,695				2,189			
(III) CAPITAL EXPENSES									
(IV) OTHER COSTS									
(V) INDIRECT COSTS		4,366				4,234			
Totals for PCA Codes	148,772	63,000				37,968		47,804	

California Department of Public Health
Maternal, Child and Adolescent Health Division

ORIGINAL BUDGET

Program:	Maternal, Child and Adolescent Health		UNMATCHED FUNDING				NON-ENHANCED MATCHING (50/50)		ENHANCED MATCHING (75/25)			
Agency:	201114 Inyo		MCAH-TV		AGENCY		MCAH Cnty-N		MCAH Cnty-E			
SubK:		(1)	(2)	(3)	(6)	(7)	(10)	(11)	(14)	(15)	(16)	(17)
EXPENSE CATEGORY		TOTAL FUNDING	%	Federal Title V	%	Local* Revenue	%	Combined* Fed/Agency	%	Combined* Fed/Agency		
II. OPERATING EXPENSES DETAIL PAGE												
	TOTAL OPERATING EXPENSES	10,516		3,695		2,444		4,377			Match Available	
	TRAVEL	400			34.22%	137	65.78%	263				
	TRAINING	400			34.14%	137	65.86%	263				
1	General Operating	2,356	13.09%	308	21.13%	498	65.78%	1,550			0.08%	
2	CCLMCAH Dues	1,100	100.00%	1,100							65.86%	
3	Motivational Redirectives	2,550	65.78%	1,677	16.57%	423	17.65%	450			48.21%	
4	Rents / Janitorial	2,310	3.55%	82	30.59%	707	65.86%	1,521				
5	Utilities	300	44.16%	132	55.84%	168					65.86%	
6	Toll free phone	600	65.78%	395	34.22%	205					65.86%	
7	Motorpool	500			34.14%	171	65.86%	329				
8											65.86%	
9											65.86%	
10											65.86%	
11											65.86%	
12											65.86%	
13											65.86%	
14											65.86%	
15											65.86%	

** Unmatched Operating Expenses are not eligible for Federal matching funds (Title XIX). Expenses may only be charged to Unmatched Title V (Col. 3), State General Funds (Col. 5), and/or Agency (Col. 7) funds.

IV. OTHER COSTS DETAIL PAGE											
	TOTAL OTHER COSTS										
SUBCONTRACTS											
1											
2											
3											
4											
5											
6											
7											
8											
OTHER CHARGES											
	AGENCY'S TOTAL INDIRECT COSTS										
	AGENCY'S OTHER INDIRECT COSTS										Match Available
1											65.86%
2											65.86%
3											65.86%
4											65.86%
5											65.86%
6											65.86%
7											65.86%

California Department of Public Health
Maternal, Child and Adolescent Health Division

ORIGINAL BUDGET

Program:	Maternal, Child and Adolescent Health					UNMATCHED FUNDING				NON-ENHANCED MATCHING (50/50)		ENHANCED MATCHING (75/25)			
Agency:	201114 Inyo					MCAH-TV		AGENCY		MCAH Cnty-N		MCAH Cnty-E			
SubK:					(1)	(2)	(3)	(6)	(7)	(10)	(11)	(14)	(15)	(16)	(17)
EXPENSE CATEGORY					TOTAL FUNDING	%	Federal Title V	%	Local* Revenue	%	Combined* Fed/Agency	%	Combined* Fed/Agency		
I. PERSONNEL DETAIL PAGE															
TOTAL PERSONNEL COSTS					192,453		54,939		10,687		63,089		63,739		
BENEFITS					64,111		18,518		3,441		21,969		20,183		
TOTAL WAGES					128,342		36,421		7,246		41,121		43,555		
	INITIALS	TITLE OR CLASS.	% FTE	ANNUAL SALARY	TOTAL WAGES									J-Pers MCF Per Staff	Staff Traveling (X)
1	TC	MCAH Director (SIDS)	3.07%	99,144	3,044	91.07%	2,772	8.93%	272					58.5%	X
2	TC	MCAH Director	1.93%	99,144	1,913	41.50%	794			12.70%	243	45.80%	876	58.5%	X
3	MBB	Admin Secretary	20.00%	50,992	10,198	41.50%	4,232			25.67%	2,618	32.83%	3,348	58.5%	X
4	LT	Dental Case Manager	40.00%	47,676	19,070	19.21%	3,663	0.80%	152	80.00%	15,256			80.0%	
5	EG	HHS Specialist	20.00%	44,291	8,858	40.00%	3,543			60.00%	5,315			60.0%	
6	KL	Account Tech II	5.00%	42,092	2,105	100.00%	2,105							58.5%	
7	TB	Administrative Analyst II	10.00%	52,827	5,283	32.21%	1,702	33.24%	1,756	34.55%	1,825			58.5%	
8	SW	PCG Nurse	25.00%	78,063	19,516	31.07%	6,064	3.93%	767	11.41%	2,227	53.59%	10,459	65.0%	
9	MM	PSC Coordinator	30.00%	76,452	22,936	5.00%	1,147			33.39%	7,658	61.61%	14,131	95.0%	
10	NH	MCAH Coordinator	30.00%	86,301	25,890	29.14%	7,544	12.36%	3,200	16.88%	4,370	41.62%	10,775	58.5%	X
11	VAC	NP	10.00%	95,286	9,529	29.96%	2,855	11.54%	1,100	16.88%	1,609	41.62%	3,966	58.5%	X
12															
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BUDGET JUSTIFICATION
PERSONNEL ACTUAL BENEFITS WORKSHEET AND MEDI-CAL FACTOR IDENTIFICATION

Program: Maternal, Child and Adolescent Health
Agency: 201114 Inyo
SubK:
FY: 2011-2012 ORIGINAL

ACTIVE

Version 1.3a

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	INITIALS	TITLE OR CLASS.	% FTE	ANNUAL SALARY	TOTAL FUNDING	Staff Benefit Rate	Actual Benefit $ Per Staff	Program	MCF %	MCF Type	Requirements (Click link to view)	MCF % Justification Maximum characters = 1024
1	TC	MCAH Director (SIDS)	3.07%	99,144	3,044	44.03%	1,340.23	MCAH	58.5%	Base		
2	TC	MCAH Director	1.93%	99,144	1,913	39.59%	757.29	MCAH	58.5%	Base		
3	MBB	Admin Secretary	20.00%	50,992	10,198	64.44%	6,571.84	MCAH	58.5%	Base		
4	LT	Dental Case Manager	40.00%	47,676	19,070	57.03%	10,874.74	MCAH	60.0%	Variable	YES	Based on previous year's caseload and Medi-Cal rate of cases.
5	EG	HHS Specialist	20.00%	44,291	8,858	60.47%	5,356.34	MCAH	60.0%	Variable	YES	Based on previous year's caseload and Medi-Cal rate of cases.
6	KL	Account Tech II	5.00%	42,092	2,105	62.81%	1,322.20	MCAH	58.5%	Base		
7	TB	Administrative Analyst II	10.00%	52,827	5,283	56.47%	2,983.33	MCAH	58.5%	Base		
8	SW	PCG Nurse	25.00%	78,063	19,516	41.84%	8,165.25	MCAH	65.0%	Variable	YES	Based on previous year's caseload and Medi-cal rate of cases.
9	MM	PSC Coordinator	30.00%	76,452	22,936	47.43%	10,877.41	MCAH	95.0%	Variable	YES	Based on State CPSP Medi-Cal Program
10	NH	MCAH Coordinator	30.00%	86,301	25,890	43.34%	11,221.38	MCAH	58.5%	Base		
11	VAC	NP	10.00%	95,266	9,529	48.70%	4,640.68	MCAH	58.5%	Base		
12												
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California Department of Public Health CDPH
Maternal, Child and Adolescent Health Division

BUDGET JUSTIFICATION
OPERATING EXPENSES

Version 1 3a

Program: Maternal, Child and Adolescent Health
Agency: 201114 Inyo
SubK:
Fiscal Year: 2011-2012 ORIGINAL

ACTIVE

	Amount	Travel Expense Justification
Travel Expenses	400	
		Agencies are responsible for reimbursement of costs above allowable State travel reimbursement rates. State travel reimbursement rates are posted on the MCAH website. To access, click HERE and choose the current AFA fiscal year. The travel reimbursement information link will be located in the Forms section.

	Amount	Training Expense Justification
Training Expenses	400	

	Other Operating Expenses	Amount	Other Operating Expense Justification
1	General Operating	2,356	Includes office supplies, postage, duplication, advertising etc.
2	CCLMCAH Dues	1,100	Annual CCLMCAH dues
3	Motivational Redirectives	2,550	Various Motivation redirectives (dental and prenatal education tools)
4	Rents / Janitorial	2,310	Includes Rent @ 159.17 x 12mos.= $1,910.00 Plus Janitorial Services $400.00
5	Utilities	300	Includes phones, electricity, gas and water
6	Toll free phone	600	Tollfree phone
7	Motorpool	500	Travel to / from trainings and in County travel
8			
9			
10			
11			
12			
13			
14			
15			

** Unmatched Operating Expenses are not eligible for Federal matching funds (Title XIX). If there are any questions regarding which expenses may not be eligible for Federal matching funds please contact the appropriate MCAH Contract Manager or Program Consultant.

California Department of
Public Health CDPH
Maternal, Child and Adolescent Health Division

BUDGET JUSTIFICATION
CAPITAL EXPENDITURES

Version 1.3a

Program: Maternal, Child and Adolescent Health
Agency: 201114 Inyo
SubK:
Fiscal Year: 2011-2012 ORIGINAL

ACTIVE

List each Capital Expenditure	Amount Budgeted
TOTAL CAPITAL EXPENDITURES	

California Department of
Public Health CDPH
Maternal, Child and Adolescent Health Division

BUDGET JUSTIFICATION
OTHER COSTS

Version 1 3a

Program: Maternal, Child and Adolescent Health
Agency: 201114 Inyo
SubK:
Fiscal Year: 2011-2012 ORIGINAL

ACTIVE

	Subcontracts	Amount Budgeted	Other Costs Justification
1			
2			
3			
4			
5			
6			
7			
8			

	Other Charges	Amount Budgeted	Other Charges Justification
	Agency's Other Indirect Costs *		
1			
2			
3			
4			
5			
6			
7			

* Agency's Other Indirect Costs is the difference between an Agency's total indirect cost for their program and the amount shown for indirect costs on the Budget Summary Page.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Division
Jean Turner, Director
207A West South Street
Bishop, CA 93514
TELEPHONE (760) 873-7868
FAX (760) 873-7800
EMAIL healthofficer@inyocounty.us

COUNTY OF INYO

December 5, 2011

California Department of Health Services
Maternal, Child and Adolescent Health
Operations Section
ATTN: O.B. Ray, Contract Manager
MS 8300
P.O. Box 997420
Sacramento, California 95899-7420

Re: Request for waiver

Dear O.B. Ray,

The current MCAH Coordinator will function within the MCAH budget at 30% FTE. Inyo County is requesting approval of the FTE waiver.

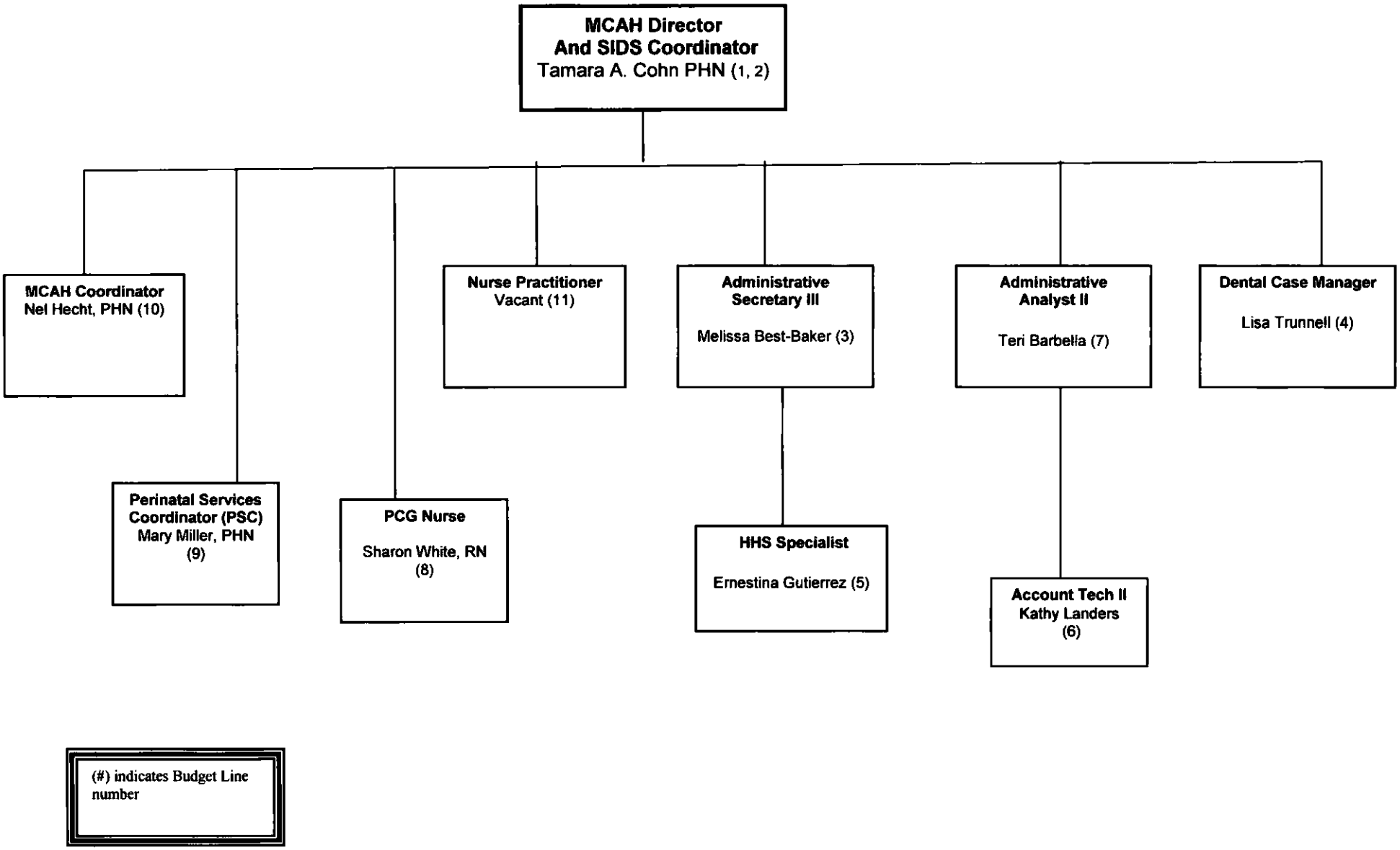
The Inyo County MCAH staff will continue to function as a team to address the needs of the maternal, child and adolescent population. The team consists of the MCAH Director, the Coordinator, Perinatal Services Coordinator, and Perinatal Care Guidance nurse.

Thank-you,

Tamara A Cohn

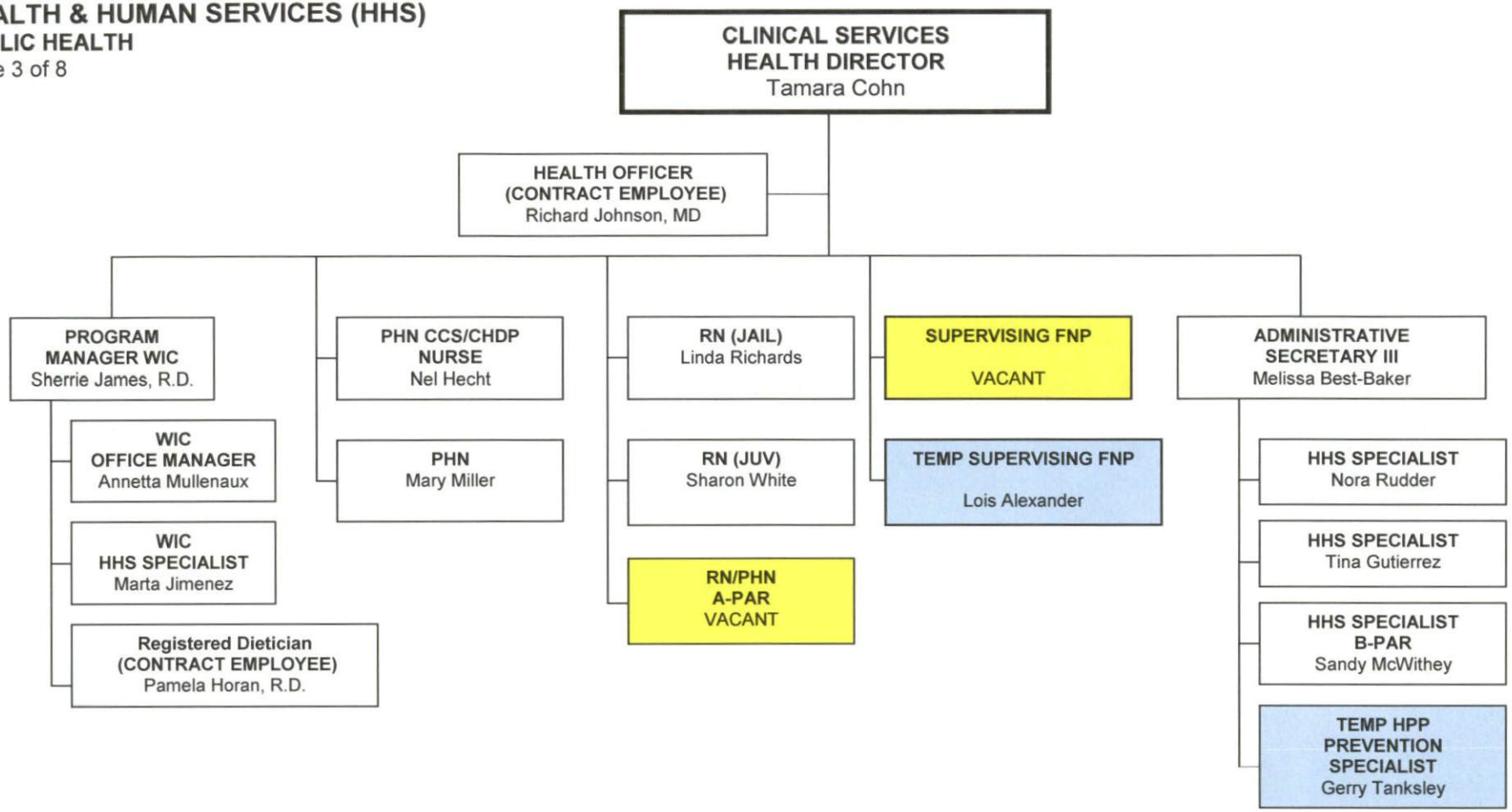
Tamara A. Cohn, PHN
MCAH Director

Maternal, Child and Adolescent Health (MCAH) Organizational Chart



Monday, December 05, 2011

COUNTY OF INYO
HEALTH & HUMAN SERVICES (HHS)
PUBLIC HEALTH

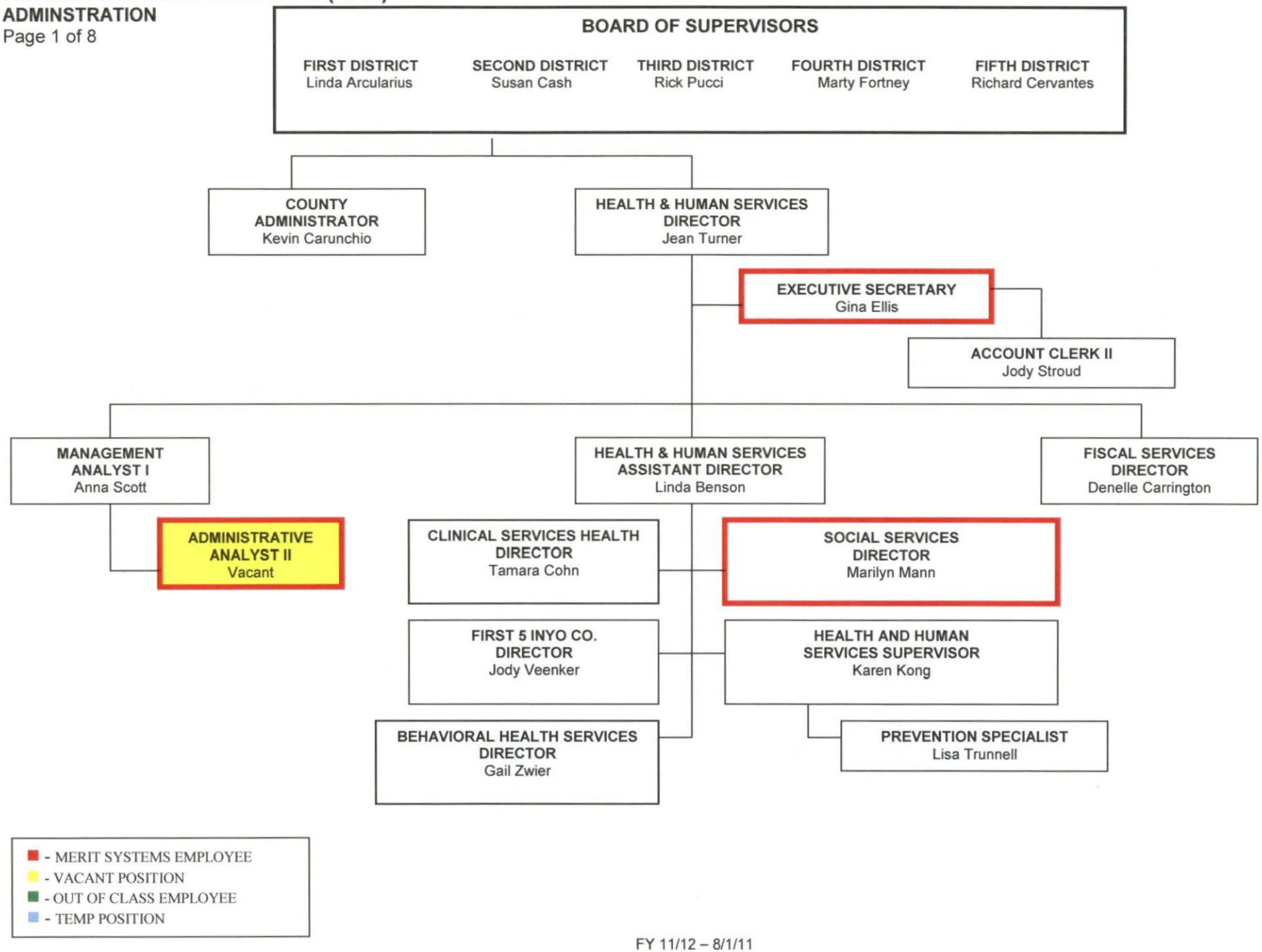


- MERIT SYSTEMS EMPLOYEE
- VACANT POSITION
- OUT OF CLASS EMPLOYEE
- TEMP POSITION

COUNTY OF INYO

HEALTH & HUMAN SERVICES (HHS)

ADMINSTRATION



Maternal, Child and Adolescent Health (MCAH) Program
Scope of Work (SOW)

The Local Health Jurisdiction (LHJ), in collaboration with the State MCAH Program, shall strive to develop systems that protect and improve the health of California's women of reproductive age, infants, children, adolescents and their families. The information generated from this SOW can be used to capture and describe the objectives, activities and outcomes of the MCAH LHJs.

The goals in this MCAH SOW reflect the priorities of the MCAH Division as identified by the federally required 2011-2015 Title V 5-Year Needs Assessment which incorporates local priority needs. All LHJs must perform the activities in the shaded areas in Goals 1-3 and monitor and report on the corresponding general process and outcomes measures. In addition, each LHJ is required to develop at least one specific objective(s) and corresponding intervention activities and evaluation/performance measure(s) for Goals 1, 2 and 3.

Every five years the LHJ is required to use the findings from their Title V Needs Assessment to identify local priority goals and objectives and are encouraged to develop a Five-Year MCAH Action Plan. Each fiscal year the LHJ is required to address one or more local priority objective(s) in their MCAH SOW. Place local priority objective(s) under any of the corresponding Goals 1-6 with the title "Local Priority Objective".

The development of this SOW was guided by several public health frameworks including the 10 Essential Services of Public Health and the three core functions of assessment, policy development and assurance; the Spectrum of Prevention; the Life Course Perspective; the Socioecological Model, and the Social Determinants of Health. Please consider integrating these approaches when conceptualizing and organizing objectives, activities and evaluation measures.

- The 10 Essential Services of Public Health http://www.cdc.gov/nphpsp/essentialServices.html; http://www.publichealth.lacounty.gov/qi/corefcns.htm
- The Spectrum of Prevention http://www.preventioninstitute.org/index.php?option=com_jlibrary&view=article&id=105&Itemid=127
- Life Course Perspective http://mchb.hrsa.gov/lifecourseresources.htm
- The Social-Ecological Model http://www.cdc.gov/ncipc/dvp/social-ecological-model_dvp.htm
- Social Determinants of Health http://www.cdc.gov/socialdeterminants/

Although the State MCAH Division wants each LHJ to make progress towards Title V State Performance Measures and Healthy People (HP) 2020 goals, it is understood that these goals involve complex issues and are difficult to achieve, particularly in the short term. The MCAH Division recognizes the importance of monitoring progress toward reaching long term objectives and that LHJs can only be held accountable for the activities they can realistically achieve given the scope and resources of individual local MCAH programs.

LHJs are also required to comply with requirements as stated in the MCAH Program Policies and Procedures manual such as attending statewide meetings, submitting Agreement Funding Applications and completing Annual Reports.
http://www.cdph.ca.gov/services/funding/mcah/Documents/MO-MCAHFI-MCAHProgramPoliciesandProcedures.doc
Additional fiscal requirements are located in the MCAH Fiscal Policies and Procedures Manual at:
http://www.cdph.ca.gov/services/funding/mcah/Documents/MO-MCAHFI-AdminFiscalPolicyProcedures-1011-2010-0-630.doc

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Goal 1: Improve Outreach and Access to Quality Health and Human Services

- **Link the MCAH population to needed medical, mental, social, dental, and community services to promote equity in access to quality services, especially for those who are eligible for Medi-Cal or other publicly provided health care programs** [1]
  - **Outreach services will be targeted to identify pregnant women, women of reproductive age, infants, children and adolescents and their families who are eligible for Medi-Cal assistance or other publicly provided health care programs and assist them in applying for these benefits** [2]

Long Term Outcome Objectives

1.a Increase the percentage of children and adolescents age 0 to 19 with health insurance from a baseline of (88%) to (92.4 %) by 2015. **HP 2020 AHS-1.1.** Source: http://fhop.ucsf.edu/fhop/data/SOW/t5_16_health_ins_2009-NEW.xls

1.b Decrease the percentage of children age 2-11 without dental insurance from a baseline of (26.1%) to (24.8%) by 2015. **HP 2020 AHS-1.2 (Developmental).** Source: http://familymedicine.medschool.ucsf.edu/fhop/docs/excel/mcah_t5/t5_17_dental_ins.xls

1.c Increase the percentage of women age 19-44 with health insurance from a baseline of (80.9%) to (84.945%) by 2015. **HP 2020 AHS-1.1.** Source: http://fhop.ucsf.edu/fhop/data/SOW/CHIS_Health_Insurance_Women_20-44_2009-NEW.xls

1.d Decrease the percentage of unenrolled children age 0-17 who are eligible for Medi-Cal/Healthy Families from a baseline of (66.8%) to (63.46%) by 2015. Source: http://fhop.ucsf.edu/fhop/data/SOW/MediCal_Eligibility_0-17_2009_CA_MCAH_County_Groups-NEW.xlsx

1.e Decrease the percentage of unenrolled women, ages 20-44 , who are eligible for Medi-Cal from a baseline of (9.2%) to (Insert 9.675%) by 2015. Source: http://fhop.ucsf.edu/fhop/data/SOW/MediCal_Eligibility_19-44%202007-2009_CA_MCAH_County_Groups%20-%20NEW.xlsx

1.f Insert specific LHJ data collected, if applicable

Data Source

California Health Interview Survey (CHIS), Medi-Cal Statistical Reports, LHJ specific statistics, if applicable

Healthy People 2020 Objectives

http://www.healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives.pdf

Timelines

All the intervention activities identified in this SOW are to be conducted within the term of the Agreement's fiscal year.

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Nothing is entered in the shaded areas.

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	Short and/or Intermediate Outcome Measure(s)
1.1-1.8 Develop and maintain required foundational structure and public health activities that improve coordination of and access to local health and human services.	**Assessment** **1.1** Identify and monitor trends in health, including disparities, social determinants and barriers to the provision of health and human services to the MCAH population.	**Assessment** **1.1** List and briefly describe trends in health, including disparities, social determinants and barriers to the provision of health and human services.	**1.1** Complete and submit Annual Report Data Table (Form 1)
	1.2 Identify and monitor local geographic areas and/or population groups that have insufficient access to health and human services.	**1.2** Briefly describe geographic areas or population groups that have insufficient access to health and human services.	
	1.3 Participate in collaboratives, coalitions, networks, etc., and develop products that address unmet needs and promote increased local access to health and human services.	**1.3** Submit Collaborative Form to document participation, objectives, activities and accomplishments of MCAH-related collaboratives to improve infrastructure and access to health and human services:	**1.3** List products developed to improve infrastructure and access to health and human services and describe outcomes of dissemination
	Policy Development **1.4** Review, revise and enact policies that facilitate access to Healthy Families (HF), Medi-Cal, Access for Infants and Mothers (AIM), or other publicly provided health care programs.	**Policy Development** **1.4** Describe participation in review and development of policy changes and corresponding systems changes that facilitate access to HF, Medi-Cal, AIM, or other publicly provided health care programs.	**Policy Development** **1.4** Describe the impact of policy changes and corresponding systems changes that facilitate access to HF, Medi-Cal, AIM, or other publicly provided health care programs.
	1.5 Work with community organizations to influence policy and address social determinants of health and disparities regarding access to health and human services and/or publicly provided health care programs.	**1.5** Describe efforts to work with community organizations to influence policy and address social determinants of health and disparities regarding access to health and human services and/or publicly provided health care programs.	**1.5** Describe results of work with community organizations to influence policy and address social determinants of health and disparities regarding access to health and human services and/or publicly provided health care programs.

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	Short and/or Intermediate Outcome Measure(s)
	Assurance **1.6** Promote MCAH and public health competencies, participation in trainings, and workforce development as resources allow.	**Assurance** **1.6** List trainings and educational events that promoted MCAH and public health competencies and workforce development.	**Assurance** **1.6** Describe outcomes of trainings and educational events that promoted MCAH and public health competencies and workforce development.
	1.7 Conduct activities that promote referrals to HF, Medi-Cal, AIM, and other low cost/no cost health insurance programs for health care coverage [2].	**1.7** Describe activities that promote referrals to referrals to HF, Medi-Cal, AIM or other no/low cost health insurance programs for health care coverage. • Provide the number of referrals to HF, Medi-Cal, AIM or other no/low cost health insurance programs	**1.7** Describe outcomes of activities that promote referrals to HF, Medi-Cal, AIM or other no/low cost health insurance programs for health care coverage.
	1.8 Provide a toll-free or "no cost to the calling party" telephone information service and other appropriate methods of communication, e.g. local MCAH Program web page to the local community [2] .The requirements are as follows: • The service must provide culturally and linguistically appropriate information and referrals to health care providers and practitioners regarding access to prenatal care, and other relevant information • The telephone number must be disseminated widely • The toll free line must be operated during normal business hours. After hours messages must be answered by end of the next business day.	**1.8** Report the following: • Number of calls and the success/barriers toll-free or "no cost to the calling party" telephone information service • Report the number of web hits to the appropriate local MCAH Program webpage	**1.8** Describe outcomes of community information services.
Insert Short and/or Intermediate Outcome Objective(s), activities, Evaluation/Performance Measures in the appropriate column below			
1.9 Short and/or Intermediate	**1.9** Implement or participate in	**1.9** Develop process measures for the	**1.9** Develop short and/or intermediate

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	**Short and/or Intermediate Outcome Measure(s)**
Outcome Objective(s) which increase access to health and human services Add specific LHJ short and/or intermediate outcome objective(s) which correspond to key intervention activities in column two here.	specific LHJ activities that address health disparities, social determinants and barriers to increased access to health and human services:	specific LHJ defined objectives and activities that were implemented to increase access to health and human services:	related performance measures for the specific LHJ defined objectives and activities that were implemented to increase access to health and human services:
1.9 By June 30, 2012, Develop and implement a strategy to refer pregnant women to dental care.	1.9 Activities include: • Create/Update dental referral list of dental providers that accept new pregnant Medi-Cal patients. • Collect, create and/or update oral health educational materials for pregnant women. • Identify or create a dental referral form to be used in Public Health clinics to assist pregnant women seeking services. • Identify or create 1 client brochure that explains Denti-Cal benefits to enrolled beneficiaries. • Meet and collaborate with WIC and other stakeholders to distribute oral health information and resources to pregnant women.	1.9 Process measures include: • Description of selected resource materials for clients. • Description of dental referral form and process for distribution to providers. • Tracking of referred women to determine which received treatment. • Number of stakeholder group meetings held and brief description	1.9 • Number of strategies developed and implemented/goal of 1 strategy • Number of women referred to Dental Case Manager • Number of women contacted by Dental Case Manager • Number of women assisted into care by Dental Case Manager

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Goal 2: Improve Maternal Health

- **Improve maternal health by optimizing the health and well-being of girls and women across the lifecourse** [1]
- **Reduce maternal morbidity and mortality and the increasing disparity in maternal health outcomes** [1]
  - **Assure that all pregnant women will have access to early, adequate and high quality perinatal care with a special emphasis on low-income and Medi-Cal eligible women** [2]

Long Term Outcome Objectives	**2.a** Decrease the percentage of births within 24 months of a previous birth among women age 15 to 44 from a baseline of (15.08%) to (4.33%) by 2015. **HP 2020 FP -5 (18 mths.)**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm **2.b** Decrease the percentage of births within 24 months of a previous birth among women age 12 to 19 from a baseline of (7.59%) to (7.21%) by 2015. **HP 2020 FP -5 (18 mths.)**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm **2.c** Increase the percentage of live born infants whose mothers received prenatal care in the first trimester of pregnancy from a baseline of (70.76%) to (74.3%) by 2015. **HP 2020 MICH-10.1**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm **2.d** Increase the percentage of women age 15 to 44 with a live birth during the reporting year whose observed to expected prenatal visits are equal to 80 to 109 percent on the Kotelchuck Index from a baseline of (65.26%) to (68.52%) (APNCU Index- FHOP) by 2015. **HP 2020 MICH-10.2**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm **2.e** Decrease the rate of domestic violence calls for assistance per 10,000 from a baseline of (93.9) to (89.21) by 2015. **HP 2020 IVP-39 (Developmental).** Source: http://fhop.ucsf.edu/fhop/docs/pdf/mcah/DV1987-2009%20by%20LHJ1.pdf **2.f** Insert specific LHJ data collected, if applicable
Data Source	Birth Statistical Master File, Department of Justice statistics, LHJ specific statistics, if applicable
Healthy People 2020 Objectives	**http://www.healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives.pdf**
Timelines	All the intervention activities identified in this SOW are to be conducted within the term of the Agreement's fiscal year.

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Nothing is entered in the shaded areas.

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	Short and/or Intermediate Outcome Measure(s)
2.1-2.5 Develop and maintain required foundational structure and public health activities that improve coordination of and access to early, adequate and high quality perinatal care and maternal health.	**Assessment** **2.1** Identify and monitor trends in disparities and barriers in access to early, adequate and high quality perinatal care and maternal health.	**Assessment** **2.1** List and briefly describe trends in disparities and barriers in access to early, adequate and high quality perinatal care and maternal health.	
	2.2 Identify and monitor local geographic areas and/or population groups that have insufficient access to early, adequate and high quality perinatal care and poor maternal health.	**2.2** Briefly describe geographic areas and/or population groups that have insufficient access to early, adequate and high quality perinatal care and poor maternal health.	
	2.3 Conduct the following activities: a. Collaborate with providers and other third party payers to improve maternal health and extend comprehensive perinatal care to all pregnant women b. Participate in collaboratives, coalitions, networks, etc., and develop products that address unmet needs to provide access to early perinatal care and CPSP services for all women	**2.3 a & b.** Submit Collaborative Form to document participation, objectives, activities and accomplishments of collaboratives and coalitions that improve maternal health and address access to early, adequate and high quality perinatal care.	**2.3 b**. List products developed to improve access to early, adequate and high quality perinatal care and maternal health and describe outcomes of dissemination.
	Policy Development **2.4** Review, revise and enact policies that facilitate access to early, adequate and high quality perinatal care and improve maternal health.	**Policy Development** **2.4** Describe participation in the review and development of policy changes and corresponding systems changes that facilitate access to early, adequate and high quality perinatal care and improve maternal health.	**Policy Development** **2.4** Describe the impact of policy changes and corresponding systems changes that facilitate access to early, adequate and high quality perinatal care and improve maternal health.

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	**Short and/or Intermediate Outcome Measure(s)**
	2.5 Work with community organizations to influence policy and address disparities regarding access to early, adequate and high quality perinatal care and maternal health.	**2.5** Describe efforts to work with community organizations to influence policy and address disparities regarding access to early, adequate and high quality perinatal care and maternal health.	**2.5** Describe results of work with community organizations to influence policy and address disparities regarding access to early, adequate and high quality perinatal care and maternal health.
2.6-2.8 Promote access to and quality of local CPSP.	**Assurance** **2.6** Process applications for identified Medi-Cal providers desiring to become approved CPSP providers.	**Assurance** **2.6** Report the number of current and newly enrolled providers in CPSP and number of Medi-Cal Obstetrical (OB) providers. List barriers to recruitment and retention of OB providers.	**Assurance** **2.6** Describe the impact on access to and quality of CPSP services.
	2.7 Provide consultation and technical assistance to CPSP providers related to the provision of CPSP services.	**2.7** List consultation and/or technical assistance provided to CPSP providers.	**2.7** Describe outcomes of consultation and/or technical assistance provided to CPSP providers.
	2.8 At a minimum, conduct yearly, continuous quality improvement (CQI) and quality assurance activities (QA) for local CPSP providers to ensure that the program is being implemented according to Policies and Procedures and clients are receiving the required nutrition, psychosocial and health education services.	**2.8** List CPSP provider CQI/QA activities that were conducted. Report the number of site visits and face to face contacts with current and potential CPSP providers	**2.8** Describe the results of CQI/QA activities that were conducted.
Insert Short and or Intermediate Outcome Objective(s), activities, Evaluation/Performance Measures in the appropriate column below			
2.9 Short and/or Intermediate Outcome Objective(s) which improve access to early, adequate and high quality perinatal care and maternal health Add specific LHJ short and/or intermediate outcome objective(s) which correspond to key intervention activities in column two here.	**2.9** Implement or participate in specific LHJ defined activities to improve access to early, adequate and high quality perinatal care and maternal health:	**2.9** Develop process measures for the specific LHJ defined objectives and activities that were implemented to improve access to early, adequate and high quality perinatal care and maternal health:	**2.9** Develop short and/or intermediate related performance measures for the specific LHJ defined objectives and activities that were implemented to improve access to early, adequate and high quality perinatal care and maternal health:

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	Short and/or Intermediate Outcome Measure(s)
2.9 By June 30, 2012 Identify top two barriers to accessing early prenatal care.	2.9 1. Convene a MCAH Advisory Group to develop strategies utilizing available birth data. 2. Inform and educate prenatal care providers of local incidence rate. 3. Enlist prenatal care providers collaboration in gathering patient data and examining outcomes. 4. Using birth certificates obtain a list of women entering prenatal care after the first trimester. 5. Explore multiple alternative methods to gather an understanding of barriers.	2.9 • Documentation of letter to prenatal providers • Review of Birth Certificates and list to identify women who entered into prenatal care after the first trimester. • Contact women on list and ask them barriers to seeking care • Review and identify barriers	2.9 • Doctors who responded to patient data request/Doctors sent request for patient data • Number of women who respond/Number of women to be contacted • Identification of two commonly identified barriers

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Goal 3: Improve Infant Health

- **Reduce infant mortality and address disparities by promoting preconception health and health care and by preventing causes such as birth defects, low birth weight/prematurity, SIDS, and maternal complications in pregnancy** [1]

Long Term Outcome Objectives

3.a Decrease the percentage of Low Birth Weight Live Births from a baseline of (9.34%) to (8.87%) by 2015. **HP 2020 MICH-8.1**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

3.b Decrease the percentage of Very Low Birth Weight Live Births from a baseline of (1.46%) to (1.39%) by 2015. **HP 2020 MICH-8.2**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

3.c Decrease the percentage of Preterm Births (less than 37 weeks gestation) from a baseline of (12.48%) to (11.86%) by 2015. **HP 2020 MICH-9.1-9.4**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

3.d Decrease the rate of perinatal deaths (fetal and infant deaths from 28 wks gestation through 7 days after birth) from a baseline of (.58) to (.577) per 1,000 live births by 2015. **HP 2020 MICH-1.2**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

3.e Decrease the rate of neonatal deaths (within the first 28 days of life) from a baseline of (.58) to (.57) per 1,000 live births by 2015**. HP 2020 MICH- 1.4**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

3.f Decrease the rate of postneonatal deaths (between 28 days and 1 year) from a baseline of (.44) to (.0418) per 1,000 live births by 2015. **HP 2020 MICH-1.5**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

3.g Decrease the rate of infant deaths (birth to 1 year) from a baseline of (1.02) to (.97) per 1,000 live births by 2015. **HP 2020 MICH -1.3**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

3.h Maintain the status of no infant deaths due to SIDS by 2015. **HP 2020 MICH-1.8**. Source: LHJ statistics

3.i Insert specific LHJ data collected, if applicable

Data Source

LHJ Coroner's Notification Card (CDPH 4411), California SIDS Program compliance monitoring reports, Death Statistical Master File, Birth Statistical Master File, LHJ specific statistics, if applicable

Healthy People 2020 Objectives

http://www.healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives.pdf

Timelines

All the intervention activities identified in this SOW are to be conducted within the term of the Agreement's fiscal year.

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Nothing is entered in the shaded areas.

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	Short and/or Intermediate Outcome Measure(s)
3.1-3.7 Develop and maintain required foundational structure and public health activities that improve infant health outcomes.	**Assessment** **3.1** Identify, and monitor trends in perinatal, neonatal, postneonatal and infant health outcomes.	**Assessment** **3.1** List and briefly describe trends in disparities and barriers related to perinatal, neonatal, postneonatal and infant health outcomes.	
	3.2 Identify and monitor local geographic areas and/or population groups that have high rates of poor perinatal, neonatal, postneonatal and infant health outcomes.	**3.2** Briefly describe local geographic areas and/or population groups that have high rates of poor perinatal, neonatal, postneonatal and infant health outcomes.	
	3.3 Participate in collaboratives, coalitions, networks, etc., and develop products that address unmet needs to prevent poor perinatal, neonatal, postneonatal and infant health outcomes.	**3.3** Submit Collaborative Form to document participation, objectives, activities and accomplishments of collaboratives and coalitions that address poor perinatal, neonatal, postneonatal and infant health outcomes.	**3.3** List products developed to improve infant health outcomes and describe outcomes of dissemination. **(List below)**
	Policy Development **3.4** Review, revise and enact policies that enable the implementation of appropriate interventions to improve infant health.	**Policy Development** **3.4** Describe participation in the review and development of policy changes and corresponding systems changes that improve infant health.	**Policy Development** **3.4** Describe the impact of policy changes and corresponding systems changes that improve infant health.
	3.5 Work with community organizations to influence policy and address disparities in infant health.	**3.5** Describe efforts to work with community organizations to influence policy and address disparities regarding infant health.	**3.5** Describe results of efforts to address disparities in infant health outcomes.
	Assurance **3.6** Establish contact with parents/caregivers of infants with presumed SIDS death to provide grief and bereavement support services.	**Assurance** **3.6** (Insert number) of parents/caregivers who experience a presumed SIDS death and the number who are contacted for grief and bereavement support services.	

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	**Short and/or Intermediate Outcome Measure(s)**
	3.7 Attend the SIDS Annual Conference/ SIDS training(s) and other conferences/trainings related to infant health.	**3.7** Provide staff member name and date of attendance at SIDS Annual Conference/training(s) and other conferences/trainings related to infant health.	**3.7** Describe results of improved knowledge of staff trainings related to infant health
Insert Short and or Intermediate Outcome Objective(s), activities, Evaluation/Performance Measures in the appropriate column below			
3.8 Short and/or Intermediate Outcome Objective(s) which promote SIDS risk reduction and community health education Add specific LHJ short and/or intermediate outcome objective(s) which correspond to key intervention activities in column two here. 3.8 By June 30, 2012, Develop and implement a countywide SIDS risk reduction and community health education outreach.	**3.8** Implement or participate in specific LHJ defined activities to promote SIDS risk reduction and health education materials to the community: 3.8 • Acquire and adapt SIDS risk reduction education materials • Inform and educate stakeholders about new SIDS education materials • Monthly provide SIDS materials to families with newborns in the previous six weeks.	**3.8** Develop process measures for the specific LHJ defined objectives and activities that were implemented to promote SIDS risk reduction and health education materials to the community: 3.8 • SIDS risk reduction education materials on file • List of families receiving SIDS information • Stakeholders distribution list of SIDS risk reduction education materials.	**3.8** Develop short and/or intermediate related performance measures for the specific LHJ defined objectives and activities that were implemented to promote SIDS risk reduction and health education materials to the community: 3.8 • Number of families receiving SIDS risk reduction education materials
Insert Short and or Intermediate Outcome Objective(s), activities, Evaluation/Performance Measures in the appropriate column below			
3.9 Short and/or Intermediate Outcome Objective(s) which improve infant health outcomes Add specific LHJ short and/or intermediate outcome objective(s) which correspond to key intervention activities in column two here.	**3.9** Implement or participate in specific LHJ defined activities to improve infant health outcomes:	**3.9** Develop process measures for the specific LHJ defined objectives and activities that were implemented to improve infant health outcomes:	**3.9** Develop short and/or intermediate related performance measures for the specific LHJ defined objectives and activities that were implemented to improve infant health outcomes:

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	Short and/or Intermediate Outcome Measure(s)
3.9 By June 30, 2012, Identify factors associated with Preterm births (less than 37 weeks gestation) utilizing 2006-2011 birth data	3.9 1. Consult with local prenatal providers to assist in identifying factors associated with preterm births. 2. Identify potential high risk indicators related to preterm deliveries. 3. Review birth certificate data of less than 37 week gestation for high risk indicators.	3.9 • List of potential high risk indicators • Review of birth certificates of preterm delivery for high risk indicators. • Documentation of consultation with local prenatal providers	3.9 • Development of measurements to identify preterm risks • Total number of preterm births/Total number of births by county residents

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Goal 4: Improve Nutrition and Physical Activity

- **Promote healthy nutrition and physical activity among MCAH populations throughout the lifespan beginning with exclusive breastfeeding of infants to six months of age**[1]

Long Term Outcome Objectives (Choose one or more. Delete those not chosen.)

4.a Increase the percentage of any breastfeeding at the hospital from a baseline of (94.6%) to (96.97%) by 2015. **HP 2020 MICH -21**. Source: http://fhop.ucsf.edu/fhop/data/SOW/MO-BFP-CountyofResidenceBreastfeedingbyRaceReport-2009.pdf

4.b Decrease the percentage of children less than age 5 who are overweight from a baseline of (36.4%) to (34.58%) by 2015. **HP 2020 NWS 10.0 (children age 2-5 yrs)**. Source: http://fhop.ucsf.edu/fhop/data/SOW/PEDNSS 2-5 2009 final.xlsx

4.c Decrease the percentage of children age 5-19 who are overweight from a baseline of (41.5%) to (39.43%) by 2015. **HP 2020 NWS-10.4 (children and adolescents 5-19 yrs)**. Source: http://fhop.ucsf.edu/fhop/data/SOW/PEDNSS 5-19 2009 final.xlsx

4.d Insert specific LHJ data collected, if applicable

Data Source

California Pediatric Nutrition Surveillance System, Genetic Disease Branch, LHJ specific statistics, if applicable

Healthy People 2020 Objectives

http://www.healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives.pdf

Timelines

All the intervention activities identified in this SOW are to be conducted within the term of the Agreement's fiscal year.

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Descriptions and Measures	Short and/or Intermediate Outcome Measure(s)
Insert Short and/or Intermediate Outcome Objective(s) which promote healthy nutrition and physical activity in the MCAH population. Add specific LHJ short and/or intermediate outcome objective(s) which correspond to key intervention activities in column two here.	**4.1** Place any specific LHJ defined intervention activities to meet the Outcome Objective(s) here. Number each intervention activity sequentially, such as, 4.1, 4.2, 4.3, 4.4, etc. Organize intervention activities and performance measures using the three core functions of public health: Assessment, Policy Development and Assurance. http://www.publichealth.lacounty.gov/qi/corefcns.htm	Develop process measures for each specific LHJ defined intervention activity. Number sequentially to correspond with each intervention activity, such as, 4.1, 4.2, 4.3, 4.4, etc.	**4.1** Develop short and/or intermediate outcome related performance measures for the specific LHJ defined objectives and activities

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Descriptions and Measures	Short and/or Intermediate Outcome Measure(s)
4.1a By June 30, 2012, Develop a unified approach to addressing childhood obesity in Inyo County through the collaborative, Childhood Obesity Work Group 4.1b By June 30, 2012, Develop a 12 month strategic plan to identify activities of participating stakeholders in community events. 4.1c By June 30, 2012, Creation of name for collaborate group for community use.	4.1a. Designate Childhood Obesity Work Group meeting agenda to develop a community conceptual approach. 4.1b Utilizing a unified approach, develop activities throughout the 12 month calendar starting at Quarter 1 of the fiscal year. 4.1c Utilizing group process, facilitate name designation.	4.1a Description of strategy and process for developing strategy. 4.1b Description of group process to identify group focus for 12 month calendar. 4.1c Description of group process.	4.1b • Designation of activities • Number of community events which include multiple stakeholders 4.1c Successful identification of group name.

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Goal 5: Improve Child Health

- **Support the physical, socio-emotional, and cognitive development of children, including the prevention of injuries, through the implementation of prevention, early identification and intervention strategies** [1]

Long Term Outcome Objectives (Choose one or more. Delete those not chosen.)

5.a Decrease the rate of deaths age 1-14 per 100,000 from a baseline of (.012) to (.011) by 2015. **HP 2020 MICH 3-4.** Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

5.b Increase the percentage of children age 2-11 who have been to the dentist in the past year from a baseline of (86.5%) to (90.825%) by 2015. **HP 2020 OH-7**. Source: http://familymedicine.medschool.ucsf.edu/fhop/docs/excel/mcah_t5/t5_18_dental_vis.xls

5.c Decrease the rate of asthma hospitalizations for children age 0-4 per 10,000 from a baseline of (.068) to (.0646) by 2015. **HP 2020 RD -2.1**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

5.d Maintain no asthma hospitalizations for children age 5-17 per 10,000 by 2015. **HP 2020 RD -2.2.** Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

5.e Decrease the rate of mental health hospitalizations for children age 5-14 per 10,000 from a baseline of (.082) to (.078) by 2015. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

5.f Decrease the rate of non-fatal injury hospitalizations for children age 0-14 per 10,000 from a baseline of (.27) to (.2565) by 2015. **HP 2020 IVP 1.2**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

5.g Decrease the rate of non-fatal injury hospitalizations for motor vehicle accidents age 0-14 per 10,000 from a baseline of (.044) to (.0418) by 2015. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

5.h Decrease the rate of children living in foster care each January per 1,000 from a baseline of (4.4) to (4.18) by 2015. Source: http://fhop.ucsf.edu/fhop/data/SOW/Children in Foster Care_2010.xls

5.i Decrease the percentage of children age 0-17 living in poverty from a baseline of (18.5%) to (17.37%) by 2015. Source: http://fhop.ucsf.edu/fhop/data/SOW/Poverty Rates_CA Counties_0-17_2009.xlsx

5.j Insert specific LHJ data collected, if applicable

Data Source

OSHPD Patient Discharge Data, California Highway Patrol Statewide Integrated Traffic Records System, California Department of Social Services, Child Welfare Dynamic Report System, LHJ specific statistics, if applicable

Healthy People 2020 Objectives

http://www.healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives.pdf

Timelines

All the intervention activities identified in this SOW are to be conducted within the term of the Agreement's fiscal year.

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	**Short and/or Intermediate Outcome Measure(s)**
Insert Short and/or Intermediate Outcome Objective(s) which improve the physical, socio-emotional, and cognitive development of children. Add specific LHJ short and/or intermediate outcome objective(s) which correspond to key intervention activities in column two here.	**5.1** Place specific LHJ defined intervention activities to meet the Outcome Objective(s) here. Number each intervention activity sequentially, such as, 5.1, 5.2, 5.3, 5.4, etc. Organize intervention activities and performance measures using the three core functions of public health: Assessment, Policy Development and Assurance. http://www.publichealth.lacounty.gov/qi/corefcns.htm	Develop process measures for each specific LHJ defined intervention activity. Number sequentially to correspond with each intervention activity, such as, 5.1, 5.2, 5.3, 5.4, etc.	**5.1** Develop short and/or intermediate outcome related performance measures for the specific LHJ defined objectives and activities
5.1a By June 30, 2012, Ongoing development of referral mechanisms into dental case management program. 5.1b By June 30, 2012, Conduct a dental case management program review of services provided and numbers of participants to identify trends based on community/school interventions in last 5 years. 5.1c By June 30, 2012, Ongoing implementation of the Inyo County Family Dental Program providing dental case manager services, transportation assistance and referral management of children having difficulty finding a dental home.	5.1a Convene a meeting of partners to identify potential referral sources into dental case management program. 5.1b • Identify the data variables to be measured. • Review program statistics and participant data 5.1c • Provision of teaching plan targeting the school aged children • Provision of dental case management services.	5.1a. Documentation of meeting 5.1b Gathering of data and creating trend graphs. 5.1c • Brief narrative of education activities • Report on activities and accomplishments in dental case management program	5.1a Enumeration of referral sources 5.1b Development of 2012/13 Dental Case Management objectives 5.1c • # of schools participating in education activities • # of students receiving education activities • # of clients receiving transportation assistance • # of children receiving dental treatment # of children referred into dental case management

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Goal 6: Improve Adolescent Health

- **Promote positive youth development strategies to support the physical, mental, sexual and reproductive health of adolescents** [1]

Long Term Outcome Objectives (Choose one or more. Delete those not chosen.)

6.a Maintain no births among adolescent females age 10-14 by 2015. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.b Decrease the birth rate among adolescent females age 15-17 from a baseline of (19) to (18.91) by 2015. **HP 2010. FP 8.1 (pregnancy rate)**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.c Decrease the birth rate among adolescent females age 18-19 from a baseline of (68.2) to (64.79) by 2015. **HP 2010 FP 8.1 (pregnancy rate)**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.d Decrease the birth rate among adolescent females age 15-19 from a baseline of (38.39) to (36.47) by 2015. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.e Decrease the rate of Chlamydia per 1,000 females age 15-19 from a baseline of (181.3) to (172.24) by 2015. **HP 2020 STD 1.1 (females 15-24 yrs.)**. Source: http://www.cdph.ca.gov/data/statistics/Documents/STD-Data-Chlamydia-Provisional-Tables.pdf

6.f Maintain the rate of no asthma hospitalizations for children age 5-17 per 10,000 by 2015. **HP 2020 RD 2.2**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.g Decrease the rate of deaths age 15-19 per 100,000 from a baseline of (.024) to (.0228) by 2015. **HP 2020 MICH 4.2**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.h Decrease the rate of mental health hospitalizations for adolescents age 15-19 per 10,000 from a baseline of (insert rate 82.12) to (insert rate 78.01) by 2015. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.i Decrease the rate of non-fatal injury hospitalizations for adolescents age 15-24 per 10,000 from a baseline of (59.62) to (56.64) by 2015. **HP 2020 IVP 1.2**. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.j Decrease the rate of non-fatal motor vehicle accident injuries age 15-24 per 100,000 from a baseline of (insert rate 1731) to (1644) by 2015. **HP 2020 IVP – 14.** Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm (see Workbook B indicator 24b)

6.k Decrease the rate of non-fatal injury hospitalizations for motor vehicle accidents age 15-24 per 10,000 from a baseline of (4.9) to (4.655) by 2015. Source: http://familymedicine.medschool.ucsf.edu/fhop/htm/ca_mcah/counties/index.htm

6.l Decrease the percentage of children age 0-17 living in poverty from a baseline of (18.5%) to (17.58%) by 2015. Source: http://fhop.ucsf.edu/fhop/data/SOW/Poverty Rates_CA Counties_0-17_2009.xlsx

6.m Insert specific LHJ data collected, if applicable

Data Source

OSHPD Patient Discharge Data, California Highway Patrol Statewide Integrated Traffic Records System, California Departn of Social Services, Child Welfare Dynamic Report System, U.S. Census Bureau, LHJ specific statistics, if applicable

Healthy People 2020 Objectives

http://www.healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives.pdf

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

Timelines All the intervention activities identified in this SOW are to be conducted within the term of the Agreement's fiscal year.

Short and/or Intermediate Objective(s)	Intervention Activities to Meet Objectives (Describe the steps of the intervention)	Evaluation/Performance Measures Process, Short and/or Intermediate Measures *(Report on these measures in the Annual Report)*	
		Process Description and Measures	**Short and/or Intermediate Outcome Measure(s)**
Insert Short and/or Intermediate Outcome Objective(s) which promote positive youth development. Add specific LHJ short and/or intermediate outcome objective(s) which correspond to key intervention activities in column two here.	**6.1** Place specific LHJ defined intervention activities to meet the Outcome Objective(s) here. Number each intervention activity sequentially, such as, 6.1, 6.2, 6.3, 6.4, etc. Organize intervention activities and performance measures using the three core functions of public health: Assessment, Policy Development and Assurance. http://www.publichealth.lacounty.gov/qi/corefcns.htm	Develop process measures for each specific LHJ defined intervention activity. Number sequentially to correspond with each intervention activity, such as, 6.1, 6.2, 6.3, 6.4, etc.	**6.1** Develop short and/or intermediate outcome related performance measures for the specific LHJ defined objectives and activities

[1] 2011-2015 Title V State Priorities
[2] Title V Requirement

AGENDA REQUEST FORM
BOARD OF SUPERVISORS
COUNTY OF INYO

☒ Consent ☐ Departmental ☐ Correspondence Action ☐ Public Hearing
☐ Schedule time for ☐ Closed Session ☐ Informational

For Clerk's Use Only:
AGENDA NUMBER

FROM: PUBLIC WORKS

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Water Department Building Window Replacement Project.

DEPARTMENTAL RECOMMENDATIONS:

1. Recommend the Board approve the plans and specifications for the Water Department Building Window Replacement Project; and,
2. Authorize the Public Works Director to advertise and bid the project.

CAO RECOMMENDATION:

SUMMARY DISCUSSION:

This project consists of replacing 31 existing windows of the Inyo County Water Department building located at 135 South Jackson Street, Independence, CA 93526. These existing windows range in size from approximately 4' X 1' to 8' X 4'. This project will replace the low energy efficency existing windows with energy efficient, dual-pane, Low E, white vinyl-frame windows with insect screens.

Most of the current windows for this building are very old, in poor condition, and are energy inefficient single pane type. Approximately one-third of the existing windows are original to the 1954 constructed building and are also in poor operating condition. The existing windows are requiring increased maintenance from the County Building Maintenance Department.

The Water Department has desired replacement windows be installed at this building since they were relocated to this building in 2008. The Water Department has funding available to complete this work.

A copy of the plans and specifications for the Water Department Building Window Replacement Project has been provided to the assistant clerk of the board for review by members of the Board of Supervisors.

ALTERNATIVES:

The Board could choose not to approve the plans and specifications and decline to authorize the Public Works Director to advertise for bids. This is not recommended as funding is available to replace these windows and this will result in higher energy efficiency for this County building.

OTHER AGENCY INVOLVEMENT:

The auditor's office to make payments to the contractor after the contract is awarded
County counsel to review and approve contract documents.

FINANCING:

There is sufficient funding available for this window replacement project as noted in the current FY 2011/2012 approved County budget 024102 (Water Department) - object code 5640 (Structures and Improvements).

APPROVALS		
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS (Must be reviewed and approved by County Counsel prior to submission to the board clerk.)	Approved: yes Date 1-9-12
AUDITOR/CONTROLLER	ACCOUNTING/FINANCE AND RELATED ITEMS (Must be reviewed and approved by the auditor/controller prior to submission to the board clerk.)	Approved: yes Date 1/10/12
PERSONNEL DIRECTOR N/A	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.)	Approved: Date

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received) Date: 1/11/12

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ☐ Departmental ☐ Correspondence Action ☐ Public Hearing
☐ Schedule time for ☐ Closed Session ☐ Informational

For Clerk's Use Only:
AGENDA NUMBER
9

FROM: Road Department

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Proposed Road Closure of Pa Ha Lane Road for sewerline installation

DEPARTMENTAL RECOMMENDATIONS:

(1) Approve/ratify the closure of a portion of Pa Ha Lane on approximately January 16th through the January 20th for sewerline installation. The exact dates and times of the closure will be approved by the Road Commissioner.

CAO RECOMMENDATION:

SUMMARY DISCUSSION:

The Bishop Paiute Tribe in cooperation with the Bureau of Indian Affairs, Indian Health Services has obtained funding for the replacement and upgraded of old sewerlines and manholes on Pa Ha Lane. They have selected John Longo Construction from Reno Nevada to install the facilities.

Because of the trench depth and location of the manholes, intermittent traffic control (ITC) is not recommended for the installation of the sewerlines for safety reasons. The contractor has requested that the road be closed to general traffic during construction. Provisions will be made for residents, school busses and emergency vehicles to access this area during construction.

ALTERNATIVES:

The Board could choose not to approve these road closures, in which case the construction will be more complex and extensive single lane intermittent road closure would be required. This is not recommended because it may affect the course of the construction and could possibly affect the safety during the construction.

OTHER AGENCY INVOLVEMENT:

(1) Bishop Paiute Tribe
(2) Bureau of Indian Affairs, Department of Health Services
(3) John Longo Construction, contractor.

FINANCING:

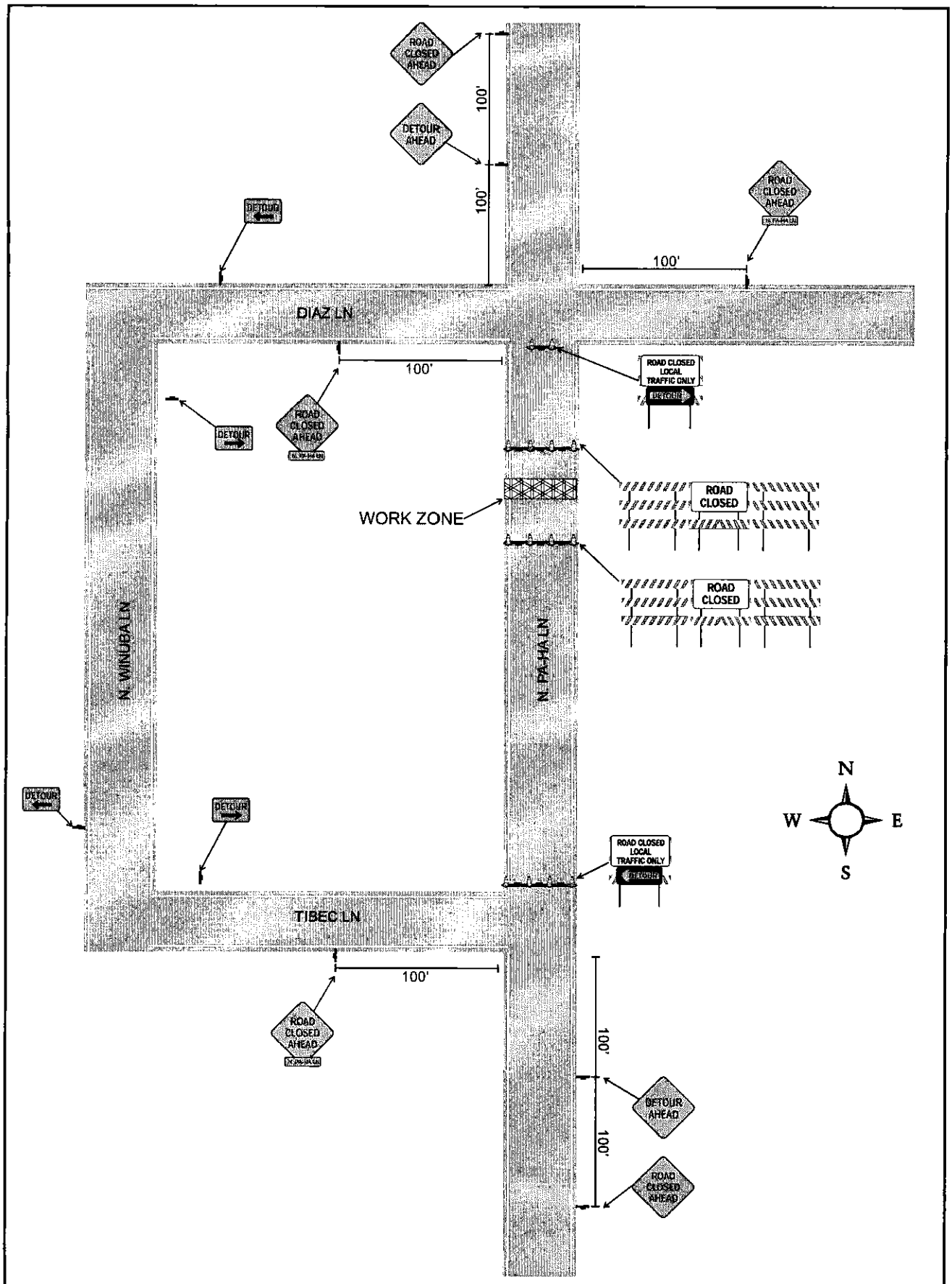
Minor costs associated with permit inspection and administration. Permit fees were waived for the Tribe.

APPROVALS	
COUNTY COUNSEL: NO	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS (Must be reviewed and approved by County Counsel prior to submission to the board clerk.) Approved:_____ Date_____
AUDITOR/CONTROLLER N/A	ACCOUNTING/FINANCE AND RELATED ITEMS (Must be reviewed and approved by the auditor/controller prior to submission to the board clerk.) Approved:_____ Date_____
PERSONNEL DIRECTOR N/A	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.) Approved:_____ Date_____

DEPARTMENT HEAD SIGNATURE:

(Not to be signed until all approvals are received) _____

Date: 1-10-12



CONTRACTOR: LONGO

JOB: N. PA-HA LN

ATSSA CERT: 00154411

DRAWN BY: DAVE EATON

SIGNATURE:

DATE: 12-6-11

TRAFFIC CONTROL MEETS
MUTCD STANDARDS

Silver State Barricade & Sign

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ☒ Departmental ☐ Correspondence Action ☐ Public Hearing
☐ Schedule time for ☐ Closed Session ☐ Informational

For Clerk's Use Only:
AGENDA NUMBER
11

FROM: Leon B. Brune, Inyo County Coroner

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Approval of Amendments to Contracts between the County of Inyo and FY 2011/2012 Coroner Contracts and Approval of Amendment to FY 2011/2012 Coroner Budget.

DEPARTMENTAL RECOMMENDATIONS:

Request your Board:

1) Approve Amendment #1 to the contract between the County of Inyo and Medtox Laboratories, Inc., for Toxicology Services, amending the term date to July 1, 2011 thru December 31, 2012; Approve Amendment #1 to the contract between the County of Inyo and William D. Stinnett, for Personal Services, amending the term date to July 1, 2011 thru December 31, 2012 and increasing the contract amount by $8,150.00 for a contract amount not to exceed $23,350.00; Approve Amendment #1 to the contract between the County of Inyo and Jason Molinar, for Personal Services, amending the term date to July 1, 2011 thru December 31, 2012 and increasing the contract amount by $10,400.00 for a contract amount not to exceed $19,400.00; Approve Amendment #1 to the contract between the County of Inyo and Jeffrey E. Mullenhour, for Personal Services, amending the term date to July 1, 2011 thru December 31, 2012 and increasing the contract amount by $8,150.00 for a contact amount not to exceed $23,350.00; Approve Amendment #1 to the contract between the County of Inyo and Milton R. Jones, M.D. for Autopsy Services, amending the term date to July 1, 2011 thru December 31, 2012 and increasing the contract amount by $15,225.00 for a contract amount not to exceed $51,125.00; and
2) Amend the Coroners FY 2011/2012 Budget (023500) by increasing expenditures in object code 5001 – Salaried Employees by $1,000.00 and object code 5021 – Retirement & Social Security by $77.00 for a Net County Increase of $1,077.00 (4/5ths vote required); and
3) Authorize the Chairperson to sign, contingent upon appropriate signatures being obtained and contingent upon approval of future County budgets.

CAO RECOMMENDATION:

SUMMARY DISCUSSION:

My summary is based on a twelve month period. The increases for the three deputy coroners are Stinnett ($50 per month), Mullenhour ($50 per month), and Molinar ($100 per month). As noted in the past, VIA contract...they are available 24/7, 365 days a year (other than vacation time). They do not participate in PERS or the county's health insurance program. The actual cost of the three deputy coroners is $37,200 per year plus FICA of $2,846. It should also be noted that amounts requested in categories 5265, 5311, 5331 and 5332 are only spent when needed. Any surplus is returned to the General Fund at the end of the year.

ALTERNATIVES:

Your Board has the option to disapprove the contract amendments and advise staff of further direction. This action is not recommended because their services are critical to the coroner function.

OTHER AGENCY INVOLVEMENT:

None

FINANCING:

Approving these amendments to the Coroner contracts will increase Net County Cost by $1,077.00 for FY 2011/2012.

APPROVALS	
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS (Must be reviewed and approved by County Counsel prior to submission to the board clerk.) Approved:_____ Date_____
AUDITOR/CONTROLLER	ACCOUNTING/FINANCE AND RELATED ITEMS (Must be reviewed and approved by the auditor/controller prior to submission to the board clerk.) Approved:_____ Date_____
PERSONNEL DIRECTOR	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.) Approved:_____ Date_____

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received) Leon B. Brune Date: 01/12/2012

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Medtox Laboratories, Inc.
FOR THE PROVISION OF Toxicology Services

WHEREAS, the County of Inyo (hereinafter referred to as "County") and Mectox Laboratories, Inc of St. Paul, MN (hereinafter referred to as "Contractor"), have entered into an Agreement for the Provision of Personal Services dated June 28, 2011, on County of Inyo Standard Contract No.116 for the term from July 1, 2011 to June 30, 2012.

WHEREAS, County and Contractor do desire and consent to amend such Agreement as set forth below;

WHEREAS, such Agreement provides that it may be modified, amended, changed, added to, or subtracted from, by the mutual consent of the parties thereto, if such amendment or change is in written form, and executed with the same formalities as such Agreement, and attached to the original Agreement to maintain continuity.

County and Contractor hereby amend such Agreement as follows:

2. TERM.

The term of this Agreement shall be from July 1, 2011 to December 31, 2012 unless sooner terminated as provided below.

The effective date of this Amendment to the Agreement is_____.

All the other terms and conditions of the Agreement are unchanged and remain the same.

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Medtox Laboratories, Inc.
FOR THE PROVISION OF Toxicology SERVICES

IN WITNESS THEREOF, THE PARTIES HERETO HAVE SET THEIR HANDS AND SEALS THIS _____DAY OF _____, _____.

COUNTY OF INYO

By:_____

Dated:_____

CONTRACTOR

By:_____
Signature

_____
Type or Print

Dated:_____

APPROVED AS TO FORM AND LEGALITY:

_____
County Counsel

APPROVED AS TO ACCOUNTING FORM:

_____
County Auditor

APPROVED AS TO PERSONNEL REQUIREMENTS:

_____
Director of Personnel Services

APPROVED AS TO RISK ASSESSMENT:

_____
County Risk Manager

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
William D. Stinnett
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

WHEREAS, the County of Inyo (hereinafter referred to as "County") and William D. Stinnett of Bishop, California (hereinafter referred to as "Contractor"), have entered into an Agreement for the Provision of Personal Services dated June 28, 2011, on County of Inyo Standard Contract No.201 for the term from July 1, 2011 to June 30, 2012.

WHEREAS, County and Contractor do desire and consent to amend such Agreement as set forth below;

WHEREAS, such Agreement provides that it may be modified, amended, changed, added to, or subtracted from, by the mutual consent of the parties thereto, if such amendment or change is in written form, and executed with the same formalities as such Agreement, and attached to the original Agreement to maintain continuity.

County and Contractor hereby amend such Agreement as follows:

2. TERM.

The term of this Agreement shall be from July 1, 2011 to December 31, 2012 unless sooner terminated as provided below.

3. CONSIDERATION.

D. Limit upon amount payable under Agreement. The total sum of all payments made by the County to Contractor for services and work performed under this Agreement, including overtime, travel, and per diem expenses, if any, and all payments made by the County to any Federal, State, County or municipal agency by reason of Contractor's employment under this Contract, including employer's social security contributions and state disability insurance payments, if any, shall not exceed ($23,350.00) Twenty three thousand three hundred fifty dollars (hereinafter referred to as "contract limit"). County expressly reserves the right to deny any payment or reimbursement requested by Contractor for services or work performed, including overtime, travel or per diem, which is in excess of the contract limit.

ATTACHMENT B

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
William D. Stinnett
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

TERM:

FROM: July 1, 2011 **TO:** December 31, 2012

SCHEDULE OF FEES:

$1,100.00 Per Month

The effective date of this Amendment to the Agreement is_____.

All the other terms and conditions of the Agreement are unchanged and remain the same.

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
William D. Stinnett
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

IN WITNESS THEREOF, THE PARTIES HERETO HAVE SET THEIR HANDS AND SEALS THIS _____DAY OF _____, _____.

COUNTY OF INYO

By:_____

Dated:_____

CONTRACTOR

By: William Stinnett
Signature

_____
Type or Print

Dated:_____

APPROVED AS TO FORM AND LEGALITY:

_____
County Counsel

APPROVED AS TO ACCOUNTING FORM:

_____
County Auditor

APPROVED AS TO PERSONNEL REQUIREMENTS:

_____
Director of Personnel Services

APPROVED AS TO RISK ASSESSMENT:

_____
County Risk Manager

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Jason Molinar
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

WHEREAS, the County of Inyo (hereinafter referred to as "County") and Jason Molinar of Bishop, California (hereinafter referred to as "Contractor"), have entered into an Agreement for the Provision of Personal Services dated June 28, 2011, on County of Inyo Standard Contract No.201 for the term from July 1, 2011 to June 30, 2012.

WHEREAS, County and Contractor do desire and consent to amend such Agreement as set forth below;

WHEREAS, such Agreement provides that it may be modified, amended, changed, added to, or subtracted from, by the mutual consent of the parties thereto, if such amendment or change is in written form, and executed with the same formalities as such Agreement, and attached to the original Agreement to maintain continuity.

County and Contractor hereby amend such Agreement as follows:

2. TERM.

The term of this Agreement shall be from July 1, 2011 to December 31, 2012 unless sooner terminated as provided below.

3. CONSIDERATION.

D. Limit upon amount payable under Agreement. The total sum of all payments made by the County to Contractor for services and work performed under this Agreement, including overtime, travel, and per diem expenses, if any, and all payments made by the County to any Federal, State, County or municipal agency by reason of Contractor's employment under this Contract, including employer's social security contributions and state disability insurance payments, if any, shall not exceed ($19,400.00) Nineteen thousand four hundred dollars (hereinafter referred to as "contract limit"). County expressly reserves the right to deny any payment or reimbursement requested by Contractor for services or work performed, including overtime, travel or per diem, which is in excess of the contract limit.

ATTACHMENT B

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Jason Molinar
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

TERM:

FROM: July 1, 2011 **TO:** December 31, 2012

SCHEDULE OF FEES:

$900.00 Per Month

The effective date of this Amendment to the Agreement is_____.

All the other terms and conditions of the Agreement are unchanged and remain the same.

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Jason Molinar
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

IN WITNESS THEREOF, THE PARTIES HERETO HAVE SET THEIR HANDS AND SEALS THIS _____DAY OF _____, _____.

COUNTY OF INYO

By:_____

Dated:_____

CONTRACTOR

By:_____
Signature

_____
Type or Print

Dated:_____

APPROVED AS TO FORM AND LEGALITY:

_____
County Counsel

APPROVED AS TO ACCOUNTING FORM:

_____
County Auditor

APPROVED AS TO PERSONNEL REQUIREMENTS:

_____
Director of Personnel Services

APPROVED AS TO RISK ASSESSMENT:

_____
County Risk Manager

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Jeffrey E. Mullenhour
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

WHEREAS, the County of Inyo (hereinafter referred to as "County") and Jeffrey E. Mullenhour of Lone Pine, California (hereinafter referred to as "Contractor"), have entered into an Agreement for the Provision of Personal Services dated June 28, 2011, on County of Inyo Standard Contract No.201 for the term from July 1, 2011 to June 30, 2012.

WHEREAS, County and Contractor do desire and consent to amend such Agreement as set forth below;

WHEREAS, such Agreement provides that it may be modified, amended, changed, added to, or subtracted from, by the mutual consent of the parties thereto, if such amendment or change is in written form, and executed with the same formalities as such Agreement, and attached to the original Agreement to maintain continuity.

County and Contractor hereby amend such Agreement as follows:

2. TERM.

The term of this Agreement shall be from July 1, 2011 to December 31, 2012 unless sooner terminated as provided below.

3. CONSIDERATION.

D. Limit upon amount payable under Agreement. The total sum of all payments made by the County to Contractor for services and work performed under this Agreement, including overtime, travel, and per diem expenses, if any, and all payments made by the County to any Federal, State, County or municipal agency by reason of Contractor's employment under this Contract, including employer's social security contributions and state disability insurance payments, if any, shall not exceed ($23,350.00) Twenty three thousand three hundred fifty dollars (hereinafter referred to as "contract limit"). County expressly reserves the right to deny any payment or reimbursement requested by Contractor for services or work performed, including overtime, travel or per diem, which is in excess of the contract limit.

ATTACHMENT B

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Jeffrey E. Mullenhour
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

TERM:

FROM: July 1, 2011 **TO:** December 31, 2012

SCHEDULE OF FEES:

$1,100.00 Per Month

The effective date of this Amendment to the Agreement is_____.

All the other terms and conditions of the Agreement are unchanged and remain the same.

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Jeffrey E. Mullenhour
FOR THE PROVISION OF PERSONAL SERVICES
AS A COUNTY OFFICER

IN WITNESS THEREOF, THE PARTIES HERETO HAVE SET THEIR HANDS AND SEALS THIS _____DAY OF _____, _____.

COUNTY OF INYO

By:_____

Dated:_____

CONTRACTOR

By:_____
Signature

JEFFREY E. MULLENHOUR
Type or Print

Dated: JANUARY 10, 2012

APPROVED AS TO FORM AND LEGALITY:

_____
County Counsel

APPROVED AS TO ACCOUNTING FORM:

_____
County Auditor

APPROVED AS TO PERSONNEL REQUIREMENTS:

_____
Director of Personnel Services

APPROVED AS TO RISK ASSESSMENT:

_____
County Risk Manager

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Milton R. Jones, M.D.
FOR THE PROVISION OF Autopsy Services

WHEREAS, the County of Inyo (hereinafter referred to as "County") and Milton R. Jones, M.D. of Lone Pine, California (hereinafter referred to as "Contractor"), have entered into an Agreement for the Provision of Personal Services dated June 28, 2011, on County of Inyo Standard Contract No.116 for the term from July 1, 2011 to June 30, 2012.

WHEREAS, County and Contractor do desire and consent to amend such Agreement as set forth below;

WHEREAS, such Agreement provides that it may be modified, amended, changed, added to, or subtracted from, by the mutual consent of the parties thereto, if such amendment or change is in written form, and executed with the same formalities as such Agreement, and attached to the original Agreement to maintain continuity.

County and Contractor hereby amend such Agreement as follows:

2. TERM.

The term of this Agreement shall be from July 1, 2011 to December 31, 2012 unless sooner terminated as provided below.

3. CONSIDERATION.

D. Limit upon amount payable under Agreement. The total sum of all payments made by the County to Contractor for services and work performed under this Agreement shall not exceed ($51,125.00) Fifty one thousand one hundred twenty five dollars (hereinafter referred to as "contract limit"). County expressly reserves the right to deny any payment or reimbursement requested by Contractor for services or work performed which is in excess of the contract limit.

ATTACHMENT B

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Milton R. Jones, M.D.
FOR THE PROVISION OF Autopsy SERVICES

TERM:

FROM: July 1, 2011 **TO:** December 31, 2012

SCHEDULE OF FEES:

Complete gross autopsy.....$875.00
External examination.....$400.00
Reimbursement of necessary charges in determining the
Cause of death. Microscopic studies, etc. .....$as billed

(As billed by an outside service that provides the tests required, with a copy of their actual billing)

The effective date of this Amendment to the Agreement is_____.

All the other terms and conditions of the Agreement are unchanged and remain the same.

AMENDMENT NUMBER 1 TO
AGREEMENT BETWEEN THE COUNTY OF INYO AND
Milton R. Jones, M.D.
FOR THE PROVISION OF Autopsy SERVICES

IN WITNESS THEREOF, THE PARTIES HERETO HAVE SET THEIR HANDS AND SEALS THIS _____DAY OF _____, _____.

COUNTY OF INYO

By:_____

Dated:_____

CONTRACTOR

By: Milton R Jones MD
Signature

Milton R. Jones, M.D.
Type or Print

Dated: January 10, 2012

APPROVED AS TO FORM AND LEGALITY:

_____
County Counsel

APPROVED AS TO ACCOUNTING FORM:

_____
County Auditor

APPROVED AS TO PERSONNEL REQUIREMENTS:

_____
Director of Personnel Services

APPROVED AS TO RISK ASSESSMENT:

_____
County Risk Manager

AGENDA REQUEST FORM
BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ☒ Departmental ☐ Correspondence Action ☐ Public He
☐ Schedule time for ☐ Closed Session ☐ Informational

For Clerk's Use Only:
AGENDA NUMBER
12

FROM: Inyo County Coroner

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Salary Adjustment Request

DEPARTMENTAL RECOMMENDATIONS:
Request Board discuss and provide direction on a salary increase from $1,600 per month to $2,000 per month for the Coroner. Request Board direct staff to prepare the Elected Officials Ordinance.

CAO RECOMMENDATION:

SUMMARY DISCUSSION:
PERS recently eliminated my back-up deputy coroner position in the Southern Inyo County/Lone Pine area. This has created a staffing problem in the southern end of the county. When Deputy Coroner Mullenhour is out of the area, I will be the primary backup, covering from Bishop.

ALTERNATIVES:

OTHER AGENCY INVOLVEMENT:
None

FINANCING:
Funds are available from the PERS position that was eliminated.

APPROVALS	
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS (Must be reviewed and approved by County Counsel prior to submission to the board clerk.) Approved:_____ Date_____
AUDITOR/CONTROLLER	ACCOUNTING/FINANCE AND RELATED ITEMS (Must be reviewed and approved by the auditor/controller prior to submission to the board clerk.) Approved:_____ Date_____
PERSONNEL DIRECTOR	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.) Approved:_____ Date_____

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received) Leon B. Brune Date: 01/11/2012

For Clerk's Use Only:
AGENDA NUMBER

13

AGENDA REQUEST FORM
BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ■ Departmental ☐ Correspondence Action ☐ Public Hearing
☐ Scheduled Time for ☐ Closed Session ☐ Informational

FROM: HEALTH & HUMAN SERVICES – Social Services

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Request to hire a Social Worker in Child Welfare Services.

DEPARTMENTAL RECOMMENDATION:
Request your Board find that, consistent with the adopted Authorized Position Review Policy:

1) the availability of funding for this requested position exists, as certified by the Health and Human Services Director and concurred with by the County Administrator, and the Auditor-Controller; and
2) where internal candidates meet the qualifications for the position, the vacancies could possibly be filled through an internal recruitment, but an open recruitment would be more appropriate to ensure a sufficient number of qualified applicants apply; and
3) approve the hiring of one Social Worker, either a II at Range 64 ($3590-$4363), or a III at Range 67 ($3852-$4676), contingent upon qualifications.

CAO RECOMMENDATION:

SUMMARY DISCUSSION:
On or about December 27, 2011, your Board authorized the hiring of a Social Worker in the Child Welfare Program to fill a vacancy. However, a second vacancy of a Social Worker III position occurred on or about January 6, 2012, resulting in this request for authorization to fill the position. As previously indicated, the intense Child Welfare program is responsible for investigating and managing issues related to child abuse and neglect. Over the past few years, the Child Welfare program has experienced increased requirements from a federal, state and local level. In addition, recent legislation will result in foster care being extended past age eighteen beginning in January 2012. This will result in additional responsibilities being implemented in a division that is already stretched thin due to a position being held vacant for salary savings.

It is very important to the overall effective functioning of the division to assist the remaining staff by moving swiftly to fill this vacancy.

ALTERNATIVES:
Denying this request would result in the existing staff, who now are absorbing additional caseloads, being at risk of inadvertent, compromised safety decisions on behalf of children due to unacceptable workloads.

OTHER AGENCY INVOLVEMENT:
Juvenile Court, Juvenile Probation, Toiyabe Family Services, local Indian tribes, Mental Health, Wild Iris, Sheriff's Office, Bishop Police Department

FINANCING: State and Federal funds and Social Services Realignment funds. This position is budgeted in the Social Services budget (055800) in the salaries and benefits object codes. No County General Funds.

APPROVALS	
COUNTY COUNSEL:	**AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS** *(Must be reviewed and approved by County Counsel prior to submission to the Board Clerk.)* Approved: _____ Date:
AUDITOR/CONTROLLER:	**ACCOUNTING/FINANCE AND RELATED ITEMS** *(Must be reviewed and approved by the Auditor/Controller prior to submission to the Board Clerk.)* Amy Shepherd Approved: ✓ 1/5/12 Date:
PERSONNEL DIRECTOR:	**PERSONNEL AND RELATED ITEMS** *(Must be reviewed and approved by the Director of Personnel Services prior to submission to the Board Clerk.)* Sue DC Approved: ✓ 1/4/12 Date:

DEPARTMENT HEAD SIGNATURE: Jean Turner Date: _____

(Not to be signed until all approvals are received)

For Clerk's Use Only:
AGENDA NUMBER

14

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ☒ Departmental ☐ Correspondence Action ☐ Public Hearing

☐ Scheduled Time for XX a.m. ☐ Closed Session ☐ Informational

FROM: Inyo County Planning Department

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Correspondence Regarding the BLM's Supplement to the Solar Energy Development Programmatic Environmental Impact Statement (PEIS).

DEPARTMENTAL RECOMMENDATION: Authorize the Chairperson to sign the attached correspondence to the Bureau of Land Management (BLM) regarding the Supplement to the Solar Energy Development Programmatic Environmental Impact Statement (PEIS).

SUMMARY DISCUSSION:

In October of 2011 the Bureau of Land Management (BLM) and the Department of Energy (DOE) jointly produced a Supplement document to the Draft Programmatic Environmental Impact Statement (PEIS) for Solar Development in Six Southwestern States, which had been released back in December of 2010, and which the County had commented on in March 2011 (the website for the Supplement document is at http://solareis.anl.gov; see Attachment #3 for BLM's letter introducing the Supplement document).

The Supplement to the PEIS outlines two additional pathways to expand and/or open up future new Solar Energy Zones (SEZs): first, through "on-going state-based efforts" for those states identified as needing additional SEZ areas (note that BLM has identified California as one such state on page 1-8 of the Supplement, and see Section 2.2.2.2.5 & 6 of the Supplement to the PEIS for a further explanation of such state-based efforts); second, through a variance process that could be used for projects that propose development on lands outside the SEZ areas identified and established by the original Draft PEIS document (see Section 2.2.2.3.1 of the Supplement to the PEIS for a further explanation of the variance process).

The attached comment letter on the Supplement to the PEIS (see Attachment #1) voices support for the changes proposed by the Supplement, as a means of providing potential pathways that could be used to increase solar development within the County. However, the comment letter also continues to request coordination with the BLM as a means to address the fact that the Draft PEIS both doesn't include any County lands among the proposed SEZ areas and also outright excludes solar development in some areas of the County through the use of exclusion zones.

ALTERNATIVES:

- Direct changes to the correspondence.
- Return to staff with other direction.

OTHER AGENCY INVOLVEMENT: BLM, Department of Energy, California Energy Commission, other cooperating California agencies.

FINANCING: General Planning Department funds are utilized to monitor federal actions affecting the County.

APPROVALS	
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the board clerk.)* R Hellen 1·10·12 YES
AUDITOR/CONTROLLER:	ACCOUNTING/FINANCE AND RELATED ITEMS (*Must be reviewed and approved by the auditor-controller prior to submission to the board clerk.)*
PERSONNEL DIRECTOR:	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.)

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received)

for Josh Hart Sandra Gretz Date: 1-10-12

Attachments

1. Proposed comment letter on Supplement to the PEIS, dated January 17, 2012.
2. BLM letter introducing the Supplement to the PEIS, dated October 2011.
3. County's prior comment letter on the Draft PEIS, dated March 1, 2011.

BOARD OF SUPERVISORS PACKET

ATTACHMENT #1

January 17, 2012

Supplement to the Draft Solar Energy PEIS
Argonne National Laboratory
9700 S. Cass Avenue – EVS/240
Argonne, IL 60439

Re: Comments on Supplement to the Draft PEIS for Solar Energy Development in Six Southwestern States

Dear Gentlemen/women:

Inyo County has reviewed the Supplement to the Draft PEIS for Solar Energy Development in Six Southwestern States, and would like to take this opportunity to make the following comments on the document.

Inyo County has commented a number of times on the fact that there are no Solar Energy Zones (SEZ) identified or planned for areas within the County. The County is, therefore, particularly supportive of comments within the Supplement that document provisions for added solar development opportunities. Specifically, the County supports:

- BLM's Efforts to Identify New SEZs: Section 2.2.2.2.5 notes that the "BLM intends to identify new SEZs and/or expand existing SEZs on an as-needed basis. The BLM has already initiated efforts to identify new SEZs in the states of California, Arizona, Nevada, and Colorado through ongoing state-based efforts..."
- Variance Process for Development Outside SEZs: Section 2.2.2.3.1 details a variance process which would allow utility-scale solar development outside of SEZs or other exclusion areas.

The County is supportive of both of the above-noted efforts, as they provide a way for areas within the County to be included as identified SEZ development zones, or, alternatively, provide a way for solar development to take place within the County, lacking any SEZ-identified zones through the PEIS process.

Also significant and important to the County – and which the County has commented on previously – is the fact that the Supplement notes that "the modified program alternative (BLM Preferred Alternative) emphasizes and incentivizes development within SEZs and proposes a collaborative process to identify additional SEZs" (p. 2-14). Specifically, Inyo County has formally invoked the right of coordination with BLM on PEIS-related

issues via Resolution No. 2009-29, and looks forward to taking an active role with BLM in identifying additional new SEZ areas in the County.

We appreciate the opportunity to comment, and look forward to continued input on solar development issues in California.

Sincerely,

Marty Fortney, Chairperson
Inyo County Board of Supervisors

cc: Greg Miller, Renewable Energy Program Mgr., BLM California Desert District
Clare Laufenberg Gallardo, California Energy Commission
Board of Supervisors, Inyo County
Kevin Carunchio, County CAO
Randy Keller, County Counsel
Josh Hart, Inyo County Planning Director

BOARD OF SUPERVISORS PACKET

ATTACHMENT #2

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Washington, D.C. 20240
http://www.blm.gov

TAKE PRIDE IN AMERICA

October 2011

In Reply Refer To:
1610 (300)

Dear Reader:

Attached for your review and comment is the Supplement to the Draft Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States (Supplement). This document was prepared by the Bureau of Land Management (BLM) and the Department of Energy (DOE) as co-lead agencies. The BLM and DOE prepared this document in consultation with cooperating agencies and in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; the Council on Environmental Quality, DOE, and Department of the Interior regulations implementing NEPA (40 CFR Parts 1500-1508, 10 CFR Part 1021, 43 CFR Part 46); and the Federal Land Policy and Management Act of 1976, as amended.

On December 17, 2010, the lead agencies published a Draft PEIS for Solar Energy Development in Six Southwestern States. Public comments were accepted through May 2, 2011, and more than 80,500 comments were received. The lead agencies have thoroughly analyzed the comments and made numerous adjustments to the PEIS in response to this input. The Supplement focuses on modified and new components of the lead agencies' proposed solar programs and incorporates by reference relevant portions of the Draft PEIS.

Development of this Supplement allows the public an opportunity to evaluate the modified and new elements of the proposed programs and provide input to assist the BLM and DOE decision-making processes. Based on input received on the Draft PEIS and this Supplement, the lead agencies will prepare a Final PEIS and Record(s) of Decision. All comments received on both documents will be responded to in the Final PEIS.

Through the Supplement, the BLM has modified its preferred alternative to emphasize its commitment to the concept of Solar Energy Zones (SEZ). Efforts have been made to ensure that SEZs are not located in high conflict areas, a protocol for establishing new SEZs has been provided, and incentives for projects within SEZs have been outlined. In addition, the BLM has revisited ongoing state-based planning efforts to assure that such efforts could result in the identification of new zones.

While the BLM's preferred alternative emphasizes the use and creation of SEZs for utility-scale solar energy development, the BLM has also proposed a process that will accommodate responsible development outside of SEZs.

As described in the Draft PEIS, under DOE's proposed action (action alternative), DOE would develop and adopt programmatic environmental guidance that would be used by DOE to further integrate environmental considerations into its analysis and selection of proposed solar projects. DOE has since used the information about environmental impacts provided in the Draft PEIS and other information to develop draft programmatic guidance. DOE has included the draft programmatic guidance in the Supplement for public comment.

Your timely comments on the Supplement will help formulate the Final PEIS. Comments will be accepted for ninety (90) calendar days following the Environmental Protection Agency's publication of its Notice of Availability in the *Federal Register*. The BLM and DOE can best utilize your comments and resource information submissions if received within the review period. Comments received after the end of the review period will be considered to the extent practicable. We request that your comments be as specific as possible. Comments are more helpful if they reference a section or page number of the Supplement and include suggested changes, additional information sources, or alternative methodologies.

Comments may be submitted electronically using the online comment form available at the project Web site: http://solareis.anl.gov. To facilitate analysis of comments and information submitted, we strongly encourage you to submit comments through the project Web site. Comments may also be submitted by mail to Solar Energy Draft PEIS, Argonne National Laboratory, 9700 S. Cass Avenue—EVS/240, Argonne, Illinois 60439.

Before including your address, phone number, email address, or other personal, identifying information in your comment, be advised that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal, identifying information from public review, we cannot guarantee that we will be able to do so.

In addition to written comments, public meetings to take public comments will be announced through local media and Web sites. Public meetings are currently planned for the following locations:

El Centro, California
Palm Desert, California
Phoenix, Arizona
Las Vegas, Nevada

Copies of the Supplement have been sent to affected Federal, state, and local government agencies and applicable tribal governments. Requests for additional information on the Supplement, including requests for copies of the document, should be directed to Shannon Stewart, BLM Washington Office, by email at shannon_stewart@blm.gov, or by telephone at 202–912–7219; or Jane Summerson, DOE Solar PEIS Document Manager, by email at Jane.summerson@ee.doe.gov, or by telephone at 202-287-6188. You may also visit the Solar Energy Development PEIS Web site at http://solareis.anl.gov.

Thank you for your continued interest in the PEIS for Solar Energy Development in Six Southwestern States. We appreciate the information and suggestions you contribute to the NEPA and planning process.

Sincerely,

Michael D. Nedd
Assistant Director
Minerals and Realty Management

BOARD OF SUPERVISORS PACKET

ATTACHMENT #3

In the Rooms of the Board of Supervisors

County of Inyo, State of California

I, HEREBY CERTIFY, that at a meeting of the Board of Supervisor of the County of Inyo, State of California, held in their rooms at the County Administrative Center in Independence on the 29th day of ***March,*** 2011 an order was duly made and entered as follows:

Planning/PEIS Correspondence	The Planning Director, Mr. Josh Hart, presented the proposed letter to the BLM concerning the PEIS. He explained that the Board had considered a response earlier with direction for changes. He said that since the deadline for comments had been extended, Staff had the opportunity to bring the amended correspondence back for Board consideration. Moved by Supervisor Cervantes and seconded by Supervisor Fortney to approve correspondence to the Bureau of Land Management (BLM) regarding the Solar Energy Development Programmatic Environmental Impact Statement (PEIS); and authorize the Chairperson to sign. Motion carried unanimously.

WITNESS my hand and the seal of said Board this 29th

Day of ***March*** ***2011***

KEVIN D. CARUNCHIO
Clerk of the Board of Supervisors

By: Patricia Gunsolley

Patricia Gunsolley, Assistant

Routing

CC
Purchasing
Personnel
Auditor
CAO
Other Planning

DATE: April 4, 2011

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

AGENDA NUMBER

24

☐ Consent ☒ Departmental ☐ Correspondence Action ☐ Public Hearing

☐ Scheduled Time for ☐ Closed Session ☐ Informational

FROM: Inyo County Planning Department

FOR THE BOARD MEETING OF: March 29, 2011

SUBJECT: Correspondence Regarding the Solar Energy Development Programmatic Environmental Impact Statement.

DEPARTMENTAL RECOMMENDATION: Authorize the Chairperson to sign the attached correspondence to the Bureau of Land Management (BLM) regarding the Solar Energy Development Programmatic Environmental Impact Statement (PEIS).

SUMMARY DISCUSSION: On March 1, 2011, the Board reviewed a proposed comment letter regarding the BLM's Draft Solar PEIS and directed staff to comment to the BLM to the effect that Inyo County had invoked coordination and expected such coordination.[1] In considering this direction, staff realized that in response to the Board's invocation of coordination in 2009, the BLM included Inyo County in cooperative status regarding the PEIS. Given this status, it would seem that, rather than again invoking coordination, the County should more specifically point out the County plans and policies that conflict with the Draft Solar PEIS and should cite the coordination regulations that require the BLM to achieve consistency between its and the County's planning documents (to the extent possible). This would both recognize that the BLM has (more or less) complied with the initial stage of coordination requiring early involvement and input, and would request that the process move to the more important stage of attempting to achieve consistency between the BLM's proposed plan and the County's plans. The attached comment letter is designed to achieve this result.

ALTERNATIVES:

- Direct changes to the correspondence.
- Return to staff with other direction.

OTHER AGENCY INVOLVEMENT: BLM, Department of Energy, California Energy Commission, other cooperating California agencies

FINANCING: General Planning Department funds are utilized to monitor federal actions affecting the County.

---

1 Refer to http://inyoplanning.org/RenewableNewPage.htm for the Agenda Request Form from March 1, 2011.

APPROVALS	
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the board clerk.)* YES 3.14.11
AUDITOR/CONTROLLER:	ACCOUNTING/FINANCE AND RELATED ITEMS (M*ust be reviewed and approved by the auditor-controller prior to submission to the board clerk.)*
PERSONNEL DIRECTOR:	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.)

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received)

Date: 3-18-11

Attachments: Draft Correspondence to BLM

BOARD OF SUPERVISORS
COUNTY OF INYO

P. O. BOX N • INDEPENDENCE, CALIFORNIA 93526
TELEPHONE (760) 878-0373 • FAX (760) 878-2241
e-mail: pgunsolley@inyocounty.us

MEMBERS OF THE BOARD
LINDA ARCULARIUS
SUSAN CASH
RICK PUCCI
MARTY FORTNEY
RICHARD CERVANTES

KEVIN D. CARUNCHIO
Clerk of the Board

PATRICIA GUNSOLLEY
Assistant Clerk of the Board

March 29, 2011

Draft Solar Energy Programmatic EIS
Argonne National Laboratory
9700 S. Cass Avenue – EVS/240
Argonne, IL 60439

RE: Draft Solar PEIS

To Whom It May Concern:

Inyo County has reviewed the Draft Solar Programmatic Environmental Impact Statement (PEIS) and is supportive of this effort by Bureau of Land Management (BLM) and Department of Energy (DOE) to encourage and streamline solar energy development in California and the southwest.

Inyo County is particularly supportive of statements within the PEIS, such as found in Chapter 2, which note that additions to the proposed Solar Energy Study Areas/Solar Energy Zones (SEZ) are likely to be considered at a future date. Since becoming involved in the PEIS process in July of 2009, Inyo County has consistently requested that the County be included as a site for such Solar Energy Study Areas/SEZs.

As noted in our comment letter of July 28, 2009, there are PEIS-proposed Solar Energy Study Areas immediately adjacent to Inyo County across the California state line in Nevada. The County requests that the extensive BLM lands within its own borders – which contain the same excellent solar development potential as the adjacent Nevada BLM lands – be identified and targeted as Solar Energy Study Areas/SEZs in future planning.

Significantly, while BLM's preferred alternative is the Solar Development Program rather than the SEZ Program, the County notes that this action alternative also excludes lands the County has identified as appropriate for renewable energy development (refer to attached). The County's General Plan encourages the sound development of energy resources on federal lands within the County, and maintaining and expanding access to federal lands for those purposes (Policy Gov 10-1). The County notes that, not only are areas identified by the County as highly appropriate for solar energy development not included as SEZs in the PEIS, but some of those areas are specifically excluded from consideration for solar energy development. At this time, the PEIS is not consistent with the County's plans and policies.

Accordingly, Inyo County requests additional and intensified coordination with the BLM to address and resolve the inconsistencies between the PEIS and the Inyo County General Plan and approved policies. In accordance with 43 C.F.R. 1610.3-1(f), Inyo County hereby informs the BLM of the specific inconsistencies between Inyo County plans and policies and the PEIS. The County requests staff-to-staff meetings to address these inconsistencies and, ideally, to resolve them. It is the County's position that the draft PEIS does not adequately identify and address these inconsistencies and the possible resolution of them.

Thank you for your attention. Please contact the County's Administrative Officer, Kevin Carunchio, at (760) 878-0292 at your earliest convenience to arrange for coordination.

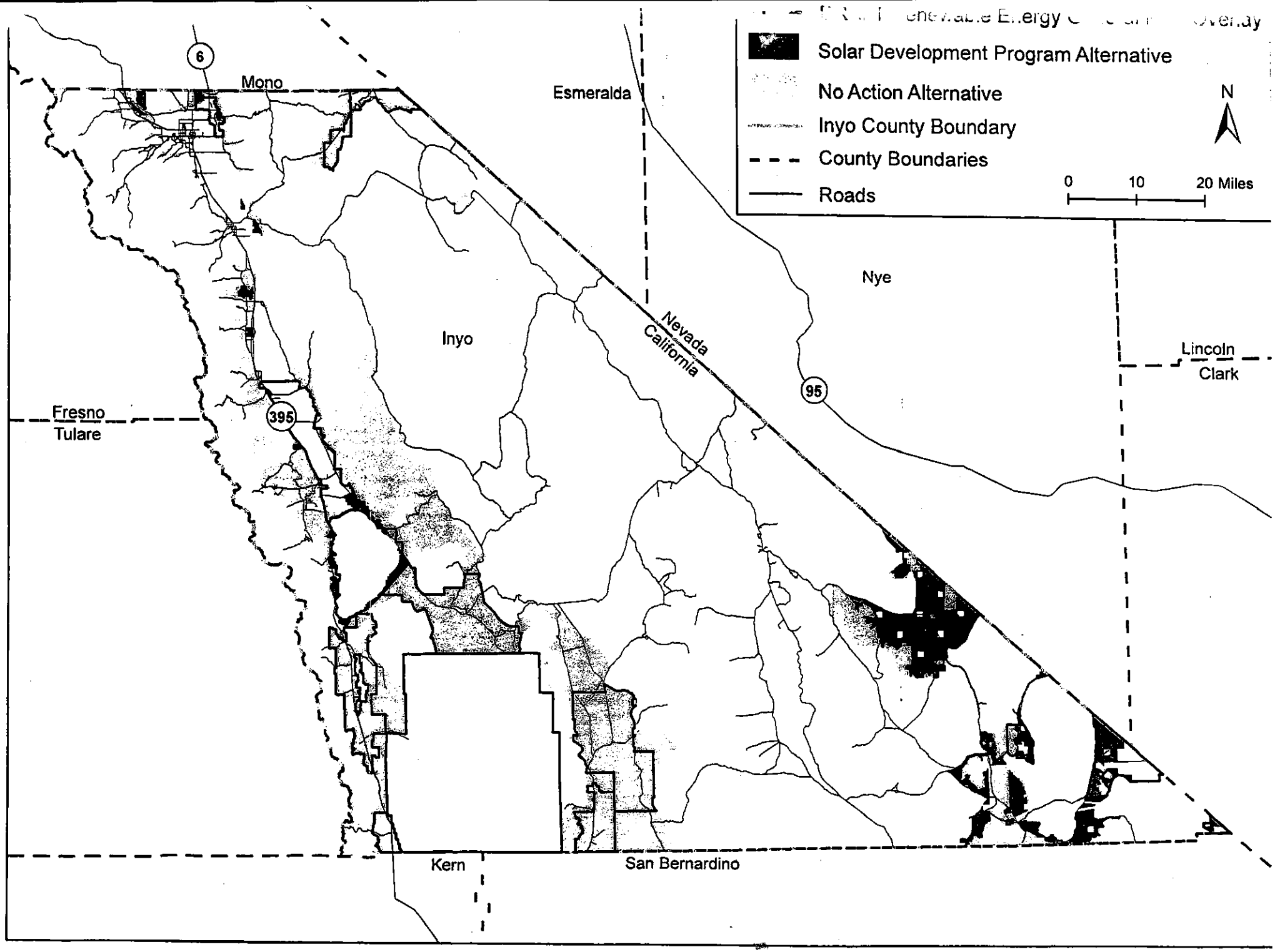
Sincerely,

Susan Cash

Susan Cash, Chairperson
Inyo County Board of Supervisors

Attachment: Map Comparing PEIS alternatives to Inyo County Renewable Energy General Plan Amendment Overlay

cc: Board of Supervisors, Inyo County
Kevin Carunchio, County CAO
Randy Keller, County Counsel
Joshua Hart, Inyo County Planning Director
Bob Abbey, BLM
Jim Abbot, BLM
Ashley Conrad-Saydah, BLM
Sara Quinn, BLM
Greg Miller, BLM
Linda Resseguie, BLM
Clare Laufenberg Gallardo, California Energy Commission
Regional Council of Rural Counties
California State Association of Counties
National Association of Counties


Solar Development Program Alternative
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For Clerk's Use Only:
AGENDA NUMBER
15

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ☒ Departmental ☐ Correspondence Action ☐ Public Hearing

☐ Scheduled Time for ☐ Closed Session ☐ Informational

FROM: Inyo County Planning Department

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Owens Lake Master Plan

DEPARTMENTAL RECOMMENDATION: Review the Draft Owens Lake Master Plan and Authorize the Chairperson to sign correspondence to the Stakeholder Committee for the Owens Lake Master Plan Regarding the Draft Master Plan.

SUMMARY DISCUSSION: The Los Angeles Department of Water and Power (DWP) has initiated a Master Plan for the Owens Lake following many years of dust mitigation efforts. The Plan will provide a framework for the future of the Lakebed, including potential solar energy development, water conservation, habitat enhancement, and further dust mitigation.[1] The Board has received several presentations about the Plan from staff and DWP representatives and has appointed Supervisors Arcularius and Cervantes and the Planning Director to participate on the project Planning Committee.[2]

The Planning Committee has been meeting about once per month since March 2010. The draft Master Plan has been released (Attachment 2). Staff has prepared draft comments regarding the draft Master Plan (Attachment 1), primarily related to the County's previous input regarding the Long-term Water Agreement, the County's planning and zoning for the project, public utilities, services, and infrastructure, and financing. The Board previously indicated that the County's lands along the lake should not be included within the plan area; it is requested that the Board revisit this issue and consider offering to include the County's lands within the plan area. Comments are due February 6, 2012.

OTHER AGENCY INVOLVEMENT: Owens Lakebed Planning Committee and interested organization and individuals – DWP; Great Basin Unified Air Pollution Control District; State Lands Commission; Department of Fish and Game; Inyo County Water Department and other County Departments; Inyo and Mono County Agriculture Department; numerous tribes, business, community, agricultural, conservation, and other groups.

FINANCING: Resources from the County's general fund and Water Department budget are utilized to monitor DWP's activities and participate in related planning efforts.

---

1 Refer to https://owenslakebed.pubspsvr.com/default.aspx for more information regarding the Master Plan.

2 Refer to http://inyoplanning.org/projects.htm regarding the County's previous input regarding the Master Plan process.

APPROVALS	
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the board clerk.)*
AUDITOR/CONTROLLER:	ACCOUNTING/FINANCE AND RELATED ITEMS (M*ust be reviewed and approved by the auditor-controller prior to submission to the board clerk.)*
PERSONNEL DIRECTOR:	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.)

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received)

Date: 1-6-12

Attachments

1. Draft Correspondence
2. Draft Owens Lake Master Plan

January 17, 2012

Owens Lakebed Planning Committee
City of Los Angeles Department of Water and Power
111 North Hope Street
Los Angeles, CA 90012

RE: Draft Owens Lakebed Master Plan

Members of the Owens Lakebed Planning Committee:

On behalf of the Inyo County Board of Supervisors, I wish to relay to you, the Department of Water and Power (DWP), and the City of Los Angeles our continued support for dust mitigation efforts on Owens Lake. Based upon our review of the draft Master Plan and our previous input, we offer the following comments:

1. The Master Plan should include a goal to work to provide water for areas of the Owens Valley that historically received water that has been diverted to the Lake. The ecosystem of the Owens Valley as a whole should not be compromised for the Lake micro-ecosystem. We suggest that this goal be included with priority on page 1-8 and 1-9 (Section 1.4.2), as well as discussed in more detail in pages 2-1 through 2-3 (Section 2.1) and Chapter 5 (pages 5-1 through 5-8, and particularly Section 5-2 on page 5-6).

2. The Master Plan should acknowledge the County's General Plan, Zoning Ordinance, Renewable Energy Ordinance, and other relevant planning policies and regulations within and adjacent to the Plan boundary. We suggest a new section or chapter to address relevant plans, regulations, and policies more broadly. Possible locations include a new section in Chapter 1 (pages 1-1 through 1-9) or a new chapter describing the regulatory background between existing draft Chapters 2 and 3. Reference to the Renewable Energy Ordinance should be included in Section 7.4 (pages 7-24 through 7-26). (Please see attachment).

3. The Master Plan should provide additional background regarding the Long-term Water Agreement between the County and the City of Los Angeles. We suggest that this issue be elaborated in Chapter 5 (particularly in Section 5.3 on page 5-7) and/or in a new section or chapter regarding the regulatory background described above (Please see attachment).

4. The Master Plan should address public services, utilities, and infrastructure to provide for development of master plan components. We suggest a new section or chapter to discuss these and other relevant issues, such as within Chapter 7 (pages 7-1 through 7-28) or in a new chapter between existing Chapters 7 and 8. (Please see attachment).

5. The Master Plan should provide for vector control, such as for mosquito control, for communities bordering the planning area. These issues have been kept under control by extensive monitoring and control programs of the Inyo/Mono Agriculture Commissioner, and require continuing attention to avoid public health and ecological harm. The Plan should address these potentially negative impacts resulting from it. We suggest discussing these topics

Kevin Carunchio, CAO
Randy Keller, County Counsel
Honorable Mayor of Los Angeles, Antonio Villaraigosa
Ron Nichols, DWP General Manager
City of Los Angeles Board of Water and Power Commissioners
James B. McDaniel, DWP
Martin L. Adams, PE, DWP
Gina Bartlett, Center for Collaborative Policy
Board of the Great Basin Unified Air Pollution Control District
State Lands Commission
Curtis Fossum, State Lands Commission

Attachment
(Numbers correspond to numbering in letter)

2. Inyo County has several relevant plans, accompanying policies and regulations that are geographically within or adjacent to the Owen's Lake Master Plan (OLMP) Area. These include the County's General Plan and Zoning and Renewable Energy Ordinances, the Lower Owens River Plan, the Inyo County City of Los Angeles, Long Term Water Agreement, as well as, programs relating to agriculture and pest control. The OLMP efforts should not conflict or compete with these already established plans, regulations and programs.

- Inyo County General Plan. The OLMP area includes General Plan designations of: State and Federal Lands (SFL); Rural Protection (RP); Natural Resources (NR); Agriculture (A) and Residential Rural High Density (RRH). General Plan land use designations are the roadmap to the County's vision of how it wants to develop and they were vetted through a full public process. Major deviations from this vision, by promoting activities that do not agree with the general plan designations, could change the character of the County envisioned by its citizens.

  The County's General Plan also contains policies related to Economic Development, Conservation/Open Space, Biological Resources and Public Safety that relate to activities recommended in the OLMP.

  - Economic Development: the General Plan goals for economic development emphasize the County's many opportunities for tourism. The OLMP goals should help to promote the Lake and surrounding area as a visitor destination. Dust mitigation activities should be conducted in a way that does not make the lake, or areas surrounding the lake, undesirable to visitors.

  - Conservation/Open Space (Agriculture): the General Plan establishes goals to encourage and protect agricultural activities in the County. The OLMP should not include program elements that might prohibit current, or limit future, agriculture practices.

  - Conservation/Open Space (Water): the General Plan establishes goals for sustainable ground water withdrawal and maintaining water resolutions. Water that is used to implement the goals of the OLMP must follow the intent and specific regulations pertaining to water use in Inyo County.

  - Biological Resources: the General Plan has a specific goal to work to restore the Owen's River channel. Dust mitigation programs for the lake, identified in the OLMP, need to work in conjunction with current and future river restoration programs.

  - Public Safety (Air Quality): the general plan establishes goals to reduce emissions from the lake. The County supports the efforts of the OLMP in dust mitigation programs and

emergency responders, and if so, will there be opportunities for compensation to the County? The OLMP calls for an increase of visitors to the lake: will any part of the cost for amenities for visitors, such as parking, trails, restroom facilities and etc. be expected to be shared by the County?

9. Promote economic development in the area that includes, but is not limited to tourism, public access and educational opportunities. Traditional economic drivers that have historically existed on the lake, such as mining and agriculture practices, primarily grazing, should also be encouraged.

OWENS LAKE

MASTER PLAN

Planning Committee Review Draft

December 2011

DRAFT

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LIST OF ABBREVIATIONS AND ACRONYMS

AFY	Acre-Feet Per Year
APCO	Air Pollution Control Officer
AWWA	American Water Works Association
BACM	Best Available Control Measure
BDCP	Bay Delta Conservation Plan
BLM	Bureau of Land Management
BMP	Best Management Practice
BP	Before Present
CAA	Clean Air Act
CDFG	California Department of Fish and Game
CDWR	California Department of Water Resources
CEC	Cation Exchange Capacity
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNPS	California Native Plant Society
Commission	California State Lands Commission
CRA	Colorado River Aqueduct
CRHR	California Register of Historical Resources
DAM	Dry Alkali Meadow
District	Great Basin Unified Air Pollution Control District
FHA	Federal Highway Administration
HSI	Habitat Suitability Index
HSM	Habitat Suitability Model
IAVC	Interagency Visitor Center

kV	Kilovolt
LAA	Los Angeles Aqueduct
LADWP	Los Angeles Department of Water and Power
LIDAR	Light Detection and Ranging
LORP	Lower Owens River Project
MAM	Moist Alkali Meadow
mg/L	Milligrams per Liter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSL	Mean Sea Level
MW	Megawatt
MWD	Metropolitan Water District
$\mu g/m^3$	Micrograms Per Cubic Meter
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NRC	National Research Council
NRHP	National Register of Historic Places
OHV	Off-Highway Vehicle
OVIWC	Owens Valley Indian Water Commission
OVPA	Owens Valley Planning Area
PM_{10}	Particulate Matter 10 Micrometers in Diameter or Less
RWQCB	Regional Water Quality Control Board
SAM	Saturated Alkali Meadow

SIP	State Implementation Plan
SWP	State Water Project
SWWI	Soil and Water West Inc.
TAC	Technical Advisory Committee
TAM	Transmontane Alkali Meadow
TDS	Total Dissolved Solids
ULARA	Upper Los Angeles River Area
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VRMP	Visual Resource Management Program
USFWS	United States Fish and Wildlife Service
WSSI	WaterSense Specification

1.0 INTRODUCTION

Owens Lake historically received surface water inflow from the Owens River and the Sierra Nevada Mountain Range (Sierra Nevada). Beginning in the 1860s, withdrawals from the Owens River began to reduce inflows to the lake. When the City of Los Angeles began diverting water in the early 1900s, the inflow was significantly reduced and the lake was virtually dry by the early 1930s. Prior to implementation of dust control measures, the dry lakebed was one of the largest sources of dust in the world. Today, over 40 square miles of dust control have been implemented, primarily with water-based control methods.

Although the landscape of Owens Lake has changed significantly, it continues to provide diverse resources to a large group of interests: it provides habitat, public access and recreation, open space and scenic amenities, a rich cultural history, grazing and mining resources, and opportunities for renewable energy and economic development. The Owens Lake Master Plan (Master Plan) provides a framework to manage the diverse resources of the lake, while continuing to control dust. The framework considers methods, that when implemented together, can collectively control dust, conserve water, maintain habitat value, and protect or enhance other lake resources. The Master Plan does not propose projects for implementation on the lake. The term of the Master Plan is 20 years. This timeframe represents a reasonable planning horizon to guide management decisions on the lake.

1.1 Background

Owens Lake covers approximately 110 square miles in the southern end of the Owens Valley, east of the Sierra Nevada of Inyo County, California (Figure 1-1). Historically, Owens Lake was the terminus of the Owens River. The river and streams that fed Owens Lake were diverted by agricultural uses and most notably by the Los Angeles Department of Water and Power (LADWP) into the Los Angeles Aqueduct. LADWP is a retail water agency that provides water to over four million residents within a 465 square-mile service area.

As a result of water diversions, Owens Lake was virtually dry by 1930 (Sapphos 2008). The exposed lakebed became a major source of airborne dust in the Owens Valley (Figure 1-2).

FIGURE 1-1. OWENS LAKE VICINITY MAP

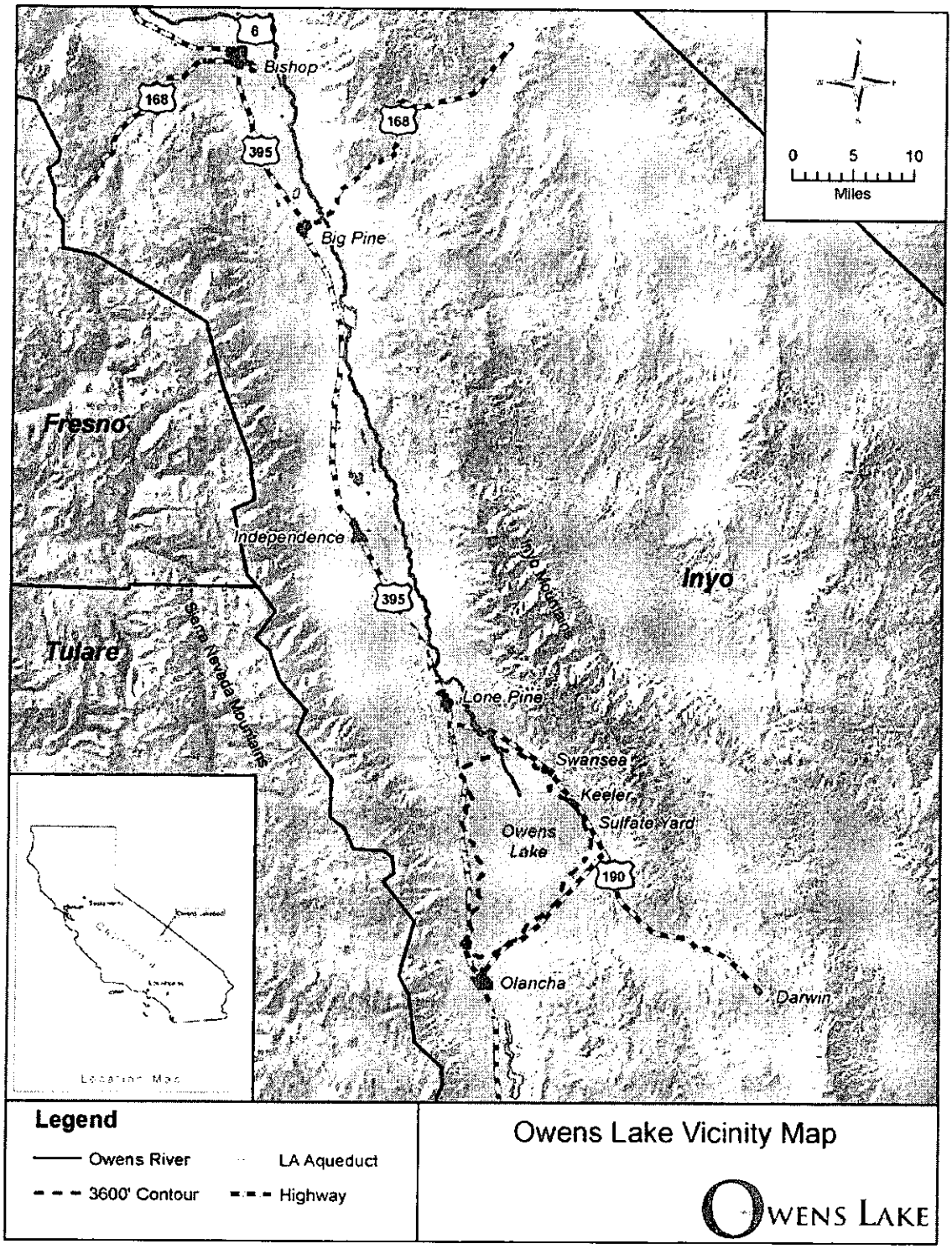


FIGURE 1-2. DUST STORM AT OWENS LAKE PRIOR TO IMPLEMENTATION OF DUST CONTROL MEASURES

In 1987, the United States Environmental Protection Agency (USEPA) revised the National Ambient Air Quality Standards (NAAQS), replacing total suspended particulates with PM_{10}, a new indicator for particulate matter or dust.[1] The intent of this health-based standard is to prevent airborne concentrations of suspended particles that are injurious to human health. The southern Owens Valley (known as the Owens Valley Planning Area, or OVPA) violated the new PM_{10} standards. Air quality monitoring showed that the bed of Owens Lake, most of which is owned by the State of California and managed by the California State Lands Commission (Commission), was the major source of PM_{10} emissions contributing to violations in the area.

The USEPA required the State of California to prepare a State Implementation Plan (SIP) for the OVPA that demonstrated how PM_{10} emissions would be decreased to prevent violations of the NAAQS. The Great Basin Unified Air Pollution Control District (District) is delegated by the State of California to fulfill this requirement. Since 1989, the District has pursued a comprehensive research and testing program to develop dust control measures that are effective for the lakebed. Dust control measures are PM_{10} control measures that can be placed onto portions of the lakebed and effectively reduce PM_{10} emissions. The District, in cooperation with LADWP, developed and approved three dust control measures, known as Best Available Control Measures (BACM), that it has found to be feasible and effective. BACM are those measures that, according to USEPA guidance, are technology-based and can help ensure that the Federal standard be attained as expeditiously as practicable. Current BACM include the following:

- Shallow Flood provides dust control by maintaining sufficiently wet surfaces with sheet flooding or pond flooding. As a result, topographic lows provide habitat for invertebrates, shorebirds, and waterfowl. The annual water use per acre for this measure is three to five acre-feet.

- Managed Vegetation provides dust control because vegetated surfaces are resistant to soil movement and thus provide protection from PM_{10} emissions. Saltgrass (*Distichlis spicata*) was the first plant species approved for this dust control measure. Additional species have

[1] The notation PM_{10} is used to describe particulate matter that is 10 micrometers in diameter or less.

recently been approved by the District. The annual water use per acre for saltgrass is one and one-half acre-feet.

- Gravel cover provides dust control by preventing the formation of salt crusts and creating a surface that has a high threshold for surface particle movement and dust emissions. No water is required for this dust control measure.

Since 2001, LADWP has implemented approximately 40 square miles (25, 600 acres) of Shallow Flood, Managed Vegetation, and Gravel on the lakebed. Prior to implementation of BACM on State-owned land, dust control projects must receive a land lease from the Commission. The Commission has the discretion to determine whether dust control projects are consistent with Public Trust values and resources. To date, the Commission has determined that Shallow Flood, Managed Vegetation, and Gravel cover are acceptable dust control projects for the lakebed.

1.2 Public Trust Values and Resources at Owens Lake

The State Legislature has given the Commission jurisdiction over all State-owned filled and unfilled tidelands, submerged lands, and beds of navigable waterways. The State acquired ownership of all such lands within its boundaries upon its admission to the United States in 1850. These lands are impressed with the Common Law Public Trust. The Public Trust is a sovereign public property right held by the State or its delegated trustee for the benefit of all the people. This right limits the uses of these lands to waterborne commerce, navigation, fisheries, open space, recreation, or other recognized Public Trust purposes. A lease from the Commission is required for the use of State-owned lands under the Commission's exclusive jurisdiction.

Owens Lake was a natural and navigable lake prior to the diversion of water. Although some small portions around the edges of the lakebed were subsequently sold into private ownership, the majority of the dry lakebed is sovereign land under the jurisdiction of the Commission. The sovereign lands under the Commission's jurisdiction are also subject to the Public Trust. Because the lakebed is now dry, the water-related Public Trust values of waterborne commerce, navigation, and fisheries are no longer applicable. However, other Public Trust values and resources remain, including wildlife habitat, public access and recreation, and preservation of open space and scenic amenities.

In addition to the identified Public Trust resources, there are other activities and resources on the lakebed that are generally consistent with the Public Trust. These include mining, grazing, and the protection of cultural resources. Other activities or uses may be recognized as Public Trust consistent in the future. This could include the development of renewable energy projects, such as solar panels, on sovereign land.

1.3 Plan Area

1.3.1 Location

The plan area is the Owens Lake, defined as the area below its historic shoreline, 3,600 feet above sea level. It is situated at the south end of the long, narrow Owens Valley with the Sierra Nevada and Mount Whitney to the west, the Inyo Mountains to the east, and the Coso Range to the south (Figure 1-1). The lakebed is located approximately eight miles south of the town of Lone Pine on U.S. Highway 395, 65 miles north of the City of Ridgecrest, 12 miles east of Sequoia National Park, and 35 miles west of Death Valley National Park. The Lower Owens River Delta is within the 3,600 contour; however, it is excluded from the Master Plan because it is under jurisdiction of the Lower Owens River Project (LORP).

The communities of Olancha/Cartago and Keeler/Swansea are located on the southwestern and eastern shores of the lake, respectively. The communities of Lone Pine, Keeler/Swansea, and Olancha/Cartago are located in unincorporated Inyo County. There is also one designated Indian reservation, the Lone Pine Indian Reservation, in the vicinity to the north of the lake (Sapphos 2007).

The lakebed extends about 17 miles north and south and 10 miles east and west and covers an area of approximately 110 square miles (CH2M HILL 2000). The topography is relatively flat with an approximate elevation ranging from 3,600 feet above Mean Sea Level (MSL), as defined by the historic shoreline, to approximately 3,554 feet above MSL, as defined by the fluctuating, remnant brine pool (Sapphos 2007).

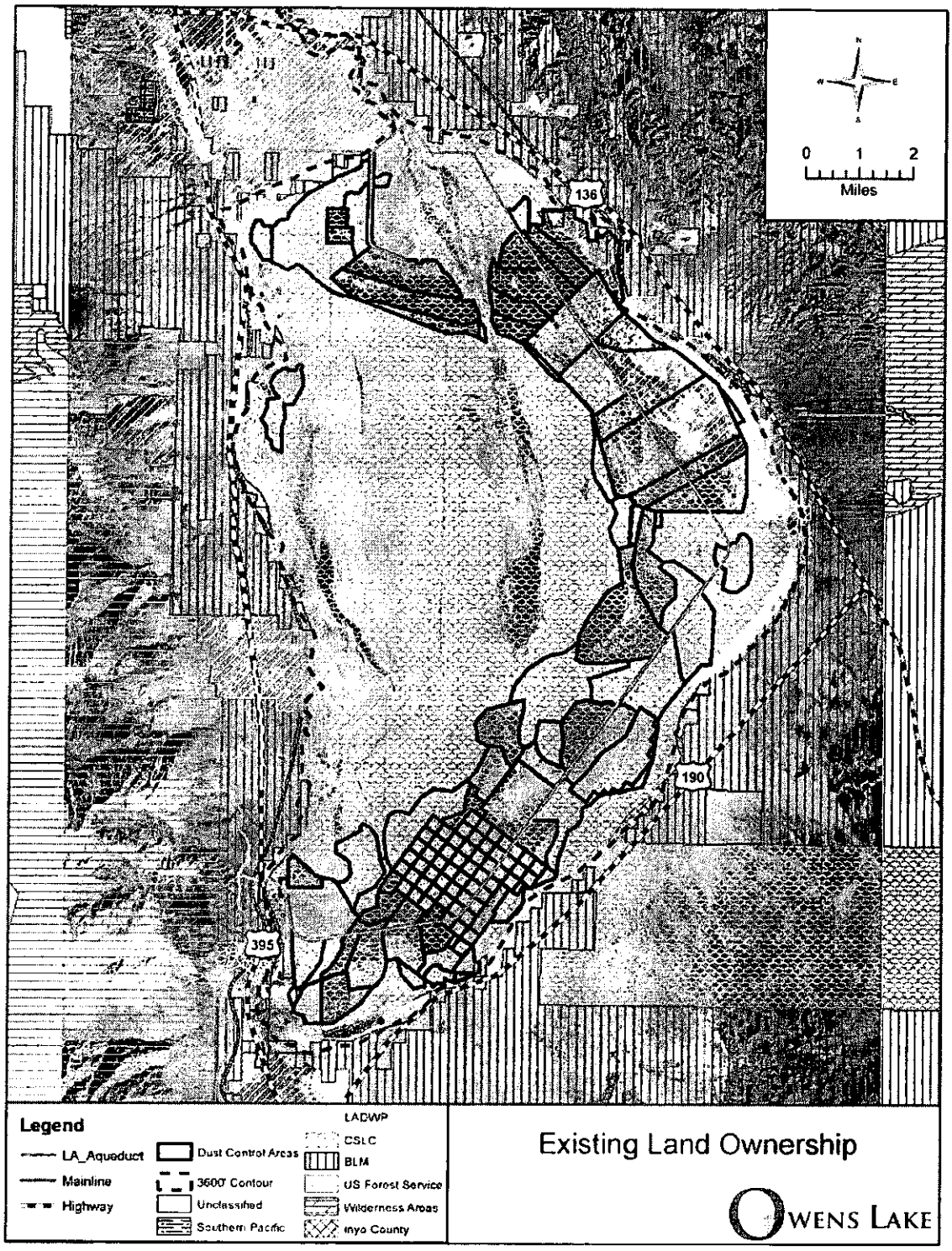
1.3.2 Land Ownership

Approximately 95 percent of the lakebed is owned by the State of California and managed by the Commission. The remaining five percent of the lakebed is owned by other private and public interests (Figure 1-3).

On the State-owned portions of the lakebed, the Commission grants leases for a variety of purposes. For example, Rio Tinto Minerals operates the U.S. Borax, Inc. leases for over 23 square miles (approximately 15,000 acres) of lakebed for mining and extracting trona ore, which is an evaporate sodium carbonate mineral. There are also a few agricultural leases near the historic shoreline. Most of the remaining lakebed areas are leased by the District and the City of Los Angeles for the purposes of developing dust control measures.

The State of California also owns land at Cartago that is managed by the California Department of Fish and Game (CDFG). Part of this land, known as the Cartago Springs Wildlife Area, is located within the lakebed plan area. The area is managed primarily for habitat values.

FIGURE 1-3. EXISTING LAND OWNERSHIP



The majority of the non-State-owned lakebed is owned by the City of Los Angeles and is managed by LADWP. The City owns land in the Owens River Delta area on the east side of the lake and on other parcels around the lakebed.

A few small areas in the plan area are Federal lands managed by the U.S. Bureau of Land Management (BLM). Several parcels located at a complex of springs on the south edge of the plan area are owned by the County of Inyo. Approximately 30 parcels located within the plan area are held privately.

1.4 Owens Lake Master Plan Planning Process

1.4.1 Planning Committee

In March 2010, LADWP initiated a broad collaborative process to develop this Master Plan as a framework to manage the diverse resources of the lake, while continuing to control dust. A Planning Committee was established that represented interests in dust control, water conservation, habitat, cultural resources, public access, education, and recreation, agriculture, and business. This approach was taken so that the Master Plan could address all resources at the lake. Table 1-1 provides a list of Planning Committee members.

The Planning Committee appointed a smaller Coordinating Committee and five Work Groups to develop specific elements of the Master Plan. The Coordinating Committee included members from the Eastern Sierra Audubon Society, the CDFG, the District, Inyo County, LADWP, and the Owens Valley Indian Water Commission (OVIWC). Work Groups were established for habitat, dust control, renewable energy, public access and recreation, and water conservation.

An Agency Forum was also established to discuss regulatory and policy issues. The agency forum included Federal (USEPA), State (the Commission, the California Air Resources Control Board, CDFG, the Department of Water Resources, and the State Water Resources Control Board), and local (LADWP, the District, and Inyo County) entities. More specific roles and responsibilities of each group are detailed in the original Planning Committee Charter in Appendix A.

TABLE 1-1. OWENS LAKE MASTER PLAN PLANNING COMMITTEE MEMBERS

Interest	Entity
Agriculture/Ranchers	California Cattleman's Association County of Inyo/Mono Agricultural Commissioner
Business	CG Roxane, LLC (Crystal Geyser) Lone Pine Chamber of Commerce Rio Tinto Minerals, Owens Lake Operation
Recreation	California Waterfowl Ducks Unlimited
Energy/Solar	Los Angeles Department of Water and Power
Environmental: Habitat, Birds, and Native Plants	Audubon California California Native Plant Society, Bristlecone Chapter Eastern Sierra Audubon Chapter Owens Valley Committee Sierra Club
Governmental	**Tribal** Bishop Paiute Tribe Lone Pine Paiute-Shoshone Tribe Owens Valley Indian Water Commission **Federal** Bureau of Land Management **State** State of California Department of Fish and Game, Bishop Field Office California Natural Resources Agency, Sierra Nevada Conservancy California State Lands Commission, Division of Environmental Planning and Management and Division of Land Management **Local** City of Los Angeles Department of Water and Power County of Inyo Board of Supervisors and Planning Department Great Basin Unified Air Pollution Control District
Open Space	Eastern Sierra Land Trust
Community and Education	Various Individuals

1.4.2 Vision Statement and Goals

The Planning Committee developed a Vision Statement to guide development of the Master Plan. The complete Vision Statement is included in Appendix B and includes the following key goals:

- Control dust on the Owens Lakebed to obtain good air quality and reduce the dust-related public health risk.

- Water use efficiency and water conservation shall be a priority when implementing dust control efforts on the Owens Lakebed.
- Protect, create, and/or enhance ecological resources at Owens Lake.
- Create a Master Plan that can be flexible in the future and that is sustainable from a climate-change and water-use-efficiency standpoint.
- Promote economic development in the area as well as tourism, public access, and educational opportunities at Owens Lake.
- Create a viewshed that is in harmony with the surrounding rural environment while recognizing the need for flexibility and balance between Public Trust values and potential future uses, including renewable energy projects.
- Protect cultural resources.
- Explore opportunities for renewable energy development.

2.0 OVERVIEW OF THE MASTER PLAN

The Master Plan provides a framework to manage the diverse resources of Owens Lake, while continuing to control dust. The framework considers methods, that when implemented together, can collectively control dust, conserve water, maintain habitat value, and protect or enhance other lake resources. The Planning Committee identified eight key goals in their vision for Owens Lake (refer to Section 1.4.2, Vision Statement and Goals). This section provides an overview of each element of the Master Plan and an outline of how the elements will achieve the key goals. The dust control, water conservation, and habitat goals are described together for this overview because these elements are interdependent and the goals will be achieved concurrently. The public access, education, and recreation; open space and scenic amenities; cultural resources; renewable energy; grazing; and mining elements are discussed separately because even though these elements may overlap with dust control, water conservation, and habitat, they are not necessarily interdependent. This section also provides an overview of the implementation process, including overall structure, monitoring, and schedule and funding.

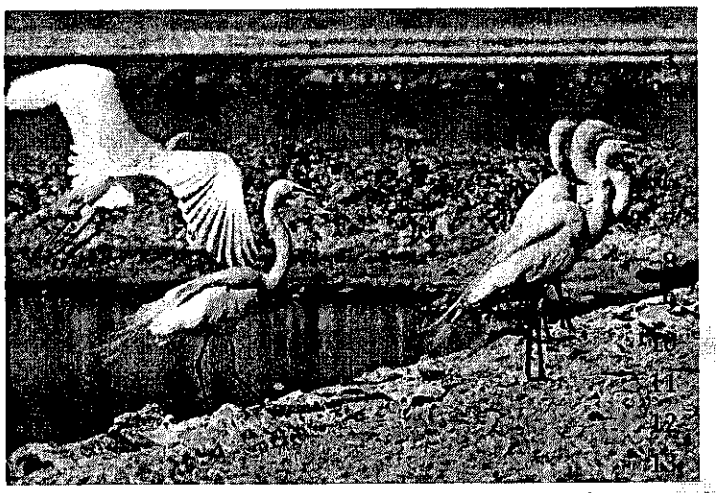
The Master Plan was developed in an open, cooperative, and collaborative process with stakeholders that represent all the diverse interests at the lake. The Master Plan framework includes an implementation structure to continue this successful approach to management of resources at Owens Lake. The approach is necessary for successful use of the Master Plan framework.

2.1 Overview of Dust Control, Water Conservation, and Habitat (Sections 4, 5, and 6)

Approximately 40 square miles of dust control have been implemented in the plan area since 2000, primarily with Shallow Flood. As a result, this portion of the plan area is now highly managed. The Planning Committee recognizes the importance of controlling dust for air quality and reducing dust-related public health risk. Shallow Flood is an effective dust control method, and it has created important habitat for many species, including migrating birds. Shallow Flood, however, is water-intensive. The Planning Committee identified water use efficiency and conservation, and the protection of ecological resources, as key goals for the Master Plan. By nature, the relationship between water-based dust control methods and habitat is interdependent. Therefore, a framework that could balance the achievement of these goals was developed.

The framework includes a toolbox of water-efficient dust control methods that can conserve water. In addition to efficient operations and management of the dust control project, water-efficient dust control methods could include existing BACM or potential new and modified BACM. Prior to implementation on the lakebed, all potential new and modified dust control methods are subject to development and testing by LADWP and to approval by the District.

FIGURE 2-1. GREAT EGRETS NEAR A SHALLOW FLOOD DUST CONTROL PROJECT

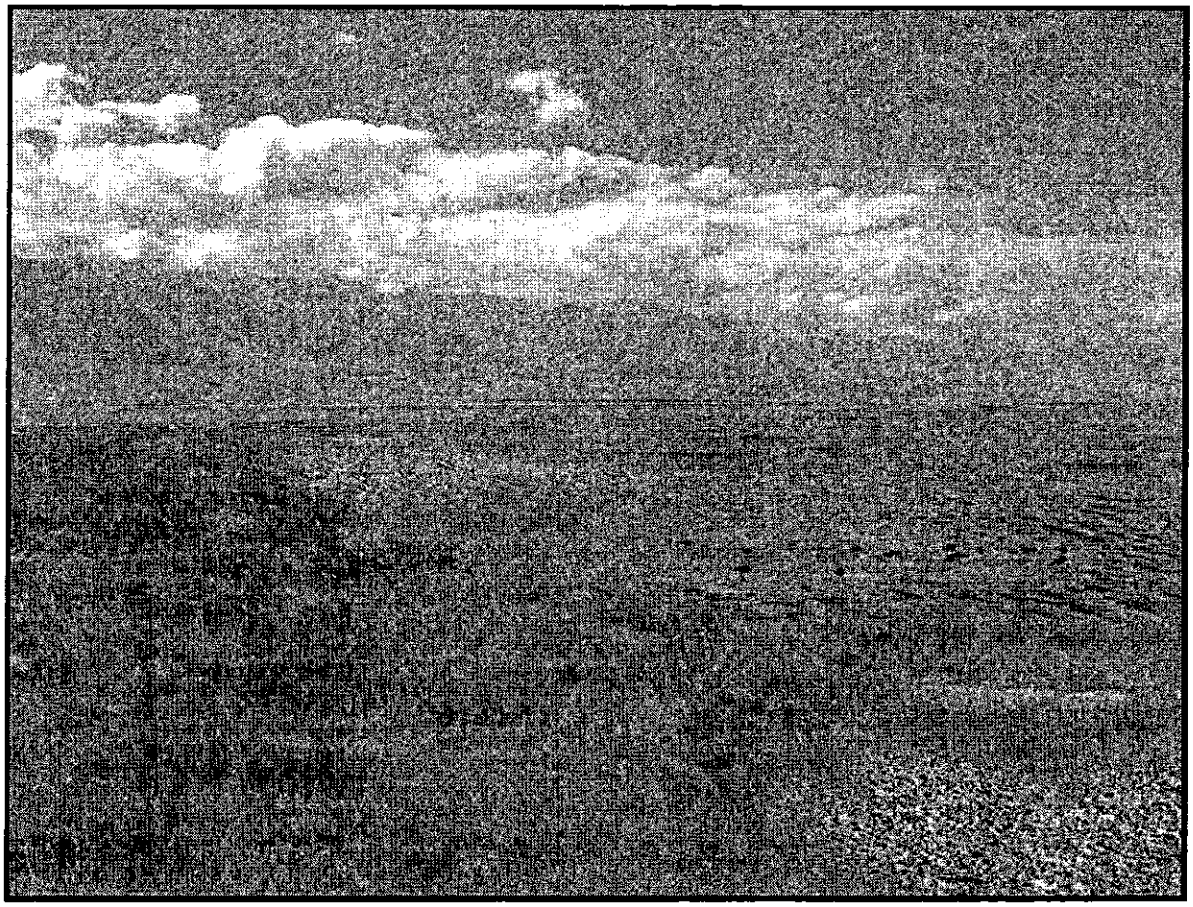


The framework also includes a Habitat Suitability Model (HSM) as a clear and objective tool for understanding, tracking, and managing habitat values on the lake for target guilds. The HSM was developed for six target habitat guilds: breeding and migrating shorebirds, breeding and migrating waterfowl, diving birds, and meadow species. The HSM is important for three reasons: 1) it can be used to track habitat conditions over time to compare to the original baseline conditions; 2) it can be used to guide the design and/or management of projects within the plan area; and 3) it improves our understanding of the habitat preferences of guilds at Owens Lake. The habitat objective is to maintain the total baseline value-acres for six target habitat guilds over time.

In order to determine the water conservation potential in the Master Plan framework, LADWP evaluated the water demand necessary to comply with dust control requirements and to maintain habitat value-acres over time under a variety of future scenarios. Based on this evaluation, the water conservation target of 50 percent of the annual water budget should be feasible within the context of the Master Plan. The feasibility of the target depends primarily on the approval of new or modified BACM.

An example of how the Master Plan framework might be implemented is the design process currently underway for Phase 7a of the dust control project. Phase 7a includes approximately three square miles of new dust control on the lake. In order to meet the water demand for the new dust control area, LADWP is transitioning approximately three square miles of existing Shallow Flood to a blend of existing BACM that enhance habitat value. Figure 2-2 provides a rendering developed during planning for Phase 7a. The new dust control areas include Shallow Flood, Managed Vegetation, and Gravel. Phase 7a will also include public access improvements and design elements to enhance aesthetics. This project is currently under design and is scheduled for implementation by 2013.

FIGURE 2-2. RENDERING OF HYBRID DUST CONTROL METHODS DEVELOPED DURING PHASE 7A PLANNING



In summary, the dust control, water conservation, and habitat goals can be achieved if all the following occur under the Master Plan framework:

1. Efficient operations and management of the dust control project
2. Testing, approval, and implementation of modified or new BACM that can conserve water (i.e., transition of Shallow Flood to water-efficient or waterless BACM)
3. A clear tool for understanding, tracking, and managing total habitat value (i.e., the HSM)
4. Appropriate leases and environmental permits issued for modified or new BACM
5. Allocation of resources, including funding and staff

2.2 Overview of Other Lake Resources (Section 7)

The Planning Committee included other lake resources in the Master Plan, including public access, education, and recreation; open space and scenic amenities; cultural resources; renewable energy; grazing; and mining. Some of these resources are currently recognized by the Commission as Public Trust resources, and others are considered generally consistent with the Public Trust. The Planning Committee included these resources in the Master Plan to enhance public access, education, recreation, and cultural resources; protect scenic amenities; and maintain economic opportunities on the lake, such as renewable energy, grazing, and mining. These goals would be achieved in a way that also enhances the local economy and protects business interests, public services, and infrastructure in the plan area. Each resource area is summarized below:

- **Section 7.1, Public access, education, and recreation:** Public access and recreation are currently recognized by the Commission as Public Trust resources at the lake. The Planning Committee considers public access, education, and recreation at the lake as opportunities for economic development. This section provides a summary of existing public access infrastructure and educational and recreational activities in the plan area. Existing public access, education, and recreation activities will continue under the Master Plan. The Planning Committee identified additional elements to draw visitors onto the lake for recreation and interpretive education. New recreational activities could include a scenic loop or a hiking trail. Interpretive education could include habitat, cultural resources, water conservation, the dust control project, and economic development opportunities. The Planning Committee identified development of an Owens Lake Interpretive/Education Plan for planning and implementation of specific projects.

- **Section 7.2, Open space and scenic amenities**: The open space and scenic amenities in the plan area are considered valuable and are currently recognized by the Commission as Public Trust resources at the lake. The Planning Committee expressed the desire to create a viewshed that is in harmony with the surrounding rural environment, but recognized the need for flexibility and balance between current and potential future uses, including renewable energy projects. This section describes the existing open space and scenic amenities in the plan area and outlines a BLM landscape-scale, systematic process that can provide a consistent evaluation of projects planned for the lake. The Commission does not have a similar established process for evaluation of visual resources at Owens Lake. Therefore, the BLM Visual Resource Management Program (VRMP) process is recommended as a method to consistently evaluate future projects in the plan area, such as a renewable energy project or a new BACM for the dust control project. This process is intended to be a guide for new projects. It would not apply to operations and maintenance of existing projects, such as mining or dust control.

- **Section 7.3, Cultural resources**: The plan area includes a rich cultural history, and although cultural resources are not considered a Public Trust resource by the Commission, the protection of cultural resources is considered consistent with the Public Trust. The Planning Committee recognizes the importance of cultural resources and identified opportunities to enhance the protection of cultural resources through education. This section provides an overview of key laws and regulations that provide for the protection of cultural resources, a cultural overview of the plan area, and educational opportunities to enhance cultural resource protection. When the Owens Lake Interpretive Plan is developed, the authors of the plan will consult with local tribes to minimize potential impacts associated with increased public access; this will include determination of open and guided access areas, location and extent of trails, and guided-tour and hunting protocols.

- **Section 7.4, Renewable energy**: Implementation of renewable energy projects is a key priority for California. Renewable energy projects at Owens Lake are not currently considered by the Commission as consistent with the Public Trust; however, it may be recognized as consistent in the future. The Planning Committee considers renewable energy an opportunity for economic development and supports renewable energy in the plan area. Generated energy could be used for dust control operations, locally in the Owens Valley, or in the City of Los Angeles. This section includes a brief overview of renewable energy resources and a list of considerations for future projects developed by the Planning Committee, such as being integrated with the dust control project and avoiding areas where there is a high level of existing or potential habitat.

- **Section 7.5, Grazing**: Cattle grazing is the only agricultural use in the plan area and is currently considered by the Commission as consistent with the Public Trust. Grazing contributes to the local economy and the Planning Committee supports continued grazing in the plan area with the following considerations: grazing should occur with valid and current leases (i.e., expired leases should be renewed) and grazers should follow a Grazing Management Plan. The Grazing Management Plan should include stocking rates, the protection of sensitive resources, including seeps and springs, and potentially fencing to manage cattle access to these areas.

- **Section 7.6, Mining**: Mining is currently considered by the Commission as consistent with the Public Trust. Mining contributes to the local economy and the Planning Committee supports continued mining in the plan area.

2.3 Overview of Implementation (Section 8)

2.3.1 Structure

Implementation of the Master Plan is structured in order to encourage an open, collaborative, and cooperative process. Implementation will occur with five participant groups: project proponents, the Advisory Committee, the Master Plan Coordinator, Technical Advisory Committees (TACs), and the Agency Forum. Implementation progress will be reported in annual Work Plans and Annual Reports. Annual Work Plans will be developed by project proponents and include activities planned for the following year. Annual Reports will be developed by an impendent Master Plan Coordinator and will include a summary of what occurred during the past year.

It is anticipated that the governmental agencies involved in development of the Master Plan will sign a Memorandum of Agreement (MOA) that will provide for Master Plan implementation. Non-governmental stakeholders and Conservation NGOs[2] may execute their own MOA(s) that will outline participation in the Advisory Committee and the associated roles and responsibilities.

2.3.2 Monitoring

Progress on implementation of the Master Plan will be reported annually. Monitoring requirements for each Master Plan element are described in their respective sections. Monitoring data will be incorporated into an Annual Report by an independent Master Plan Coordinator. Monitoring elements are summarized in Table 2-1.

[2] Non-Governmental Organizations

1 **TABLE 2-1. SUMMARY OF MONITORING ELEMENTS FOR THE OWENS LAKE MASTER PLAN**

REPORTING MECHANISM	MONITORING PARAMETER
Dust Control	
A monitoring summary will be provided to the Master Plan Coordinator by LADWP.	Progress on development and approval of new and modified BACM. Implementation of operations and maintenance activities. Implementation of dust control transitions. Implementation of proactive immediate response stabilization measures.
Water Resources	
A monitoring summary will be provided to the Master Plan Coordinator by LADWP.	Progress toward the water conservation target.
Habitat	
An annual monitoring report will be provided to the Master Plan Coordinator by LADWP.	For monitoring parameters, methods, and frequency, refer to Table 6-10, Habitat Parameter Monitoring. For wildlife validation monitoring, refer to Section 6.5.2, Wildlife Monitoring for Validation. Also refer to Section 6.5.3, Potential Additional Monitoring.
Public Access, Education, and Recreation	
A monitoring summary will be provided to the Master Plan Coordinator by the Interpretive Plan authors and/or entities that implement elements of the Interpretive Plan.	Progress on development of the Interpretive Plan, including those aspects that address cultural resources. Implementation of Interpretive Plan elements, such as trails and kiosks. Estimated number of participants in tours and educational activities based on reports from LADWP, Eastern Sierra Audubon, and the IAVC. Estimated number of hunters based on reports from LADWP Operations staff.
Open Space and Scenic Amenities	
A monitoring summary will be provided to the Master Plan Coordinator by project proponents.	Summary of the Contrast Rating System evaluation, including a description of minimization and mitigation measures, if identified. Implementation of minimization and mitigation measures, if identified.

Cultural Resources	
Not applicable	There is no monitoring associated with this plan element because monitoring protocols are already required by applicable laws and regulations. Progress on the development and implementation of the Interpretive Plan, including those aspects that address cultural resources, will be reported to the Master Plan Coordinator by the Interpretive Plan authors and/or entities that implement elements of the Interpretive Plan.
Renewable Energy	
Not applicable	There is no monitoring associated with this plan element.
Grazing	
A monitoring summary will be provided to the Master Plan Coordinator by LADWP and the Commission.	Monitoring for this plan element includes annual reporting from LADWP and the Commission regarding the status of existing leases and whether the lessees are following a Grazing Management Plan.
Mining	
Not applicable	There is no monitoring associated with this plan element.

2.3.3 Schedule and Funding

The Master Plan does not propose specific projects for implementation; therefore, a schedule of implementation has not been developed. However, habitat monitoring will begin immediately, and in the first three years the Habitat TAC will evaluate and recommend refinements to the HSM. In the first few years, the Advisory Committee also will evaluate funding opportunities for development of the Interpretive Plan. Other activities, such as operations and maintenance of the dust control project or transitions to different BACM, will occur over time, as funding and other resources allow.

Project proponents are responsible for all elements associated with implementation of their projects, including funding. When project proponents develop Work Plans, the Work Plans must identify current and potential funding for all associated project elements. Project proponents may fund these activities directly through their own budgets or in-kind services, seek grant or private foundation funds, or seek Federal or State funds. The Master Plan Coordinator position will likely be funded on pro-rated project fees and grants.

3.0 Physical and Biological Conditions in the Plan Area

This section provides background information on the physical conditions in the plan area. This information is important because physical site conditions affect site selection, management, and sustainability of projects on the lake. The following sections describe the climate, hydrology, geology and soils, and biological resources in the plan area.

3.1 Climate

The Sierra Nevada rise over 9,000 feet above Owens Lake and cast a rain-shadow, thereby preventing many wet air masses from reaching the valley. The plan area averages about 10 centimeters of rainfall per year, with the greatest amount falling November through April. Approximately half of the winter rainfall is contributed from Pacific air masses (Stuckless and Levich 2007). Summer is the driest season and when there is precipitation, it occurs as localized thunderstorms. Thunderstorms increase the flood potential in the area because of the possibility of a greater amount of rainfall in a relatively short period (District 1998).

Air temperatures range from 18°F to 70°F in winter and 44°F to 102°F in summer. Winds at Owens Lake are a significant meteorological force and can exceed hourly average speeds of 40 miles per hour (mph), as measured at a height of 32 feet. Typically, strong southern winds are formed from storm fronts moving through the valley, and strong northerly winds occur from the storms passing. Wind patterns can be complex because local eddy effects can reverse wind directions from the west to the east side of the valley (District 1998). These strong wind patterns can cause significant dust storms, especially during the spring and fall months.

3.2 Hydrology

Owens Lake has existed for the past 750,000 years as part of the Owens River cascade, a series of interconnected lakes and streams. This chain of lakes formed during the Pleistocene epoch, about 1.8 million years ago. The lakes spanned from Mono Lake (which was part of a much larger lake known as Lake Russell) in the north to Manley Lake, the southeastern-most of the chain, in what is now Death Valley. Shoreline fragments and beach stratigraphy indicate that Owens Lake reached its highest Pleistocene level of about 3,880 feet above MSL around 15,000–16,000 years ago, during the Last Glacial Maximum. Owens Lake survived into the late Holocene (the last 11,000 years) as a fluctuating saline lake. The surface extent of the lake has been diminishing since that time. About 3,000 years ago, uplift processes in the Coso Range eliminated flow out of Owens Lake, and flow was further decreased due to the drying trend beginning with the end of the Pleistocene glacial period. Once the basin became closed, water loss could only occur through evaporation from surface waters, bare soil, and transpiration from plant photosynthesis. The internal drainage, combined with the arid environment, created the highly saline condition of remaining surface brine waters and playa soils at Owens Lake (District 1998).

Prior to 1913, Owens Lake was an alkali lake and received surface water inflow from the Owens River as well as numerous perennial streams and creeks from the Sierra Nevada. Five perennial streams on the eastern side of the Sierra Nevada discharged into Owens Lake, including Bradley, Ash, Cottonwood, Carroll, and Lubken. Inflows from the east side of the lake, from the Inyo and Coso Ranges were, and remain, minimal. The historic shoreline is considered 3,597 feet above MSL, as recorded in 1878.

From the 1860s to the early 1900s, withdrawals from the Owens River for agricultural purposes substantially reduced surface water inflow to the lake. Extensive irrigation projects compounded by drought caused the lake level to drop to as low as 3,565 feet in 1906. However, by 1912, as the drought ended, the level had risen to 3,579 feet (District 1997b; 1998).

In 1913, the City of Los Angeles completed the Los Angeles Aqueduct and began diverting water from the Owens River. By the 1920s, Owens Lake had shrunk to a small hypersaline brine pool approximately 25 square miles in size and a few feet deep. Demand for exported water increased as Los Angeles grew and diversions for irrigation continued, mainly on City-owned property. These factors resulted in Owens Lake becoming virtually dry by 1930, its level dropped to an elevation of 3,554 feet, leaving only the brine pool (Sapphos 2007).

3.2.1 Surface Water and Water Quality

Current surface water inflow to the lake is primarily from the Lower Owens River, Shallow Flood and Managed Vegetation dust control measures, and seeps and springs along the shoreline. Most of the perennial creeks from the Sierra Nevada are diverted into the Los Angeles Aqueduct prior to reaching Owens Lake. Three streams (Walker, Olancha, and Cartago) may discharge into Owens Lake during high runoff, but they are normally consumed by irrigated agriculture or they are completely infiltrated as they flow over the alluvial fan. In general, the flow pattern of surface water is from the shoreline, across the playa, and toward the brine pool (District 2009; LADWP 2010).

Water quality in the Owens River fluctuates seasonally, with the best water quality conditions in the spring months and the poorest in the fall months. Prior to diversion of the Owens River in the 1920s, the water in Owens Lake was estimated to have an average Total Dissolved Solids (TDS) on the order of 100,000 milligrams per liter (mg/L). For comparison, the average TDS of seawater is 35,000 mg/L. The average TDS in the Owens River is 300 mg/L (Sapphos 2007). The brine pool has a TDS range of 250,000 to 470,000 mg/L, depending on seasonally variable freshwater input. When storm flows partially refill the lake, TDS concentrations range from 120,000 mg/L to over 200,000 mg/L.

Most or all the water used for dust control is evaporated from the water surface, bare soils, or during plant transpiration. The residual minerals resulting from the evaporation of freshwater are insignificant compared with the underlying extremely high salinity of existing surface waters,

groundwater, and soils. In addition, low concentrations of fertilizers, soil amendments, and irrigation system treatment additives can result from the Managed Vegetation dust control measure (District 2009; LADWP 2010).

Alkaline evaporative salts have concentrated a number of silicates and minerals (derived from local alluvial material) in surface water on the lake. This includes elevated concentrations (in comparison to screening levels for determining the potential of ecological risk) of the following: aluminum, arsenic, barium, boron, iron, lead, lithium, molybdenum, silver, and vanadium (District 2009). Annual monitoring is required to evaluate whether bioaccumulation of potentially toxic substances is occurring and to determine the potential for exposure to wildlife. Concentrations of samples from water, sediment, algae, invertebrate tissue, and non-viable bird eggs are compared to ecological toxicity screening values. A subset of locations in Shallow Flood areas is sampled annually (LADWP 2010). Results indicated that although some trace elements exceed ecological screening values, there is no apparent toxicity to the birds studied (Garcia and Associates 2009; LADWP 2010).

3.2.2 Groundwater

In general, the groundwater system of Owens Lake is characterized by having water levels close to the lakebed surface and high salinity. However, groundwater depth and salinity are variable. The depth of groundwater generally increases from the shoreline and wetland areas out onto the lakebed. The highest groundwater areas and lowest salinities are generally found near the historic shoreline and near the Owens River Delta. Wetland areas tend to show greater seasonal and diurnal variability than sites located on the playa due to higher evapotranspiration demands within the vegetated areas (District 2009). Salinity tends to increase across the playa toward the brine pool.

The flow of groundwater is more complex than the flow pattern of surface water. The general pattern of groundwater flow is from the shoreline toward the brine pool; however, in some areas local recharge zones develop around springs, seeps, and abandoned flowing wells. During extended dry periods, flow from the brine pool toward the playa may develop.

Regional confined aquifers appear to recharge the hydrologic system by upward movement through clay aquitards and by preferential flow along structural pathways, such as faults and fractures. This recharge gradient is driven by the high evaporation demands of the system. Additionally, groundwater flow from the surrounding alluvial fans recharges the system and supplies many of the springs and seeps that daylight near the historic shoreline.

The deepest groundwater is found in the southeastern part of the lake in the area dominated by deeply fractured clay soils in what is called the desiccated clay zone. When water levels are the lowest, groundwater flow gradients are created within the desiccated clay zone such that lateral flow comes from the historic shoreline and from the brine pool (District 2009).

3.2.3 Seeps and Springs

Springs and seeps occur along the perimeter of the lake at elevations between 3,560 and 3,600 feet, ranging from distinct point sources to broad diffuse seep zones. Spring and seep areas coincide with three factors: (1) the topographic break where lower alluvial fans intersect the surface of the playa; (2) the change from more permeable unconsolidated alluvial sediments to less permeable lacustrine sediments composed primarily of fine-grained deposits of clay and silt; and (3) faults and fractures that allow upward vertical flow from deep confined regional aquifers (District 2009; LADWP 2010).

Natural springs include perennial, seasonal, ephemeral, and uncontrolled flowing artesian wells. Many of the perennial and seasonal springs display cyclical patterns in flow rate, groundwater levels, and temperature related to seasonal changes. Ephemeral springs have inconsistent, low-volume flow and a diffuse nature. Uncontrolled flowing artesian wells have generally stable flow rates, temperatures, and salinities. The sites that respond to seasonal timing or large precipitation events are expected to have a relatively shallow source that is more sensitive to short-term changes. Conversely, sites with relatively stable flow rates and temperatures are thought to have a deeper source, which is less variable over time and less sensitive to climatic cycles and conditions. Water that discharges from the seeps and springs infiltrates into the lakebed sediments and recharges the shallow groundwater beneath the lakebed (District 2009).

3.2.4 Brine Pool

The brine pool is the lowest portion of the basin and begins at the high water mark of 3,553.55 above MSL, as defined by the U.S. Army Corps of Engineers. The brine pool is offset to the west and west-central portion of the lakebed due to fault activity along the Owens Valley Fault Zone, which runs along the western edge of the Owens Lakebed. Water depths within the brine pool range from zero to several feet, depending on the location and the time of year. The bottom of the brine pool is commonly covered with a crystalline salt precipitate crust, and the concentration of dissolved solids can be as high as 77 percent by weight (Sapphos 2003). Surface water flow into the brine pool comes primarily from the Owens River, Cottonwood Springs, and occasionally Cartago Creek. Additional surface recharge comes from numerous small springs along the western shore and from occasional flash flood events from the Inyo and Coso Mountains on the east and southeast sides of the lake, respectively (District 2009; LADWP 2010).

3.2.5 Playa

The playa area is the portion of the lakebed that has an elevation above the brine pool (3,553.55 feet above MSL) and below the vegetated shoreline areas (~3,600 feet above MSL), excluding the Owens River Delta. The playa area is largely unvegetated and consists of a mix of lacustrine clay, silt, and sand deposits with a salt crust generally developed at the surface. Groundwater levels

within the playa area range from zero (at the surface) to more than 25 feet below the surface (District 2009).

3.3 Geology and Soils

The Owens Lakebed is at the southern end of the Owens Valley, a north-south trending valley bounded by the Sierra Nevada to the west and the Inyo and White Mountains to the east. The Valley is approximately 80 miles long and 15 miles wide. The southern end of the Owens Valley is bounded by the Coso Mountains. The floor elevation of south Owens Lakebed is 3,550 feet above MSL, rising gradually to the north near Bishop to 4,100 feet. The northern portion of the lake is relatively horizontal, while the central portion of the lake dips significantly to the south, likely due to faulting and basin structural subsidence. At any point on the historic shoreline, there is little topographic relief to the lowest portion in the center of the lake, generally changing about 50 feet (District 1997a).

3.3.1 Fault Zones

Owens Valley is a fault-controlled valley, the result of uplift of the surrounding mountain blocks and subsidence of the valley floor along several faulting complexes (Orme and Orme 2008). The valley includes several geologically active faults, capable of generating earthquakes of a magnitude of 8 or greater on the Richter scale. Four major fault zones occur near the Owens Lakebed. Three fault zones trend roughly north-south and a fourth northeast-southwest trending fault zone is present along the southern side of the Owens Lakebed. The westernmost fault zone exists along the east side of the Sierra Nevada and it includes the Sierra Nevada Fault and the Independence Fault. This fault zone is not continuous along the entire length of the Sierra front, but it is a complex system of faults and down-dropped blocks.

In the Owens Lake area, the Sierra Nevada Fault displaces valley-filling sediments more than 2,000 feet with a gradually decreasing offset to the north. The second fault zone is the Owens Valley Fault, which is in the middle of Owens Valley north of the Alabama Hills and extends southward along the west side of Owens Lake, terminating near the town of Olancha. This fault zone may include the presence of a large fault block under the center of the lake approximately 4,000 feet below the surface. Near the Owens River Delta, a splay of the Owens Valley Fault extends to the west, dividing the lakebed into two main structural blocks.

The eastern side of Owens Valley is bounded by a fault zone along the western margin of the Inyo Mountains, which exhibits a total downward displacement of 5,000–7,000 feet. On the northern side of the Coso Mountains, faulting connects the Inyo Mountain Fault Zone on the east to the Owens Valley Fault Zone to the west (District 1997a).

3.3.2 Sediments

The valley consists of unconsolidated and moderately consolidated Quaternary sedimentary material and minor interstratified Quaternary basaltic volcanics deposited on top of a basement of crystalline granitic and metamorphic bedrock. The sedimentary fill material in the valley is primarily a mix of alluvial fan, fluvial, and lacustrine deposits (District 1997a). These deposits formed over the past 750,000 years, a result of alternating periods of high-volume and low-volume runoff from the east-draining slopes of the Sierra Nevada, which correspond with glacial and interglacial periods (Stuckless and Levich 2007). Lesser inputs were contributed from the drier White, Inyo, and Coso Mountains (District 1997a). Today, erosional and depositional forces contribute to the sediment in the valley.

The sediments in the lakebed are poorly sorted, fine to very coarse, heterogeneous across the playa, and with depth. The upper 1,000–1,500 feet are predominately thick sequences of lacustrine silty clay deposits with interstratified deposits of sands and sandy clays. The sand-rich deposits are from deltaic, alluvial, and fluvial processes in a shallow water environment, while the clay-rich sequences represent deeper water lake deposits. Alluvial sediments are typically deposited during high-energy, debris-flow events; therefore, they are locally heterogeneous.

Alluvial fans occur around the lakebed, join together laterally, and interfinger with sedimentary deposits on the valley floor. Depths to water are variable in the alluvial fans. Confining clay units interbedded with alluvial sediments help to create the artesian aquifers that occur in the alluvial fans and lakebed.

3.3.3 Soils

Soil conditions in the plan area present varying limitations for management on the lake due to the physical and chemical properties of the soil, as well as more unique characteristics, such as surface crusts. For example, a site must have the appropriate soil texture, soil salinity, soil boron, bearing capacity, and crust thickness to support vegetation. A thorough soils evaluation must be completed for any project on the lake. The following section provides an overview of some of the major physical and chemical properties of soils in the plan area, and it also describes some other key soil characteristics, including surface crusts, soil stratification, hardpan layers, oolitic sands, and large soil cracks. Appendix C includes a summary of mapped soil units.

Major physical and chemical properties of soils in the plan area include the following:

- **Soil textures** on the playa range from coarse sands to very low-bulk-density clays. The more coarse-textured soils are generally located near the inflow of the Owens River and finer-textured soils are generally located farther away. Soil texture affects drainage, reclamation, and irrigation.

- The **bulk density** of finer-textured soils on the lakebed is low. Low bulk density increases susceptibility to settling and compaction, particularly from vehicular traffic, application of irrigation water, and drainage.
- The **bearing capacity** of a soil is primarily dependent on groundwater levels and the integrity of the surface crust, and somewhat dependent on the subsurface soil conditions. In general, depth to groundwater and bearing capacity decreases from the shoreline to the brine pool. High bearing capacity provides good accessibility and constructability, whereas a low bearing capacity results in poor accessibility.
- The **salinity** of lakebed soils is very high and can contain up to 13,200 milliequivalents per liter of sodium (CH2M HILL 2001). Salt levels are generally uniform throughout the lakebed and independent of soil type. The soils must be adequately reclaimed for vegetation to establish. Reclamation includes leaching of salts, boron, and other soil constituents that hinder vegetation establishment and growth.
- **Cation Exchange Capacity** (CEC), or the degree to which a soil can adsorb and exchange cations, is generally low for lakebed soils. Mineral nutrient availability for vegetation decreases with decreasing CEC, which can be a limiting factor for vegetation establishment.
- Lakebed soils are extremely **alkaline** (SWWI 2001), with a pH in the range of 9 to 11. Critical nutrients for vegetation become increasingly insoluble in alkaline soils and are unavailable to plants, which can be a limiting factor for vegetation establishment.

These physical and chemical properties can result in the following unique conditions:

- **Surface crusts**, or episalic horizons, are a major component present on most soils of the lakebed. Crust thickness can range from 0 to 20 inches and is composed of 10 to 70 percent salt. The rigidity of the surface crust can vary from friable and soft to cemented and hard. A thick, hard episalic crust presents several challenges for management on the lake. The crust is difficult to break even with the use of heavy equipment.
- **Stratified soils** are present throughout the lakebed and textural changes can be abrupt, from coarse aeolian sand to heavy clay soils. Abrupt soil stratification can cause issues with drainage and water movement through the soil. The soil textural change can act as a limiting layer, preventing percolation of water downward and causing lateral movement of water across the finer-textured, subsurface soil layer (CH2M HILL 2001). Soil stratification is more prevalent in the loamy and sand textured soils of the lakebed. Stratified layers may present potential challenges for management on the lake due to perched water tables, a decrease in drainage capability, and variable water distribution within the soil profile (CH2M HILL 2003).

- **Subsurface hardpan layers,** or impenetrable layers, are located in the northern and southern areas of the lakebed. Depth and thickness of hardpan layers are variable. A shallow hardpan layer could present problems for vegetation by restricting root development, thereby reducing plant growth and vigor. Hardpan layers can also impact management of dust control facilities by decreasing drainage capability and increasing the difficulty of excavation or tillage (CH2M HILL 2003).

- **Oolitic sands** form when mineral deposits develop concentric layers around a particle from current or wave action, forming spherical concretions 0.25 to 2 millimeters in diameter. The chemical composition of oolitic material on the lakebed was dominated by sodium and potassium cations and carbonate, chloride, and sulfate anions. Oolitic material was found in some thick episalic horizons and in soils with common bedded soil stratification. The presence of oolitic material in the soil profile can pose a challenge for management because of the potential for soil subsidence from the removal of slowly soluble salt material, and slower soil reclamation for vegetation (CH2M HILL 2003).

- Areas within the southern portion of the lakebed exhibited **large soil cracks** on the soil surface. In the 2003 soil investigation, it was observed that if surface cracks were present in an investigation area, extensive large subsurface cracks were present as well (CH2M HILL 2003). The subsurface cracks were observed to extend at least 10 feet deep and likely continue beyond the excavation limit. The cracks were often lined with thin oxide material or coarser textured material. Large soil cracks can pose challenges for management of dust control facilities by creating preferential flow paths for water movement. For example, irrigation water can be lost through the cracks and be unavailable for vegetation.

3.4 Biological Resources

The following subsections describe existing biological resources within the six dominant habitat types found in the plan area, including areas within and outside of the dust control project. For each habitat type, the associated invertebrates, herpetofauna, avifauna, and mammals are described. This section is based on detailed reports and surveys associated with the dust control project, including the Owens Lake Habitat Management Plan (LADWP 2010) and the 2010 Owens Lake Monitoring Report (LADWP 2011). The six dominant habitat types in the plan area include:

- Playa
- Shallow Flood
- Transmontane Alkali Meadows surrounding seeps and springs
- Managed Vegetation (alkali meadow)
- Riparian areas surrounding the lower Delta area and creeks

- Upland scrub around the playa

3.4.1 Existing Playa Habitat

Prior to implementation of the dust control project, the playa was relatively barren. Only sparse vegetation of saltgrass (*Distichlis spicata*) and occasional shrubs, such as greasewood (*Sarcobatus vermiculatus*), occur on the playa within isolated spring mounds. Surveys completed prior to the dust control project did not identify any listed or locally important plant species within areas that have become part of the dust control project (District 1997a, CH2M HILL 2000, Sapphos 2003, Sapphos 2008).

Some areas of the playa support diatoms and cyanobacteria, which lay dormant on dry playa. When wet, these organisms become active and provide food for invertebrates, which in turn support other wildlife species, mainly birds (District 1997a, LADWP 2010).

INVERTEBRATES

During pre-dust-control implementation surveys in 1995 and 1996, several species of brine and shore fly were identified where water discharged onto playa from springs and streams, including *Ephydra hians, E. auripes, Lamproscatella (Halosccatella) salinaria, Ptilomera occidentalis*, and *Paracoenia* sp. (District 1997a). In playa areas where shallow water ponds, other invertebrate species were collected, including midges (Family Chironomidae), water boatmen (Family Corixidae), water scavenger beetles (Family Hydrophilidae), and backswimmers (Family Notonectidae).

Approximately 81 aquatic invertebrate taxa were identified in samples from aquatic habitats adjacent to and on the playa before dust control began. Seasonally moist or saturated playa areas supported four species of tiger beetles: Owens Valley Tiger Beetle (*Cicindela tranquebarica inyo*), Slender-girdled Tiger Beetle (*C. tenuicincta*), Alkali Flats Tiger Beetle (*C. willistoni psudosinilis*), and Wetsalts Tiger Beetle (*C. haemorrhagica*) (District 1997a). Tiger beetles are associated with damp areas for their burrowing and insects for their food source. Both larvae and adult tiger beetles prey on small insects and can complete their entire life-cycle on the playa. While Wetsalts Tiger Beetle is abundant and widespread throughout the southwestern U.S., the other three species are limited and patchy in their distribution in the west. Owens Valley Tiger Beetle has been found on wet, unvegetated playa, in close proximity to Transmontane Alkali Meadow.

HERPETOFAUNA

There is limited description of the herpetofaunal community associated with playa habitat prior to implementation of the dust control project. Sensitive species were discussed in baseline reports, but no sensitive species were found in playa habitats during surveys (District 1997a). There are no amphibians known or expected to use barren playa habitats. Diurnal lizards and snakes in adjacent shrub communities may venture on to the barren playa, but they are not expected to be found far

from vegetated areas. Species that may be found on the playa adjacent to shrub communities include Zebra-tailed Lizard (*Callisaurus draconoides*), Side-blotched Lizard (*Uta stansburiana*), Western Whiptail (*Aspidoscelis tigris*), Coachwhip (*Masticophis flagellum piceus*), and Gopher Snake (*Pituophis catenifer deserticola*).

AVIFAUNA

Prior to implementation of the dust control project, dry playa areas were found to support few bird species, primarily Killdeer, Snowy Plover, and Horned Larks. On the dry playa, optimal breeding habitat for the Snowy Plover is within one-half mile of springs, seeps, or outflows that support invertebrate production.

Seasonally wet playa areas are used by a variety of water birds. Shorebirds, gulls, and waders were observed during spring and fall migration, or they used the areas as a wintering location (District 1997a). The playa generally did not support waterfowl populations before dust control, except seasonally near seeps and springs, and at the north end of the brine pool in winter, where water from the Owens River flowed.

MAMMALS

Baseline observations by the District concluded that the pre-dust control playa areas offered few resources for mammals. Small mammals such as pocket mice and deer mice are not expected to use open playa due to the lack of cover and food resources. Medium and large mammals may use the edges of the playa as a travel corridor but are not expected to use open playa due to a lack of resources. Only two bat species, the Spotted Bat (*Euderma maculatum*) and Yuma Myotis (*Myotis yumanensis*), were detected over playa habitats. Due to the limited insect resources of barren playa, bats detected in playa habitats may have simply been en route to other more productive habitats (LADWP 2010).

3.4.2 Existing Shallow Flood Habitat

Most Shallow Flood areas have little terrestrial vegetation due to soil salinity and saturation. However, on the northeastern edge of the dust control project and on areas scattered throughout on higher ground, saltgrass and bulrush (*Schoenoplectus* spp.) have established where soil and drainage conditions are favorable. Algae also grow in many of the Shallow Flood cells, depending on salinities.

Shallow Flood varies in salinity, water depth, vegetation, and distance from other habitats throughout the dust control project. Depending on these habitat variables, Shallow Flood can provide habitat for a variety of wildlife according to their specific needs. The following sections describe the wildlife found within Shallow Flood habitat.

INVERTEBRATES

Since dust control was implemented, no focused invertebrate surveys have been conducted. However, within Shallow Flood, it generally has been observed that the composition of the aquatic invertebrate community varies with the salinity of the water such that invertebrate species richness is highest in low-salinity areas, while invertebrate production of a few species is highest in moderate to high-level salinity ponds. Brine flies have become the most abundant aquatic invertebrate with the initiation of Shallow Flood. These aquatic invertebrates provide a large forage base for various waterbirds that use the dust control project (LADWP 2010). Two brine fly species (*E. auripes* and *E. hians*) can be found around the shore in virtually every Shallow Flood cell with water salinity that ranges from brackish (Ec 5-25) to saline (Ec 25-100).

Brine shrimp (*Artemia* sp.) have been observed in at least eight dust control cells with ponded saline water of Ec 25-100 (LADWP 2010).

Since the implementation of Shallow Flood on the playa, the four species of tiger beetles observed previously in moist playa, Owens Valley Tiger Beetle, Slender-girdled Tiger Beetle, Alkali Flats Tiger Beetle, and Wetsalts Tiger Beetle, have benefited from the associated increase in shallowly flooded habitat. Wetsalts Tiger Beetle remains the most abundant and widespread species (LADWP 2010).

Other salt-tolerant invertebrate species that are abundant in Shallow Flood include water boatmen (*Trichocorixa reticulata*), two hydrophilid beetles (*Tropisternus sublaevis* and *Helophorus* sp.), a Dysticid beetle (*Hygrotus masculinus*), a biting midge larvae (*Culicoides* sp.), a Hydraenid beetle (*Ochthebius interruptus*), and true flies in the family Dolichopodidae (*Hydrophorus* sp.). Zooplanktonic organisms occur in high-salinity cells within Shallow Flood and include water fleas (*Daphnia major*) and copepods (*Leptodiaptomus connexus*), which can produce dense populations. Larvae of mayflies (*Callibaetis* sp.) and damsel flies (Family Coenagrionidae) have also been found in Shallow Flood areas with lower salinities (LADWP 2010).

HERPETOFUANA AND FISH

Generally, Shallow Flood areas are not suitable for reptiles; however, lizards have been observed utilizing roads in some areas where there is artificial cover, usually in the form of rip-rap or some infrastructure. Immigration of three lizard species, Desert Spiny Lizard (*Sceloporus magister*), Side-blotched Lizard, and Long-nosed Leopard Lizard (*Gambelia wislizenii*), has been observed on roads adjacent to the created Transmontane Alkali wetlands in Shallow Flood at area T30-1. Other lake areas that are colonized by lizard species with more general habitat requirements generally are adjacent to scrub habitat (LADWP 2010).

To date, no fish species has been found within the dust control project because the depth of water and/or salinity is limiting for fish.

AVIFAUNA

Since the implementation of Shallow Flood, the number and diversity of birds using the former playa has increased dramatically. As expected, ponded water in the Shallow Flood areas resulted in many more waterfowl and open water species using Owens Lake than were present on the barren playa. The majority of migrant waterfowl and open water species are using the Shallow Flood habitat during spring and fall periods. Migrating shorebirds have also increased in number and diversity of species, and shorebirds that breed at Owens Lake have increased in number, especially American Avocets. Snowy Plover, a State Species of Special Concern, also has increased on the lake since the initiation of Shallow Flood.

The following order describing avifauna groups on Owens Lake is phylogenetic: waterfowl; grebes and cormorants; herons, egrets, ibis; raptors; rails; shorebirds; gulls and terns; and perching birds.

Waterfowl

Shallow Flood cells on the playa are used regularly by migrating waterfowl, including geese, dabbling ducks, and ducks that may dive when foraging (non-dabbling ducks). Dabbling ducks represent the largest proportion of Owens Lake waterfowl, and one species, Northern Shoveler (*Anas clypeata*), accounts for most of the observations, especially in fall where they may comprise over 90 percent of all waterfowl species using the project area (LADWP 2010). Ruddy Ducks are the dominant non-dabbler species present, and diving duck species in general comprise a small component of all waterfowl that occur at Owens Lake. Food resources may be a limiting factor for some duck species (LADWP 2010). Plant-based food sources are limited in most Shallow Flood cells while animal-based food sources, such as brine flies and other invertebrate species, are abundant. Studies of Northern Shoveler and Ruddy Duck show a high amount of animal matter in their diet; therefore, the lack of plant-based foods is likely not limiting to these two species. Waterfowl are less abundant during non-migrating periods of the year, with the fewest present during summer. The ducks documented in mid-summer likely represent a mix of breeding and non-breeding individuals (LADWP 2010).

Grebes and Cormorants

The most abundant grebe species at the lake is the Eared Grebe, which are most abundant during spring and fall migration. Eared Grebes use shallow saline lakes and salt ponds throughout their range. Grebes are known to eat a variety of aquatic invertebrates by skimming or pecking food from the surface of the water and other surfaces, including rocks and vegetation. Brine shrimp can comprise a large proportion of their diet at saline lakes, and brine flies can be an important component of their diet seasonally, when foraging near shore. Double-crested Cormorants and other grebe species are encountered infrequently (LADWP 2010).

Herons, Egrets, and Ibis

Due to the lack of fish and larger aquatic vertebrate prey, this group of birds is relatively uncommon at Owens Lake. White-faced Ibis, which rely more heavily on aquatic and moist soil invertebrates, are found somewhat regularly in Shallow Flood cells supporting some emergent vegetation, primarily in spring and fall (LADWP 2010). On occasion, Snowy Egret, Black-crowned Night Heron, and Great Blue Heron have been observed within Shallow Flood areas, usually in areas adjacent to springs where mosquito fish are present.

Raptors

Raptors are encountered infrequently at the lake. However, since implementation of Shallow Flood, Peregrine Falcons are a more common occurrence at Owens Lake. The conditions on the lake offer ideal conditions for Peregrine Falcons to hunt, with vast open areas for pursuit and capture among the large number of waterbirds (LADWP 2010). Northern Harrier and Prairie Falcons are the next most frequently encountered raptor species in the dust control project.

Rails

American Coot is the only rail species regularly encountered in Shallow Flood areas (LADWP 2010). Other rail species prefer areas with more wetland vegetation than currently exists.

Shorebirds

Prior to dust control, shorebirds were limited to use of the playa around seeps and springs. With the implementation of Shallow Flood, the use of Owens Lake by migrant and breeding shorebirds has increased substantially. Currently, LADWP is required to maintain 1,000 acres of habitat for shorebirds within the dust control project. An additional 145 acres of shorebird habitat is required within Shallow Flood cells near the Dirty Socks spring. The Snowy Plover, a State Species of Concern that breeds at Owens Lake, is the focus of several mitigation measures that have been identified in environmental documents prepared for the dust control project. These mitigation measures include a requirement that LADWP maintain a baseline population of 272 Snowy Plovers, and maintain 523 acres of Snowy Plover habitat in addition to the 1,000 acres of shorebird habitat.

Shorebirds generally feed on aquatic invertebrates located within the water column or in sediments. The Shallow Flood cells, particularly those cells with brackish to saline water that support abundant aquatic invertebrate populations, provide suitable foraging habitat for most shorebird species. The primary forage base available for shorebirds is the brine fly larvae, although other species occur and are likely fed upon by shorebirds. Water depths that vary from 1 cm to 20 cm and provide a variation in microtopographic relief provide habitat for a wide variety of shorebird species. The majority of cells that support high numbers of shorebirds are Shallow Flood cells. To date, the relationship between water salinity and shorebird use within Shallow Flood cells has been non-linear but has suggested that shorebird use is highest in areas that can be classified as brackish to saline. Use by shorebirds is highest in spring and fall when common migrants such as

American Avocet and Least and Western Sandpipers are present. Wilson's and Red-necked Phalaropes are common fall migrants. Shorebirds known to nest or have potential to nest in the dust control area include American Avocet, Black-necked Stilt, Snowy Plover, Killdeer, and Long-billed Curlew. The most abundant breeding shorebirds at Owens Lake are American Avocet, Snowy Plover, and Black-necked Stilt (LADWP 2010).

Snowy Plover at Owens Lake are part of the interior nesting population, which are reproductively isolated from the Pacific coast population. The population of adult Snowy Plover increased from lake-wide survey estimates of 112 and 167 in 2000 and 2001 to a peak of 658 in the 2004 lake-wide survey. The 2007 survey showed a slight decline from the peak number of plovers counted. This decline in adult numbers appears to have occurred in the coastal population as well. Inland populations winter with coastal populations, and it has been speculated that they may have experienced high levels of mortality along with the coastal population during the cold winter. Since 2007, the Owens Lake population again increased (LADWP 2010).

In 2010, there was a slight decline from 2009 levels, mainly from the North Region in the Brine Pool Transition Area, which is attributable to survey conditions in this area and in general across the survey period. The numbers of Western Snowy Plovers in 2010 are within the range of the past six years, and numbers of adults are 104% of the average from 2002–2010 (LADWP 2011).

Snowy Plover nesting period has lengthened since the implementation of Shallow Flood. Nesting historically was initiated in mid-March, with the majority of nests found in May and June and only a few active nests in July. With the water from Shallow Flood and associated resources, nesting currently is observed in July (LADWP 2010).

Gulls and Terns

The use of Owens Lake by gulls and terns has also increased in response to Shallow Flood dust control; however, terns are observed only infrequently due to a lack of suitable food resources (e.g., fish) for most species. The most abundant gull in the region is the California Gull, and this species is now present in large numbers from spring through fall. The Shallow Flood areas offer abundant food resources and open habitats preferred by California Gulls. This species nests colonially at large interior freshwater or saline lakes, and generally locates nests on islands or islets that offer some protection from terrestrial predators. California Gulls have attempted nesting at Owens Lake since at least 2004. However, it is not known whether any young have successfully fledged. California Gull nests at Owens Lake have been found along roads and berms, or on small islands within some of the dust control cells. These sites offer little protection from terrestrial predators, and nest failure due to predation appears to be substantial. Like most other gull species, California Gull forage opportunistically, and their diet is heavily influenced by the availability of food items. At saline lakes in the Great Basin, this species is known to feed on brine flies and brine shrimp. This species may also eat the young and eggs of other birds, including its own kind, as well as carrion,

trash, and small rodents. Because of the potential effect on nesting shorebirds, and specifically on Snowy Plovers, the establishment of a large gull colony, or even the persistent presence of California Gulls throughout the plover breeding season at Owens Lake, is a management concern. However, breeding season numbers of both Snowy Plovers and American Avocet have generally been higher than before gull numbers increased (LADWP 2010).

Perching Birds

Perching birds are a small component of the avifauna. The most frequently encountered species year-round are Horned Lark and Common Raven. The Common Raven is a management concern because it is a known predator of Snowy Plover eggs and chicks, and of the eggs and chicks of other shorebirds (LADWP 2010). Other common perching birds include American Pipit, which can be encountered during winter and in migration. Swallows and swifts forage over the dust control ponds during spring and fall migration. The meadow and wetland vegetation in some dust control cells attract species such as Marsh Wren, Savannah Sparrows, Western Meadowlark, and Red-winged and Yellow-headed Blackbirds; nesting has been observed for some of these species.

MAMMALS

The response of mammals to implementation of Shallow Flood has not been documented. The system of roadways and berms that currently exists provides access to areas of former playa, and Shallow Flood has attracted large numbers of birds and nesting birds that provide additional food resources for predators. Although no quantitative data exist, it can be assumed that predators of birds or bird eggs, such as coyote *(Canis latrans)*, and other carnivorous mammals, such as mink (*Mustela vison*), have benefited from the additional resources now available. Large numbers of nests (primarily California Gull nests) within Shallow Flood habitat are known to disappear within short time periods, supporting the hypothesis that carnivores are utilizing the resource (LADWP 2010).

Tule Elk (*Cervus elaphus nanodes*) have been observed in some Shallow Flood areas, primarily in cells at the northern end of the project area supporting more vegetation. Small mammal activity has been noted in some Shallow Flood cells where vegetation is increasing. It is likely that bats forage over dust control ponds, but Shallow Flood has not created roosting opportunities (LADWP 2010).

3.4.3 Existing Alkali Meadow Habitat

The playa is fringed by vegetation composed of Transmontane Alkali Meadow (TAM) and desert upland vegetation. The TAM plant community has been described by Holland (1986) and adopted by the District (District 1997a). TAM is divided into three sub-community types according to proximity to fresh water sources and levels of soil saturation and salinity: Saturated Alkali Meadow (SAM), Moist Alkali Meadow (MAM), and Dry Alkali Meadow (DAM). More recent classification systems could be applied to describe this community following the classification of *A Manual of*

California Vegetation (Sawyer et al. 2009). For purposes of the Master Plan, the historic designations of SAM, MAM, and DAM will be used for continuity.

VEGETATION

Saltgrass dominates the DAM habitat sub-type. The most common co-occurring plant species in DAM after saltgrass are alkali pink (*Nitrophila occidentalis*), shadscale (*Atriplex confertifolia*), Parry's saltbush (*Atriplex parryi*), and other occasional upland species. These other species generally occur on slight rises within the saltgrass clumps. The DAM sub-community type extends furthest onto the playa.

The DAM sub-community grades into MAM in areas closer to water sources. MAM is characterized by perennially moist soils, and in addition to saltgrass, other wetland species occur, such as yerba mansa (*Anemopsis californica*) and alkali pink. Additional species occur in low numbers, including three-square (*Schoenoplectus pungens* or *Schoenoplectus americanus*) and baltic rush (*Juncus arcticus* var *balticus* and *J. arcticus* var. *mexicanus*), which become more common with an increased hydrological connection to freshwater springs or seeps. In SAM areas, bulrush (*Schoenoplectus* spp.) becomes dominant with occasional presence of cattails (*Typha* spp.).

MAM and SAM communities are more diverse than DAM; the majority of these wetlands support at least two species with some SAM areas consisting of more than four species. Because of the greater plant diversity, SAM wetlands have greater vegetative structural diversity. The majority of MAM wetlands species generally have the same growth form and therefore exhibit little structural diversity (CH2M HILL 2002).

The wetland meadows of Owens Lake should not be viewed as depauperate ecosystems in terms of their plant species diversity. These wetlands are composed of plant communities that tend to be dominated by a few widespread species, with many taxa either rare throughout the area or locally abundant in a few localities (McLaughlin 2010). These less common species likely contribute to ecosystem function, as they may serve as specific hosts for insects, support viable populations of pollinators, provide important food sources for wildlife and birds, and promote ecosystem resilience.

Particularly rich wetland areas include the Delta area in the north and the TAM wetlands along the west and southwest edge of the lakebed. In 2006 within the northeast area of the dust control project, a diverse SAM/MAM wetland was created and managed in a portion of T30-1. In 2002, DAM vegetation was planted and is currently managed as dust control within approximately 3.7 square miles in the southern portion of the dust control project.

Based on recent reviews of literature and field observations within the overall plan area, the California Native Plant Society (CNPS) has identified several species potentially found within TAM habitat that fringe the lakebed, which should be considered for conservation. Appendix D includes

the CNPS Letter Report by McLaughlin (2010). The plant species that have been reported for Owens Lake wetlands that are potential conservation targets include Parish's Popcorn Flower (*Plagiobothrys parishii*) (CNPS List 1B.1), Owens Valley Checkerbloom *(Sidalcea covillei)* (CNPS List 1B.1), *Cleomella brevipes* (CNPS List 4.2), and *Spartina gracilis* (CNPS List 4.2). Parish's Popcorn Flower and Owens Valley Checkerbloom have been reported from the west side of the lake within the plan area near Willow Dip (McLaughlin 2010). These are the two plant species of highest conservation priority. CNPS List 4 is often called the "Watch List," indicating plants that are not currently rare or endangered but are sufficiently uncommon that they could become threatened by habitat loss or other causes. Short-pedicelled Cleomella (*Cleomella brevipes*) is fairly common in DAM and MAM communities at Owens Lake. *Spartina gracilis* (Alkali Cordgrass) is known from a collection made in October 1931 by R. Hoffman from "Olancha (border of Owens Lake)" (Appendix D [CNPS Letter Report by McLaughlin 2010]). More recent rare-plant surveys have found scattered individuals in pastures east of Olancha.

There are several other rare plant species that may occur around alkali meadow communities associated with seeps and springs or in the Delta-transition within the plan area (McLaughlin 2010). These are: *Calochortus excavatus* (Inyo County Star-tulip, CNPS List 1B.1), *Crepis runcinata* ssp. *hallii* (Hall's Meadow Hawksbeard, CNPS List 2.1), *Ericameria albida* (White-flowered Rabbitbrush, CNPS List 4.2), *Goodmania luteola* (Golden Goodmania, CNPS List 4.2), *Phacelia inyoensis* (Inyo Phacelia, CNPS List 1B.2), and *Thelypodium integrifolium* ssp. *complanatum* (Foxtail Thelypodium, CNPS List 2.2). Rare-plant surveys have failed to find any of these taxa to date. However, many taxa appear to be dispersing into the Delta from increased flows from the LORP, and into T30-1, as seeds carried in by the Los Angeles Aqueduct water delivered to Shallow Flood. All these additional rare plants occur upstream of Owens Lake and are potential colonists on its northern edge.

WILDLIFE

Many common invertebrate species are known to occur and forage in TAM. Insects encountered in TAM include dragonflies, Short-horned Grasshoppers (Family Acrididae), Hover Flies (Family Syrphidae) and Ground Beetles (Family Carabidae). Based on more recent visits by LADWP staff, it is also apparent that DAM can support large numbers of ants (Family Formicidae) and spiders (Order Araneae), with occasional large outbreaks of grasshoppers (Family Acrididae). The Alkali Skipper (*Pseudocopaeodes eunus eunus*) is a butterfly that was found in moist and dry alkaline meadows that supports its larval host plant (saltgrass), but adult Alkali Skipper need a nectar source. Alkali Skipper occur in a large but patchy distribution from eastern San Diego County through the Mojave Desert and Great Basin Desert north to at least Mono County (Emmel and Emmel 1973). This species has no special status but is mentioned as being associated with DAM and other saltgrass-dominated TAM.

The TAM community supports low numbers and a low diversity of herpetofauna. Species found in DAM include Zebra-tailed Lizard, Desert Spiny Lizard (*Sceloporus magister)*, and Western Whiptail. Side-blotched Lizards will also occur in DAM. No amphibians were noted in DAM, although some species, such as Great Basin Spadefoot Toad (*Spea intermontana*) or Western Toad (*Anaxyrus boreas*), may seek refuge in existing burrows in DAM, depending on the location and distance from flowing water.

No known sensitive native fish populations occur in the plan area. Owens Tui Chub formerly occurred at the Cabin Bar Ranch near Olancha; however, that population has been extirpated.

The bird community associated with TAM varies considerably based on the alkali meadow sub-community type. SAM and MAM sites support the greatest number of species likely because of greater structural diversity, while DAM, with very little structural diversity, supports the fewest number of species of the three types of TAM. Species such as Savannah Sparrow and Horned Lark are typically found in DAM.

Small mammal species found in DAM include Pocket Gopher (*Thomomys bottae*), Owens Valley Vole (*Microtus californicus vallicola*), and Deer Mouse (*Peromyscus maniculatus*). Coyote, Kit Fox (*Vulpes macrotis macrotis*), and Bobcat (*Felis rufus baileyi*) may hunt in these areas. Bat species detected foraging or flying over DAM include Mexican Free-tailed Bat (*Tadarida brasiliensis*), Spotted Bat, Pallid Bat (*Antrozous pallidus*), and Yuma Myotis. Tule Elk may use DAM for resting and foraging, but saltgrass is low-quality forage for this species.

Numerous terrestrial insects or insect groups have been observed in the saltgrass Managed Vegetation (DAM) dust control area, including harvester ants, spiders (black widow spiders and jumping spiders), grasshoppers, and crickets. To date, there are no documented sightings of reptiles, but given the abundance of insects and the presence of small mammals, certain commonly encountered reptiles, such as Side-blotched Lizard and Coachwhip, would be expected to occur. The bird species most frequently encountered in Managed Vegetation are Horned Lark and Common Raven. Other bird species may be encountered in Managed Vegetation seasonally, or in small numbers, including Savannah Sparrow, American Kestrel, and Northern Harrier (LADWP 2010).

Small mammals known to use Managed Vegetation include Kangaroo Rats (*Dipodomys* spp.), Pocket Mice (*Perognathus* spp.), Deer Mice (*Peromyscus* spp.), and Pocket Gophers. Other small mammal species are expected; however, small mammal trapping has not been conducted in Managed Vegetation. Pellets of Black-tailed Jackrabbit (*Lepus californicus deserticola*) and Desert Cottontail (*Sylvilagus audubonii arizonae*) have been observed. Direct and indirect evidence has also been noted for Bobcat, Coyote, Kit Fox, Gray Fox (*Urocyon cinereoargenteus nevadensis*), Ringtail (*Bassariscus astutus*), and Badger (*Taxidea taxus berlanieri*) (LADWP 2010).

3.4.4 Existing Riparian Habitat

VEGETATION

Riparian vegetation is found in the following areas (District 1997a; CH2M HILL 2000):

- Within the plan area at the northern edge of the dust control project in the Delta (excluding LORP)
- Within Cottonwood and Ash Creeks
- On the western edge of the plan area in Willow Dip

This habitat is characterized by stands of willow species (*Salix* spp.) and occasional cottonwood trees (*Populus fremontii*). The hydrologic conditions where this type of vegetation occurs support an understory of rushes, cattails, Saltgrass, Yerba Mansa, and Alkali Pink. The invasive plant Saltcedar (*Tamarix* spp.) occurs in this habitat type, especially at Cottonwood and Ash Creeks where dense stands are found. Willow scrub is found at Willow Dip along with a diverse TAM habitat.

WILDLIFE

The structural diversity provided by trees and shrubs within these riparian zones allow use of these areas by wildlife adapted to more wooded habitats.

3.4.5 Existing Upland Scrub Habitat

VEGETATION

The upland scrub communities that occur within the plan area are shadscale scrub, desert saltbush scrub, and desert greasewood scrub (District 1997a; CH2M HILL 2000). The distinction in the field between shadscale scrub and desert saltbush scrub is generally subtle because the gradual transition between these two vegetation types is based primarily on the greater dominance of shadscale and bud sagebrush (*Artemisia spinescens*), while desert saltbush scrub is characterized by the strong dominance of one or more species of Saltbush. The presence of Greasewood and Parry's Saltbush with Saltgrass and Bush Seepweed (*Suaeda moquinii*) defines greasewood scrub. It occurs on loose sandy soil, generally at low elevations and close to the playa.

WILDLIFE

Insects found in upland scrub communities consist of widespread and common invertebrate species. Some of the more conspicuous insects found in shadscale scrub included several species of grasshoppers (Family Acrididae), many species of wild bees, woodboring beetles (Families Buprestidae and Cerambycidae), and butterflies such as Painted Ladies (*Vanessa cardui*), Lotta Marbles (*Euchloe hyantis lotta*), and Checkered Whites (*Pontia protodice*). Two species of local significance were found only in dune systems, which may support shadscale scrub. The two species

mentioned in baseline documents are the Geometrid Moth (*Tescalsia giulianiata*), a relatively recently described species found in Owens Valley and Deep Springs Valley; and the Owens Valley Dune Weevil (*Trigonoscuta ownsi*), known only from dune areas outside the plan area (District 1997a).

Scrub communities are found to support more species of lizards and snakes than playa or TAM habitats. The species encountered most frequently in previous surveys were Western Whiptail, Zebra-tailed Lizard, and Side-blotched Lizard (Sapphos 2003). The Desert Spiny Lizard (*Sceloporus magister*) has been seen in scrub adjacent to the playa, usually in close proximity to rocks, shrubs, or other cover. Desert Horned Lizards (*Phrynosoma platyrhinos*) are less common and occupy sandy upland areas with sparse vegetation. Long-nosed Leopard Lizards are uncommon around shrubs adjacent to the dust control areas (Sapphos 2003). There was one sighting of a Desert Iguana (*Dipsosaurus dorsalis*) on the west side of the Owens Lakebed (District 2008), even though their preferred habitat of creosote bush scrub is lacking.

Snakes that have been captured in upland scrub, usually on or adjacent to the interstate highways around the Owens Lakebed include Coachwhip, California Kingsnake (*Lampropeltis getulus californiae*), Gopher Snake, and Sidewinder (*Crotalus cerastes cerastes*).

The dry upland shadscale scrub community supports avian species such as Sage Sparrow, Loggerhead Shrike, and Le Conte's Thrasher. Sensitive species that may use shadscale scrub habitats for nesting include Loggerhead Shrike and Burrowing Owl. Le Conte's Thrasher are also found breeding in the shadscale scrub communities surrounding Owens Lake. Mammal species found to occur in scrub communities include Coyote, Bobcat, and Kit Fox. Small mammals such as White-tailed Antelope Ground Squirrel (*Ammospermophilus leucurus leucurus*), Kangaroo Rats (*Dipodomys* spp.), and Pocket Mice (*Perognathus* spp.) can also be found in upland scrub. The only species of bat detected in shadscale scrub was the Western Pipistrelle (*Parastrellus hesperus*). Other bat species can be expected to occur incidentally when flying to water resources for foraging or from roost sites.

4.0 DUST CONTROL

Dust control is central to all activities on the lake and the Planning Committee recognizes the importance of controlling dust for air quality and reducing dust-related public health risk. This section describes the regulatory background of dust control in the plan area; current dust control management and operations; the process for approval of new Best Available Control Measure (BACM); a variety of proposed new and modified BACM; transition, operations, and maintenance of existing dust control; proposed immediate response stabilization measures; and monitoring.

4.1 Regulatory Background

The Clean Air Act (CAA) is the comprehensive Federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes the USEPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health. One of the goals of the CAA was to set and achieve NAAQS in every State by 1975. The CAA also directed States to develop State Implementation Plans (SIPs) in order to achieve these standards. The CAA was amended in 1977 and 1990 primarily to set new dates for achieving attainment of NAAQS because many areas of the country had failed to meet the deadlines.

California law requires all counties to belong to an Air Pollution Control District. The State delegates authority for preparation of SIPs to the Air Pollution Control District. The plan area is within the Great Basin Unified Air Pollution Control District (District). As such, the District is responsible for regulating attainment with NAAQS within the plan area.

On July 1, 1987, the USEPA revised the NAAQS by replacing total suspended particulates with PM_{10} as a new indicator for particulate matter (dust). The intent of this health-based standard is to prevent airborne concentrations of suspended particles that are injurious to human health. The USEPA designated the southern Owens Valley Planning Area (OVPA) as one of the areas in the nation that violated the new PM_{10} NAAQS. Subsequent air quality monitoring by the District confirmed that the Owens Lakebed is the major source of PM_{10} emissions contributing to air quality violations in the OVPA. Prior to implementation of dust control measures, extremely high PM_{10} concentrations—over 12,000 micrograms per cubic meter ($\mu g/m^3$), or more than 80 times the standard—were verified downwind of the lakebed.

As a result of a SIP prepared by the District and approved by the USEPA in 1998, the Los Angeles Department of Water and Power (LADWP) began constructing dust control measures on the lakebed with a goal of implementing controls necessary to meet the Federal PM_{10} standards by the end of 2006. The 1998 SIP also provided for a SIP Revision in 2003 to refine the actual areas necessary for control. The 2003 SIP (District 2003) control strategy required Shallow Flood, Managed Vegetation, and/or Gravel on 29.8 square miles of the lakebed. By the end of 2006, the City had met its deadline.

The 2003 SIP also contained provisions requiring the District to continue to monitor air pollution emissions from the lakebed and to identify any additional areas that may require PM_{10} controls in order to meet NAAQS. The 2003 SIP set forth detailed procedures and protocols to determine whether additional areas required control. The Air Pollution Control Officer (APCO) is required to make an annual determination of the necessity for supplemental control, and to direct LADWP to implement, operate, and maintain dust control measures on additional areas of the lakebed as necessary.

Resulting from a dispute regarding requirements to control dust from additional areas beyond the 29.8 square miles identified in the 2003 SIP, a Settlement Agreement was approved by the District and LADWP in 2006. Under the major provisions of this agreement, the City agreed to implement an additional 13.2 square miles of dust control measures on the lakebed, for a total of 43 square miles, by April 1, 2010. The Settlement Agreement also identified a fourth dust control measure, Moat and Row, which could be implemented on a portion of the dust control area. However, this dust control measure ultimately was not accepted by the California State Lands Commission and it could not be implemented on the lakebed. The District agreed to revise the 2003 SIP before March 1, 2008, to incorporate the provisions of the Settlement Agreement (District 2008).

On March 23, 2007, the USEPA published a finding that the OVPA did not attain the 24-hour NAAQS by December 31, 2006, as mandated by the CAA Amendments. As a result of this finding, the 2003 SIP was required to be revised to include a control strategy that would provide for attainment in the OVPA as soon as practicable, by achieving at least a five percent reduction in PM_{10} emissions per year. The revised SIP was required to demonstrate that the NAAQS can be attained by March 23, 2012, unless the USEPA grants an extension, which could extend the deadline up to March 23, 2017. The USEPA may consider the severity of nonattainment and the feasibility of applying available control measures in deciding if an extension should be granted. The 2003 SIP was revised to address provisions of the Settlement Agreement and the USEPA finding that the OVPA did not attain the 24-hour NAAQS. The revised, current SIP is the 2008 SIP (District 2008).

4.2 Existing Dust Control Measures in the Plan Area

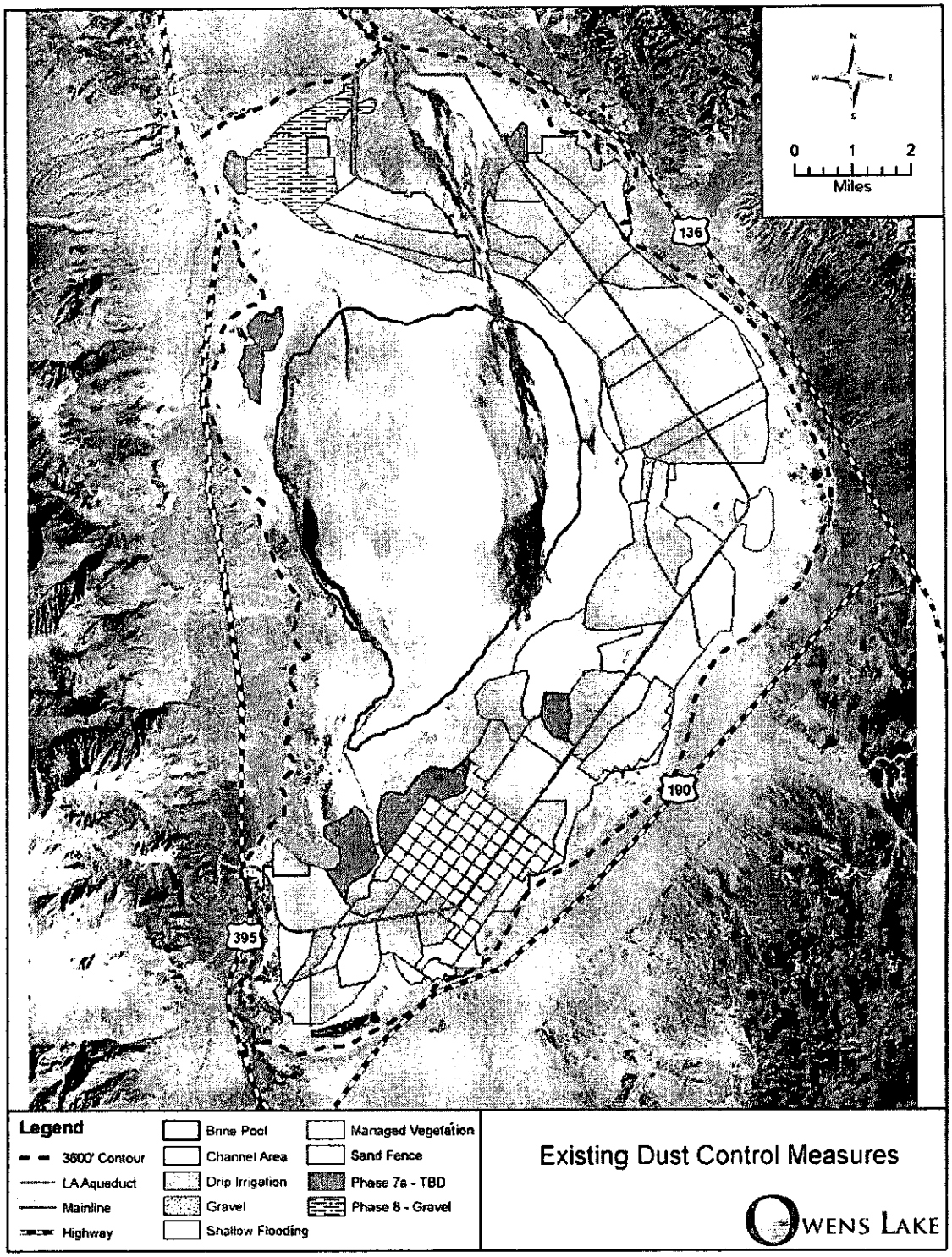
From 1980 to 2000, the District and other researchers pursued a research and testing program to develop dust control measures that are effective for Owens Lake. The District, in cooperation with LADWP, developed three dust control measures that have been designated as BACM in the SIP and approved for use on the lakebed. BACM are Best Available Control Measures, or those measures that, according to USEPA guidance, are technology-based and can help ensure that the Federal standard be attained as expeditiously as practicable.

There are three measures designated as BACM: Shallow Flood, Managed Vegetation, and Gravel. Approximately 40 square miles of dust control have been implemented, including approximately 35 square miles of Shallow Flood. Dust control measures have been implemented throughout a series

of phases (Figure 4-1). Phases 1, 2, 4, 5, and most of Phase 7 have been constructed and are operational. Phase 8 will consist of an additional two square miles of Gravel. Phase 3 was the installation of roads and pipelines, and there is no Phase 6.

All phases of the dust control project have been subject to appropriate environmental review, leasing, and permitting. Associated mitigation requirements for implementation of the dust control project include water quality monitoring, Snowy Plover monitoring, wetland creation and mitigation monitoring, and invasive plant species control. Other measures include a Corvid monitoring and control program and various measures to protect environmental resources. Vector monitoring and control is also required to protect local communities from vector-related nuisances and illnesses (Oser 2011). The Master Plan does not change any of these requirements.

FIGURE 4-1. EXISTING DUST CONTROL MEASURES



4.2.1 Approved Best Available Control Measures

4.2.1.1 Shallow Flood

The Shallow Flood dust control method consists of applying water to areas of dust emissions (Figure 4-2). As currently configured, most of the Shallow Flood is "Lateral Shallow Flood," in areas divided into cells where water is applied through outlets along lateral pipes served by submains from the main line. Applied water flows down–slope into tailwater ponds. The area must be maintained such that applied water spreads out, ponding or saturating at least 75 percent of the land surface. Lateral Shallow Flood results in a mosaic of saturated soil surfaces, shallow ponds 1 to 6 inches deep, unsaturated areas, and tailwater ponds 1 to 2 feet deep.

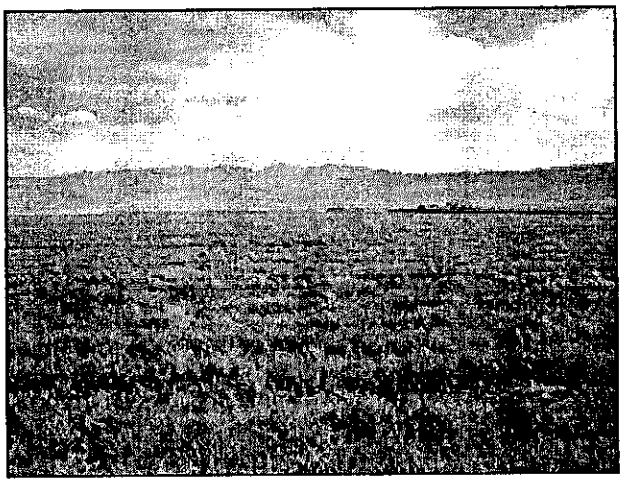
FIGURE 4-2. SHALLOW FLOOD AT OWENS LAKE

A significant, additional area of Shallow Flood is "Pond Shallow Flood," comprised of dust control cells that are one relatively continuous pond. The Pond Shallow Flood surfaces include ponded water with occasional islands, depending on topography. The up-gradient edges of the ponds are typically relatively shallow, with some areas adjacent to down-slope containment berms being a few feet deep. By 2012, it is estimated that approximately 35.6 square miles will contain these two types of Shallow Flood (LADWP 2010).

4.2.1.2 Managed Vegetation

Dust control using Managed Vegetation consists of subsurface-drip-irrigated fields of native saltgrass (*Distichlis spicata*). Subsurface drainage creates soil conditions suitable for plant growth, while requiring a minimum of applied water (Figure 4-3). Saline drainage captured by the network of buried tile drains is reused after blending with freshwater on Managed Vegetation, or applied as-is to Shallow Flood areas. Managed Vegetation uses approximately one-third of the water required for Shallow Flood operations. The saline soil was first reclaimed by application of somewhat saline water, and then planted with salt-tolerant plants that are native to the Owens Lake basin. Managed Vegetation is operated to avoid impacts to naturally occurring resources, such as wetlands.

FIGURE 4-3. MANAGED VEGETATION AT OWENS LAKE



4.2.1.3 Gravel

The Gravel dust control method consists of installing a four-inch layer of coarse gravel, greater than ½-inch diameter, on the surface of the lakebed. Per the terms of the 1998 Memorandum of Agreement (MOA), gravel used for dust control on Owens Dry Lake must be comparable in coloration to the lakebed soils.

In some locations, the gravel may need to be placed on a permeable geotextile fabric for stability. Geotextile membranes are artificial fabrics that are commonly used for: filtration/drainage, ground stabilization, structural waterproofing, land containment, and weed and root control. The geotextile is chemically inert and generally not affected by acids and alkalis that may be present in the soils.

4.2.2 Control Efficiencies

Until the 2006 Settlement Agreement and the 2008 SIP, dust control measures were required to be constructed, operated, and maintained to achieve the 99 percent PM_{10} control Minimum Dust Control Efficiencies. The 99 percent control efficiency standard resulted in performance efficiency specifications for each of the three approved dust control measures. Based on the District's research in the 1990s, this meant that all Shallow Flood areas had to be maintained at 75 percent wetted surface, Managed Vegetation was required to be maintained at 50 percent cover of live or dead vegetation of every acre (since reduced under special agreement for the existing Managed Vegetation facility, as described below), and Gravel surfaces required 100 percent coverage with a 4-inch layer of gravel.

However, not all the additional emissive areas mandated under the 2008 SIP require 99 percent control efficiency to achieve the NAAQS for PM_{10} at the historic shoreline. Based on data collected between July 2002 and June 2006, air quality modeling shows that the actual required levels of

PM_{10} control efficiency necessary to achieve the standard vary from 30 percent to over 99 percent. These varying required control efficiencies reflect the fact that different areas of the lakebed have different emissions rates based on physical factors, and that areas closer to the historic shoreline require higher control efficiencies than similar areas well away from the shoreline. Therefore, all additional dust control measures constructed under the provisions of the 2008 SIP will be constructed and operated to achieve the Minimum Dust Control Efficiencies based on modeling results (District 2008).

The 2006 Settlement Agreement also changed the efficiency specification for existing Managed Vegetation sites. The performance specification was altered to reflect the vegetation cover on the southern Managed Vegetation site when it was substantially non-emissive; LADWP must maintain the vegetation cover based on a site-specific Operation and Management Plan, ensuring that the site continues to achieve control sufficient to prevent emissions that caused or contributed to NAAQS violations. Under an approved SIP revision in July 2011, any new Managed Vegetation constructed in the future would have a similar performance specification.

4.3 Approval of Best Available Control Measures

A process for further, cooperative modification and development of BACM was retained in the 2008 SIP. Dust control approaches contained in the SIP can be used as building blocks to conceive, test, and evaluate new approaches to dust control. These approaches can be sought to achieve greater operational flexibility and efficiency, promote habitat and water conservation, or have aesthetic and recreation benefits that other BACM lack. More novel approaches that do not resemble existing BACM may also be developed, tested, and implemented. Tests, test protocols, and proposed new dust control approaches must be approved by the District so that they can be incorporated into the SIP and become allowable for use on the lakebed. In summary, the approval process for new BACM includes the following:

1. Research and development of effective dust control measures
2. Review and approval of dust control measures as BACM by the District (in the form of a revised SIP), the District's Board, the California Air Resources Board, and USEPA
3. Environmental review of BACM and approval of dust control measures by the Commission (in the form of a land lease) and other responsible agencies
4. Implementation of the dust control measures on the lakebed

According to the 2008 SIP, LADWP may apply in writing to the APCO for a SIP Revision to designate a new dust control measure as BACM after completing at least three years of testing. The application must meet all USEPA requirements for BACM designation and demonstrate to the APCO's satisfaction that the new control measure is sufficient to achieve the required PM_{10} emission reductions or control efficiency during the dust season and attain the NAAQS everywhere on the

shoreline. The APCO has full and sole discretion to determine whether these conditions have been met.

If the APCO determines that the application is complete, then the APCO has full discretion to select or approve a method of determining compliance of the proposed new BACM with its performance standard. The proposed BACM, method of compliance, and the performance standards are then included in a SIP revision for consideration by the District's Board. The Board has full and sole discretion to determine whether to adopt a SIP Revision.

Upon SIP adoption by the Board, approval by the California Air Resources Board, and submission to USEPA, LADWP may implement the new control measure on one-half square mile of the next area to be identified as needing control. Upon approval by USEPA, the new BACM may be implemented on any subsequent areas requiring control or in accordance with the BACM transition protocols described in the SIP.

In addition, because most of the dust control areas on the lakebed are under the jurisdiction of the Commission and other responsible agencies, LADWP must also secure the appropriate approvals, leases, and permits from the appropriate agencies prior to implementing any new BACM.

The overall BACM approval process, from field testing and data collection to USEPA approval, requires a significant amount of time. To date, this process has accommodated two BACM tests and one revision to the three BACM contained in the 1998 SIP.

4.4 Potential New and Modified Dust Control Methods

The Planning Committee and its Dust Control Work Group identified a variety of potential new and modified BACM for Owens Lake. Development of a greater diversity of BACM is necessary to achieve the goals of the Master Plan. Specifically, water-intensive BACM, such as Shallow Flood, must be transitioned to water-efficient BACM, such as tillage, in order to achieve the water conservation target. LADWP developed the following criteria for development of potential dust control methods:

- Likely effectiveness to control dust
- Potential to conserve water or use water efficiently
- Ability to enhance habitat
- Consistency with Master Plan goals
- Feasibility and practicality of construction, including costs
- Feasible operation and maintenance costs

All potential methods would need to conform to regulatory requirements (i.e., dust control effectiveness, BACM approval, permits and leasing) and be constructible and operable for an acceptable cost. Potential methods include the following:

- BACM that provide high Habitat Suitability Indices per unit of water applied. Examples of BACM concepts include:
  - Tillage (for Habitat) with Pulse Flooding
  - Modified Shallow Flood, with Efficiency and Habitat Enhancements
  - Dryer, Sparser, Vegetated or Graveled Shallow Flood
  - Modified Managed Vegetation
- BACM that provide waterless or very water-efficient dust control for use in areas where habitat enhancement is not a main focus. Examples of BACM concepts include:
  - Shallow Flood with Brine
  - Managed Salt Flat
  - Tillage (for Dust Control) with Irrigation as Needed
  - Modified Gravel
  - Solar with Gravel and Other Potential Solar
  - Soil Binders

These potential dust control measures can be characterized as new BACM (i.e., they are not currently characterized in the SIP), modified BACM (i.e., they include adjustments or modifications to existing BACM), or combinations of existing BACM. The testing processes for new BACM and modified BACM vary and they are described in detail in Chapter 8, Attachment D of the 2008 SIP.

Combining existing BACM would require no further testing because the principles of control have been accepted by the District. When this is done in such a way that the entire area complies with one or another of the existing BACM requirements, the area may be accepted by the District as compliant dust control without the need for further testing. For example, a site could combine Shallow Flood with Managed Vegetation and/or Gravel, while maintaining non-emissive conditions (i.e., the area still meets the 75 percent coverage requirements).

4.4.1 Existing and Potential Modified Best Available Control Measures

4.4.1.1 Shallow Flood with Brine

This measure would flood or saturate the surface with brine. The high salt concentration would lower the evaporation rate, potentially reducing the amount of water necessary to achieve dust control. The brine used in Shallow Flood cells could come from existing dust control operations ("made" brine) or from the hypersaline brine pool (mined brine). Dust control compliance requirements for an area wetted with brine would be the same as those used in other existing Shallow Flood areas that use fresh water. A possible challenge for Shallow Flood with Brine is managing salt crust that might form within the wetted areas. This feature could be non-compliant because it is too dry. From a dust control standpoint, brine flooding is consistent with currently approved Shallow Flood BACM, provided that the water cover meets that required. However, environmental work and technical feasibility testing will be necessary for compliance and implementation associated with dryer conditions.

4.4.1.2 Dryer, Sparser, Vegetated or Graveled Shallow Flood

This measure would reduce the extent of water cover and make dry areas larger than that allowed currently for Shallow Flood (25 percent of the area). The dry areas would be manipulated based on site conditions; some might be vegetated, others graveled, and some left as playa.

One source of material for these dry areas is from the Haiwee Reservoir. As water from the Los Angeles Aqueduct enters Haiwee Reservoir, the sediment load is deposited, forming a small delta. The materials are thought to be coarse, so their potential as part of a relatively erosion-resistant surface to amend soil for plant growth (as part of vegetative control) or to enhance water use efficiency may be explored. The sediment might be used as a substrate for ponds, reducing pond depths and thereby increasing water use efficiency.

4.4.1.3 Modified Gravel

The current Gravel BACM requires a four-inch layer of coarse gravel screened to greater than ½-inch in diameter. This measure would test a gravel layer less than four inches in thickness.

4.4.1.4 Modified Managed Vegetation

The Managed Vegetation dust control measure that is currently on the playa mimics natural saltgrass meadows. Dust control is achieved by stabilizing and covering the surface with saltgrass plants. Other species of vegetation could also be used. Desert shrubs, for example, require less water than salt grass and have a higher vertical profile, making them promising from the standpoint of dust control.

As alternative plant communities are established and monitored on the playa, vegetation cover required for dust control by these plant communities will be determined. It is anticipated that some of these plant communities could require less than the vegetation cover levels currently

specified for Managed Vegetation while maintaining dust control effectiveness. Examples of this modified Managed Vegetation might include the following:

- The T30-1 and T36-1 areas contain substantial vegetation but are operated and managed to comply with Shallow Flood requirements and not Managed Vegetation. Further expansion of vegetation may be facilitated if irrigation was diminished, but this would cause the area to fall out of Shallow Flood compliance. Therefore, these areas may be operated below the wetness levels required for Shallow Flood to promote plant growth, and monitored to: a) ensure that they do not become emissive, and b) determine what cover levels of this taller plant community are required to provide adequate levels of dust control.
- The "modified Shallow Flood" dust control approach described in the previous section might combine durable crusts, wetness, vegetation, and gravel in a mosaic not compliant under current provisions, but that could be shown to effectively control dust emissions.

4.4.1.5 Hybrid

Hybrid BACM would include those measures with the following principles:

- Each part of the hybrid area must be compliant with one of the currently approved BACM.
- Dust control approaches can use site variability to improve constructability, operability, consistent compliance of dust control, and to take advantage of local conditions, such as features that promote water conservation, habitat, and scenic amenities.
- Where appropriate, amenities, such as wildlife viewing areas and shade structures, can be added to enhance public access values.

4.4.1.6 Modified Shallow Flood, with Efficiency and/or Habitat Enhancements

Some avian wildlife, particularly Snowy Plovers, seem to thrive on large expanses of relatively barren playa, so long as key resources (water, invertebrates for foraging) are sufficiently close by, within approximately 0.5 miles. None of the existing BACM allow for this condition, with the exception of the dry portions of Shallow Flood areas, which can be heavily used by Snowy Plovers. This type of dust control measure would blend flooded/wetted areas with dry, non-emissive areas or vegetated or graveled "islands" in a mosaic that provides a sufficient level of dust control and habitat enhancement.

4.4.2 Potential New Best Available Control Measures

4.4.2.1 Managed Salt Flat

A potential use of brine is to protect playa surfaces and prevent wind erosion by developing non-emissive (durable) salt deposits. In this scenario, the surface would be dry most of the time and would consist of a crystalline stable salt crust or "salt flat." When the surface is not kept flooded or saturated, control could be achieved through the development of the stable salt crust.

As envisioned, the Managed Salt Flat measure would combine durable salt crusts and brine to protect playa surfaces. Performance criteria for required dust control would relate to the character and quantity of these two types of surfaces in the control area; these would be developed as part of the testing protocol. The main potential problem with the use of a durable salt crust from a dust control standpoint is the chemistry of the salt mixture within the system and its sensitivity to moisture and temperature conditions making management challenging.

4.4.2.2 Tillage (for Dust Control) with Irrigation as Needed

The effectiveness of tillage to control dust emissions is expected to vary depending on soil type. Under appropriate soil conditions, dust control through tilling could be achieved through clodding the soils, which creates non-emissive blocks of soil at the surface and buries previously exposed loose emissive surface material. Soil tilling also provides additional benefit by increasing the surface roughness. Clodded and roughened soil surfaces, created by various tillage implements, have been widely used in locations other than the Owens Lakebed to control dust emissions from agricultural fields. The most effective tillage methods for an area depend on the soil and moisture conditions present. Thus, tillage for dust control on the playa would likely take multiple forms and require several distinct types of tools.

Soil tillage has been used for temporary control of dust sources on the lakebed in the past and, as of October 2011, is being pilot-tested in the T-12 area. The approach for the test is to till the area, monitor the surface conditions, and maintain the tilled area in a non-emissive condition through re-tilling and/or wetting. The surface would have to be "reset" by irrigation when tillage alone no longer produces an erosion-resistant surface. Once irrigated, the area would be re-tilled. The very high control efficiencies (~99 percent) are a challenge for this method. Tillage could be non-linear to enhance aesthetics.

4.4.2.3 Tillage (for Habitat) with Pulse Flooding

Roughness created by tilling land can, under certain circumstances, confer benefits to wildlife. For example, ridges formed by tillage within an area that was subsequently flooded can create isolated, elongated islands that can be heavily used for nesting by avocet and stilts. This method would combine the dust control and habitat benefits by tilling for dust control, then flooding during the nesting season (approximately April through June) to increase habitat value. The purpose of

flooding is to provide standing water for habitat. Outside of the dust season (dust season is October 1–June 30), control of dust emissions would be achieved through tillage, as described above. Tillage could be non-linear to enhance aesthetics.

4.4.2.4 Solar with Gravel and Other Potential Solar

A wide variety of solar panel layouts have been and will continue to be examined for a variety of parameters, including cost effectiveness, operability, and dust control effectiveness. Solar with Gravel involves less than the BACM 4-inch gravel blanket below the panels to stabilize the land. Other potential solar applications would rely more on the protective nature of the panels themselves. Ancillary requirements include electrical transmission, access for maintenance, flood protection, and protection of the margins of solar arrays from jetting of wind beneath the panels. As is the case elsewhere on the playa, roads and berms would be constructed to provide needed access, as well as protection from storm water and encroaching sand.

4.4.2.5 Soil Binders

Commonly, dust control of disturbed land surfaces is completed through the application of various substances, usually in solution or emulsion, to stabilize land surfaces. The applied substances confer stability by binding soil particles into aggregates and/or by hardening surfaces to render them more wind resistant. Soil binding substances vary in makeup and can be salts, organic compounds, or other mixtures. To be permitted for use on the playa, materials (and their breakdown constituents) would need to be shown to be environmentally benign to human health, aesthetics, mineral deposits, and ecological risks. To be attractive from an operational perspective, the cost and application frequencies would have to make the materials competitive with alternative dust control methods.

Soil binders would be studied not only for dust control effectiveness, but also with respect to short- and long-term environmental fate and impact, as well as likely range of cost and operational complexity. Passing materials would be tested at a small scale. Promising materials would be tried in larger, operational pilot tests. One of the most obvious applications for these materials is stabilization of non-controlled surfaces in control areas, such as roads, berms, equipment storage areas, etc. Soil binders might be opportune for small areas, such as around solar panels or to reduce emissions on small islands. Soil binders would have a special approval process, as outlined in Table 4.1.

TABLE 4-1. PROCESSES FOR DEVELOPING SOIL BINDERS FOR OWENS LAKE DUST CONTROL

Administrative Process	Technical Process
Initial technical steps precede administrative steps.	Conduct literature review to determine support of the material as effective dust control (LADWP).
Initial technical steps precede administrative steps.	Screen materials for potential human and environmental impacts, including to the ore deposit (LADWP).
Initial technical steps precede administrative steps.	Conduct a preliminary cost estimate for the material (LADWP).
Consult with the Commission, the California Department of Fish and Game (CDFG), the Regional Water Quality Control Board (RWQCB), and the District before small-scale testing the materials (LADWP, the Commission, CDFG, RWQCB, and the District).	Conduct small-scale testing on the playa. If testing is successful, then assess overall practicality of the material, including cost, potential impacts, and dust control effectiveness, and determine outstanding research questions (LADWP).
Consult with the Commission, CDFG, RWQCB, Lessees, and the District on results of small-scale pilot testing before larger-scale pilot testing (LADWP, the Commission, CDFG, RWQCB, Lessees, and the District).	Address outstanding research questions with pilot tests and monitor results for at least one dust season. For materials being considered for BACM, coordinate with the District so that pilot tests achieve BACM testing goals. Materials to be used only on roads and berms, or for temporary dust control, would not fall into this category (LADWP, District).
For materials being considered for BACM, consult with the District regarding pilot test design so that results could contribute to an eventual BACM application, evaluation, and approval (LADWP, District).	
Conduct notification and California Environmental Quality Act (CEQA) analysis associated with full-scale implementation of the successful material. Results of any focused, Owens-Lakebed-specific ecological and environmental monitoring of pilot tests would be included as part of this documentation to demonstrate the safety of the proposed material (LADWP, the Commission, CDFG, RWQCB, the District, Tribes, Inyo County, etc.).	Develop workable operational approaches for employing successful and approved soil binders at full-scale (LADWP).

4.4.3 Evaluation of Existing, Potential Modified, and New Best Available Control Measures

The potential modified and new BACM can be used to achieve the goals of the Master Plan. Many of the dust control methods described in Sections 4.4.1 and 4.4.2, respectively, will require BACM compliance testing. Some of the methods, such as Shallow Flood with Brine or Hybrid, will not require BACM compliance testing because they meet the compliance standards of existing BACM. These measures will still require an evaluation relative to the Master Plan goals.

The maximum extent of BACM compliance testing at any given time is limited by the SIP at 1.5 square miles. The SIP does not currently allow potential new BACM to be tested within designated dust control areas. LADWP may pursue a SIP amendment to allow potential new BACM to be tested within designated dust control areas.

The evaluation of modified and new BACM is subject to allocation of resources, including funding and staff. Table 4-2 summarizes the estimated timeframes and locations for compliance testing and/or evaluation of each modified and new BACM. The estimated timeframe is included as a milestone at the beginning of the evaluation process. Estimated approval timeframes are not included because approval is highly variable based on research requirements, results, and evaluation by the APCO. Evaluation of BACM would be detailed in annual Work Plans. Work Plan development and review processes are outlined in Section 8, Implementation.

TABLE 4-2. ESTIMATED TIMEFRAMES AND LOCATIONS FOR EVALUATION AND/OR COMPLIANCE TESTING OF EXISTING AND POTENTIAL MODIFIED AND NEW BACM

	Current Status[3]	
	Estimated Timeframe	**Potential Location**
Existing and Potential Modified BACM[1]		
Shallow Flood with Brine	Ongoing (began 2010)	T10-3
Dryer, Sparser, Vegetated, or Graveled Shallow Flood	2012–2013	Testing would likely occur in the northwest portion of the lakebed (potentially T37-1)
Modified Gravel	2012	This likely will be a simulation analysis
Modified Managed Vegetation	2012	Channel Area and T1A-1
Hybrid	2012–2013	Planned within Phase 7a
Modified Shallow Flood, with Efficiency and/or Habitat Enhancements	2012–2013	Planned within Phase 7a and existing Shallow Flood areas irrigated with laterals
Potential New BACM[2]		
Managed Salt Flat	2015	T10-3
Tillage (for Dust Control) with Irrigation as Needed	2011	Planned within Phase 7a (T12-1)
Tillage (for Habitat) with Pulse Flooding	2014	Testing would likely occur within an existing Shallow Flood area
Solar with Gravel and Other Potential Solar	2009	Testing was completed in 2009 with wind tunnel analyses
Soil Binders	2014	Testing would likely occur on existing berms

[1]Existing and potential modified BACM are dust control methods that include adjustments or modifications to existing BACM. Refer to Section 4.4.1 for a complete description of each measure.
[2]Potential new BACM are dust control methods that are not currently characterized in the SIP. Refer to Section 4.4.2 for a complete description of each measure.
[3]Evaluation and compliance testing are subject to allocation of resources, including funding and staff.

4.5 Transition of Existing BACM to Different, New, or Modified BACM

Development of a greater diversity of BACM is necessary to achieve the goals of the Master Plan. For example, existing Shallow Flood must be transitioned to more water-efficient or waterless BACM in order to achieve the water conservation target. Transitions are those activities that change the existing basis of dust control compliance in a cell. For example, transitioning from Shallow Flood to Managed Vegetation would change the basis of dust control compliance; however, transitioning from Shallow Flood pond to Shallow Flood with laterals does not change the basis of dust control compliance and is not considered a transition.

The BACM transition process is detailed in Chapter 8, Attachment D, of the 2008 SIP. According to the SIP, LADWP may transition from one approved BACM to another provided that the performance standard of one or the other BACM is met at all times during the transition, and that LADWP makes a well-supported written demonstration of that performance to the satisfaction of the APCO, in advance of the transition. This requirement is applicable for transitions to Shallow Flood because the Shallow Flood performance standard is met immediately.

If LADWP proposes a transition without meeting the performance standard of one or the other BACM at all times, then it may submit an application to the APCO for permission to do so. The APCO has full and sole discretion to accept, reject, or condition the application. The application is required to include, among other things, a protocol that includes air quality modeling that predicts that the NAAQS will be met at the historic shoreline at all times during the transition. The application must also describe the methods to continuously monitor emissions throughout the transition period. If the modeling or monitoring show that emissions are above a pre-set trigger level, the APCO has the discretion to terminate the transition at any time. In other words, the SIP does not allow a temporary violation of NAAQS during the transition period. LADWP may pursue a SIP amendment to allow for a variance because a violation could occur even with implementation of a thorough Dust Mitigation Program. The Planning Committee supports a SIP amendment for this purpose.

The SIP allows BACM transition to occur on no more than 1.5 square miles (960 acres) lake-wide for any BACM at any given time, except Managed Vegetation, which is limited to 0.5 square miles (320 acres). Managed Vegetation is limited to 320 acres because it takes time for the vegetation to establish for compliance. Transitions would likely occur in tandem with necessary operations and maintenance, but may also occur on a voluntary basis, as funding allows. Transitions would occur on an 18-month cycle (i.e., July 1 to December 31), such that construction occurs during only one dust season. Based on the SIP and an 18-month transition cycle, the maximum rate of transition is 1.5 square miles every 18 months. At this rate, the maximum amount of transition that could occur throughout the 20-year term of the Master Plan is 20 square miles; however, the likely extent of transition is much less.

Potential transitions are limited by site-specific suitability (e.g., in some areas, Shallow Flood is the only suitable measure), the habitat objective of maintaining total baseline value-acres for the six target habitat guilds over time, and financial feasibility. The current estimated extent of potential transitions is three square miles. Approximately three square miles of existing Shallow Flood may be transitioned to Managed Vegetation or a blend of different BACM. These potential transitions are subject to the allocation of resources (i.e., funding and staff). Additional transitions may be proposed when new and/or modified BACM are approved by the District. All proposed transitions would be detailed in annual Work Plans. Work Plan development and review processes are outlined in Section 8, Implementation.

4.6 Operations and Maintenance of Existing Dust Control Projects

LADWP has been constructing dust control projects on the lake since 2000. The infrastructure and facilities associated with existing BACM need routine maintenance and, over time, the infrastructure needs to be replaced. Maintenance includes all activities that do not change the existing basis of dust control compliance in a cell. For example, changing Shallow Flood pond to Shallow Flood with laterals does not change the basis of dust control compliance. LADWP has identified and prioritized three general types of maintenance activities:

1. Maintenance to improve efficiency, operability, and/or compliance reliability.

2. Maintenance to facilitate a change in the dust control method, either to transition to a different basis of compliance under the existing dust control method or to transition to a different dust control method.

3. Maintenance to improve habitat suitability, which would also likely include type 1 and type 2 maintenance activities.

Maintenance projects would generally be handled by the Owens Lake Operations Team. The pacing of the work is roughly estimated at 1.5 square miles per 12 months. Maintenance activities that would yield the greatest benefit (i.e., water conservation, operations, facilitation of compliance, or habitat enhancement) per unit of investment would likely be highest priority. All maintenance actions are subject to the habitat objective of maintaining the total baseline value-acres for the six target habitat guilds over time.

The current estimated extent of potential maintenance activities is approximately 30 square miles. Approximately 30 square miles of existing Shallow Flood may be maintained or refurbished to upgrade the distribution, add modified whiplines, or increase salinity. All proposed maintenance activities would be detailed in annual Work Plans. Work Plan development and review processes are outlined in Section 8, Implementation.

4.7 Immediate Response Stabilization Measures

Immediate response stabilization measures could be deployed quickly in dust source areas to control emissions and to prevent the areas from expanding. These proposed measures could be deployed within existing dust control areas. Immediate response stabilization measures would be implemented in areas less than or equal to 0.5 square miles. Immediate response stabilization measures could include:

- Sand fences
- Irrigation (surface flooding, sprinkler, or drip)
- Tillage
- Gravel
- Brine
- Approved soil binders

The protocol for implementation of these measures includes the following steps:

1. LADWP notifies the Commission and the District about the emission, location, size, and stabilization approach from the approved list.
2. LADWP receives email approval within seven days of submittal from the Commission's Land Management Division Chief to proceed with the approved measure.
3. LADWP implements the specific immediate response stabilization measure.
4. LADWP monitors and reports twice annually to the Commission and the District on dust conditions and future maintenance requirements.

4.8 Monitoring

Compliance and effectiveness monitoring for dust control on Owens Lake is the responsibility of LADWP and the District, respectively, and is conducted independently of the Master Plan.

Progress on development, testing, and approval of new and modified dust control measures will be monitored during implementation of the Master Plan because new and modified BACM are necessary to achieve the goals of the Master Plan. The Master Plan Coordinator will request information on development, testing, and approval from LADWP and the District and will include this information in Annual Reports. The Master Plan Coordinator's role and Annual Reports are described in detail in Section 8, Implementation. Monitoring parameters will include the following:

- Progress on development and approval of new and modified BACM

- Implementation of operations and maintenance activities
- Implementation of transitions from one BACM to another
- Implementation of immediate response stabilization measures

DRAFT

5.0 WATER SUPPLY AND CONSERVATION

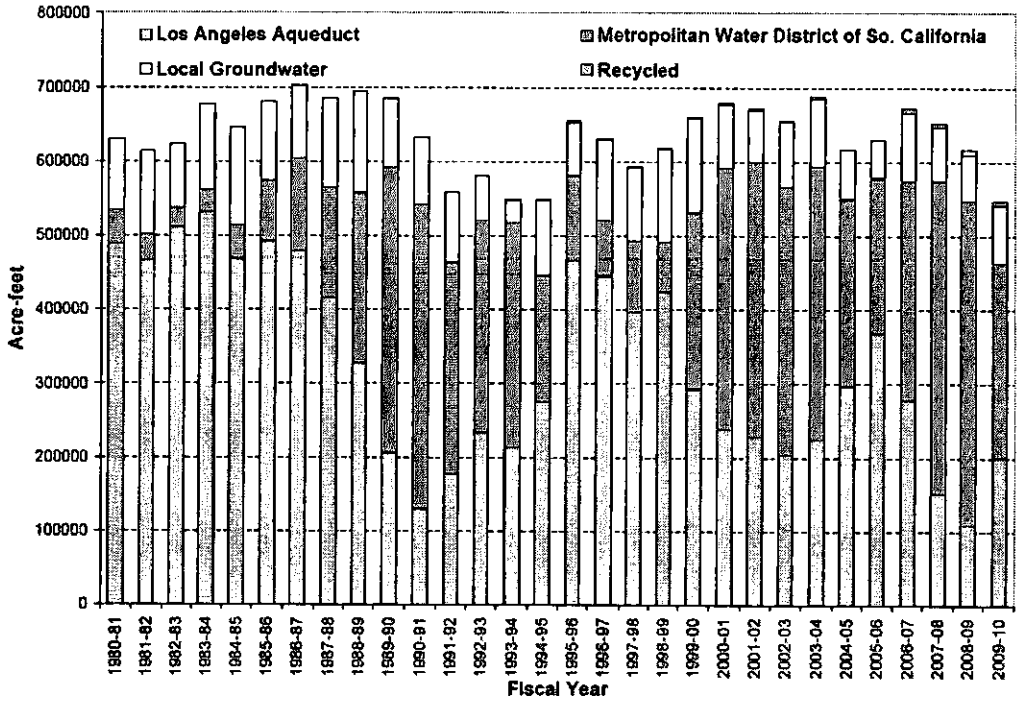
This section describes the background of LADWP as a retail water agency, including supply sources and water conservation efforts. The Planning Committee identified water use efficiency and conservation as a priority for dust control at Owens Lake. This section also includes a water conservation target and the primary methods to achieve it, as well as a description of on-going groundwater studies in the plan area.

5.1 Summary of LADWP Water Supply

LADWP is a retail water agency that provides water to over four million residents and businesses within a 465 square-mile service area. Primary sources of water are the Los Angeles Aqueduct (LAA), the Metropolitan Water District (MWD), and local groundwater. A fourth source, recycled water, is becoming a larger source in the overall supply portfolio. The LAA, MWD, and local groundwater provide approximately 35 percent, 53 percent, and 11 percent of LADWP's total water supply, respectively. Two of the supply sources, LAA and water purchased from MWD, are classified as imported because they are obtained from outside LADWP's service area. The LAA import water from the Eastern Sierra Nevada, including the Owens Valley, and the MWD imports water from the Sacramento-San Joaquin Delta (Bay Delta) via the State Water Project (SWP) and from the Colorado River via the Colorado River Aqueduct (CRA).

LADWP's historical supply sources are increasingly under multiple constraints, including variable hydrological, environmental, and regulatory restrictions. Figure 5-1 shows the City of Los Angeles' historical water supplies from fiscal year 1980–81 to 2009–10. LADWP, along with all other water agencies in California, is faced with the challenge of providing a reliable and high quality water supply to meet current and future needs. The City of Los Angeles has long recognized water conservation as a core strategy to address the challenges of providing a reliable and high quality water supply.

FIGURE 5-1. CITY OF LOS ANGELES' HISTORICAL SOURCES OF WATER SUPPLY



5.1.1 Los Angeles Aqueduct

The LAA was completed in 1913 as a gravity-fed aqueduct extending approximately 340 miles from the Mono Basin to Los Angeles. The original capacity of approximately 310,000 acre-feet per year (AFY) was increased to 530,000 AFY during two major expansions. Annual deliveries are dependent on snowpack in the Eastern Sierra Nevada. Historically, the LAA provided the vast majority of water for the City, but supplies have been significantly reduced over the last two decades in order to provide water for environmental mitigation in the Eastern Sierra Nevada, including dust control at Owens Lake and ecosystem restoration at Mono Lake. Over 200,000 AF of water were used in 2010 for environmental mitigation in the Owens Valley and Mono Basin. Additionally, nearly 110,000 AFY are supplied for agriculture, stock water, and Native American Reservations. These allocations have reduced water deliveries from the LAA and have led to an increased dependence on imported water from MWD.

5.1.2 Metropolitan Water District

The MWD is a wholesale water agency with 26 member agencies, including the City of Los Angeles. MWD's service area covers approximately 5,200 square miles in Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Ventura counties. Water is delivered to MWD from the Bay Delta and the Colorado River Basin. Water quality and supply in the Bay Delta face many challenges,

including sea level rise, climate change, levee deterioration, seismic risk, urbanization, threatened and endangered species, ecosystem degradation, and Federal court decisions regarding water exports.

To address these challenges, former California Governor Arnold Schwarzenegger established the Delta Vision Process in 2006. As a result, an independent Blue Ribbon Task Force completed a vision for sustainable management of the Bay Delta in 2008. Resulting legislation established the Delta Stewardship Council, an independent State agency, with the co-equal goal of Delta restoration and water supply reliability. The Delta Stewardship Council is preparing a Delta Plan to achieve the co-equal goals. The Delta Plan may include the Bay Delta Conservation Plan (BDCP). The BDCP is a joint effort of State and Federal fish agencies; State, Federal, and local water agencies; environmental organizations; and other parties. When complete, the BDCP will provide the basis for the issuance of endangered species permits for the operation of the State and Federal water projects. The plan would be implemented over the next 50 years. The heart of the BDCP is a long-term conservation strategy that sets forth actions needed for a healthy Delta.

With regard to MWD's Colorado River supplies, water availability from the Colorado River is governed by a system of priorities and water rights. The 1931 Seven Party Agreement established California's priorities for Colorado River Water. MWD is assigned a fourth priority of 550,000 AFY. As a result of growth in other states and drought conditions since 2003, MWD's deliveries have been limited to their base apportionment, plus water from a conservation program and unused apportionments from other states. MWD is currently engaged in several efforts to increase Colorado River supply reliability, including through its Integrated Resources Plan update process, the funding of a new reservoir adjacent to the All American Canal in Imperial County, and the authorization of agreements leading toward the adoption of a Federal Colorado River Shortage-Sharing Plan. However, it is unknown to what extent drought conditions and MWD's efforts to adapt to those conditions will affect MWD's firm Colorado River water supply.

5.1.3 Local Groundwater

Over the last ten years, local groundwater has provided over 10 percent of the total water supply for Los Angeles, and historically it has provided nearly 30 percent of total supply during droughts when imported supplies became unreliable. LADWP has water rights to approximately 110,000 AFY in the Upper Los Angeles River Area (ULARA) and the Central and West Coast Basins. The primary source of local groundwater (approximately 90,000 AFY) is in the ULARA in the San Fernando Basin. Since 2007, contamination issues have affected LADWP's ability to fully utilize its local groundwater entitlements. LADWP is working on treatment for the San Fernando Basin's groundwater and anticipates that treatment facilities will be in operation by 2021.

Additionally, reduction of natural infiltration due to expanding urban hardscape and channelization of stormwater runoff has resulted in declining groundwater elevations. LADWP is making

investments to recharge local groundwater basins through stormwater recharge projects, including replacement or rehabilitation of old and deteriorating stormwater capture facilities.

5.1.4 Summary of LADWP Water Conservation Efforts

The City has continually invested in water conservation programs targeting cost-effective reductions in water use. Programs include: investments in state-of-the-art technology; rebates and incentives promoting installation of weather-based irrigation controllers; efficient clothes washers and toilets; expansion and enforcement of prohibited water use; reductions in outdoor water uses; and extending education and outreach efforts. Other examples of the City's commitment to water conservation include, but are not limited to, the following:

- LADWP is one of the original signatories to the California Urban Water Conservation Council Memorandum of Understanding (MOU), and as such has to report its progress on achieving water conservation Best Management Practices (BMPs). LADWP is currently in compliance with all the BMPs contained in the MOU. Table 5-1 shows the status of water conservation BMPs in the City of Los Angeles.

- In 2008, the City adopted "Securing L.A.'s Water Supply," which is a blueprint for creating sustainable sources of water for the future of Los Angeles. This plan is an aggressive multi-pronged approach to water conservation that includes: investments in state-of-the-art water conservation technology; issuance of a combination of rebates and incentives; installation of smart irrigation controllers (e.g., controllers sense when adequate moisture is present); efficient commercial and residential washers and toilets; and development of long-term measures such as expansion of water recycling and investment in cleaning up the local groundwater supply.

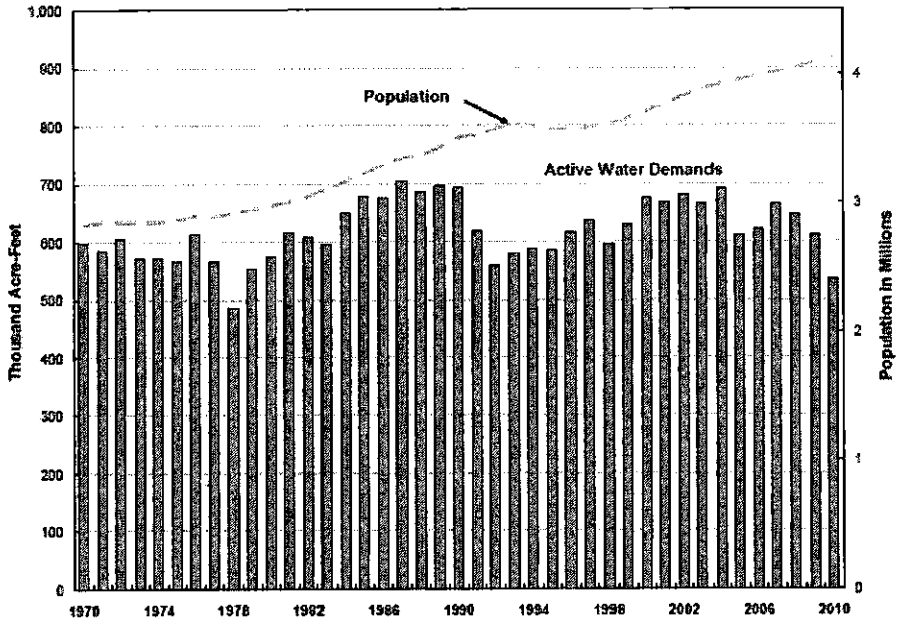
- In 2010, the City adopted a water conservation ordinance (Ordinance 181288) to clarify prohibited uses and modify certain water conservation requirements of the Water Conservation Plan of the City of Los Angeles. The purpose of this ordinance is to provide a mandatory water conservation plan to minimize the effect of a shortage of water to customers and to adopt provisions that will significantly reduce the consumption of water over an extended period of time.

TABLE 5-1. STATUS OF WATER CONSERVATION BMPS IN THE CITY OF LOS ANGELES

Category	Sub-Category	Practices	Status
Foundational			
Utility Operations	Operations Practices	Maintain the position of a trained conservation coordinator	Implemented
		Prevent water waste – Enact, enforce, or support legislation, regulations, and ordinances	Implemented
		Wholesale agency assistance programs	Not Applicable
	Water Loss Control	Conduct standard water audit and water balance	Implemented
		Measure performance using American Water Works Association (AWWA) software	Implemented
		Locate and repair all leaks and breaks	Implemented
	Metering with Commodity Rates	100% of existing unmetered accounts to be metered and billed by volume of use	Implemented
	Conservation Pricing	Maintain a water conserving retail rate structure	Implemented
Education	Public Information Programs	Maintain active public information program to promote and educate customers about water conservation	Implemented
	School Education Programs	Maintain active program to educate students about water conservation and efficient water use	Implemented
Programmatic			
Residential		Residential Assistance – Provide leak detection assistance	Implemented
		Landscape water surveys for residential accounts	Implemented
		High efficiency clothes washer incentive program	Implemented
		WaterSense Specification (WSSI) for toilets	Implemented
Commercial/Industrial/ Institutional (CII)		Implement unique conservation programs to meet annual water savings goals for CII customers	Implemented
Landscape		Implement Large Landscape custom programs	Implemented
		Offer technical assistance and surveys upon request	Implemented
		Implement and maintain incentive program(s) for irrigation equipment retrofits	Implemented

As a result of their water conservation efforts, the City of Los Angeles has significantly reduced water use despite significant population growth. During fiscal year 2009–10, water use was below 1979 water use levels, despite a population increase of approximately one million. Figure 5-2 illustrates Los Angeles' water use and population growth from 1970 to 2010.

FIGURE 5-2. CITY OF LOS ANGELES' WATER USE AND POPULATION GROWTH FROM 1970 TO 2010



5.2 Water Conservation at Owens Lake

A key part of LADWP's water resources management program is the development of new and stronger water conservation measures, including conservation at Owens Lake. The current annual water budget for dust control is approximately 95,000 AFY; actual water use varies depending on conditions during the water year (e.g., temperature, evaporation). The LADWP Board of Directors adopted a mandate to conserve water on Owens Lake. In addition, the Master Plan Vision Statement developed by the Planning Committee stated that water use efficiency and conservation shall be a priority when implementing dust control on Owens Lake. Water conserved would be available for other beneficial uses.

In order to determine the water conservation potential for the Master Plan, LADWP evaluated the water demand necessary to comply with dust control requirements and to maintain habitat value over time under a variety of future scenarios. A summary of the water demand analysis is included as Appendix E. Based on this analysis, the water conservation target of 50 percent of the annual water budget should be feasible within the context of the Master Plan. Achieving this target is dependent on the following:

- Efficient operations and management of the dust control project, defined as Phases 1 though 8
- Testing, approval, and implementation of modified or new BACM, especially where such BACM are water-efficient or waterless
- Issuance of appropriate leases and environmental permits for new BACM
- Allocation of resources for funding and staff
- Achievement of dust control, habitat, and water conservation goals concurrently

Furthermore, if ongoing groundwater evaluations determine that a cost-effective yield is environmentally sustainable, then use of local groundwater for dust control could contribute to achieving the water conservation target. Local groundwater studies are described in the following section.

5.3 Groundwater Studies at Owens Lake

In 2007, LADWP, in cooperation with the Inyo County Water Department, the District, and the Commission, commenced the Owens Lake Groundwater Evaluation Project. The project is evaluating the potential use of groundwater for dust control measures. Considerations include hydrology, geology, natural springs, vegetation, and other existing natural resources that depend on groundwater; possible impacts from groundwater withdrawals on these resources; and proposed methods to avoid or mitigate such impacts. The project will be used to determine whether an environmentally sustainable groundwater yield is possible. The estimated completion date is 2012.

If a safe yield is determined, then groundwater pumping from the Owens Lakebed would be subject to the following:

1) Resolution of the applicability of the Long Term Water Agreement
2) Resource protection criteria to protect the environmental resources (e.g., springs and seeps, private wells, vegetated areas that depend on groundwater, and facilities that could be sensitive to potential land subsidence) in and around Owens Lake; the County, the District, and LADWP are currently working to develop these criteria
3) Evaluation of water rights for use of groundwater

5.4 Monitoring

Progress toward the water conservation target will be reported annually to the Master Plan Coordinator by LADWP. The Master Plan Coordinator will document progress in an Annual Report. The Master Plan Coordinator's role and Annual Reports are described in detail in Section 8, Implementation.

There is no monitoring associated with the use of groundwater on Owens Lake because groundwater use is being evaluated independent of the Master Plan. If groundwater use on the lake occurs, then it will be subject to monitoring consistent with the resource protection criteria, currently under development by the County, the District, and LADWP.

6.0 HABITAT

Habitat is a critical element of the Master Plan because it addresses the conservation of ecological functions and values within the plan area. Additionally, wildlife habitat is recognized by the Commission as a Public Trust resource at Owens Lake. The plan area provides habitat for many species, and it is an important site for thousands of migrating birds each year. Owens Lake is designated as an Important Bird Area by the Audubon Society because it provides essential habitat for sensitive resident species and migrating birds. The Planning Committee identified the protection, creation, and/or enhancement of ecological resources at Owens Lake as a key goal of the Master Plan. By the nature of the dust control project, the relationship between habitat and dust control is interdependent, and the goals for these plan elements will be achieved concurrently.

A Habitat Suitability Model (HSM) was developed to identify baseline habitat values in the plan area for six habitat guilds: breeding and migrating shorebirds, breeding and migrating waterfowl, diving birds, and meadow species. The HSM will be used during implementation of the Master Plan to assess, plan, and manage existing areas and new projects in order to maintain baseline habitat value over time for the target guilds.

This section provides a description of the six target guilds and habitat parameters identified for their long-term management, the HSM for each guild, and the monitoring and adaptive management program to maintain or augment habitat values at the lake.

6.1 Target Habitat Guilds

Six target habitat guilds were identified for management on Owens Lake: breeding and migrating shorebirds, breeding and migrating waterfowl, diving birds, and meadow species. Table 6-1 presents the target guilds and the associated habitat variables. These guilds were identified based on the existing conditions within the plan area, current regulatory requirements, and previous conservation planning efforts. The target habitat guilds were selected in large part for species that use the dust control project because the dust control project is highly managed and provides habitat for numerous species. However, species using non-dust control project areas that are less managed, natural areas, such as the playa and the areas surrounding seeps, springs, and creeks, were also included in the target guilds so that the whole plan area is represented.

1 **TABLE 6-1. OWENS LAKE MASTER PLAN TARGET GUILDS AND IMPORTANT HABITAT VARIABLES**

Guild / Variable	Breeding and Migrating Shorebirds	Breeding and Migrating Waterfowl	Diving Waterbirds	Meadow Species
Focal Breeding Species	Western Snowy Plover, American Avocet, Black-necked Stilt	Primarily Gadwall and Mallard	None	Tule Elk, Owens Valley Vole, other rodents, and various reptiles; Northern Harrier, Savannah Sparrow, Burrowing Owl, and other ground nesting birds; rare plants
Focal Seasonal Migrant Species	Least and Western Sandpipers, phalaropes, Long-billed Curlew and other shorebirds	Northern Shoveler, Cinnamon Teal, and other dabbling ducks	Eared Grebe, Ruddy Duck, and all diving ducks	
Food Sources	Mainly brinefly larvae pupae and adults plus other invertebrates	Aquatic vegetation, seeds of wetland vegetation and aquatic invertebrates	Brinefly larvae and pupae, Brine shrimp and other planktonic invertebrates	Mainly seeds, some vegetation, terrestrial insects, and rodents
Salinity	Brackish to saline	Fresh to brackish	Fresh (diving ducks); Brackish to saline (Eared Grebe, Ruddy Duck)	Freshwater to brackish
Vegetation	Minimal, uses mostly unvegetated areas	Emergent and aquatic vegetation important for breeding and foraging	Minimal	Very important, mainly grasses, some shrubs in wet and drier meadows
Connectivity	Breeding birds need connection from nesting to foraging areas	Breeding birds need connection from nesting areas to ponds		Saltgrass connected to some upland shrubs and denser grasses
Islands	Beneficial for loafing and roosting	Islands, particularly with vegetation for security, for loafing, nesting, and roosting	Not used	Islands of shrubs for increased habitat structure
Water Depth	Shallow, variable up to 10 cm deep for a diversity of shorebirds	Average 20 cm deep	Ruddy duck may forage in shallow water; others 25 cm+	Shallow wet and dry mosaic when irrigated
Microtopography	Topographic diversity important for foraging of different size birds; also important for nesting	Bottom topographic diversity important for diverse foraging areas; generally shallow with some deeper areas	Shallow areas important for increased productivity and deeper areas for diving to escape predation.	Will help recruit a diversity of plant species and important for burrow placement
Seasonal changes in water application or water availability	Summer drawdown concentrates food insects for fall migration period	Irrigation pulses and dry-down important for seed germination and cattail control	Maintaining open water most important during spring and fall	Pulse irrigation during growing season
Peak use	April and August	Late March to early April and October	April and October	Year-round
Breeding Season	Mid-March–July	Mid-March–July	Migrants only	Varies

6.2 Habitat Suitability Model

The HSM was developed specific to Owens Lake to identify baseline habitat values for the entire plan area as a basis for conservation and management. The HSM will be used during implementation of the Master Plan framework: 1) to track habitat value over time; 2) to predict habitat value when planning projects on the lake; and 3) to improve understanding of habitat parameters in the adaptive management process. The following subsections describe the development of the Owens Lake HSM, definition of management cells and units, and the models for each target guild.

6.2.1 Development of the Owens Lake Habitat Suitability Model

Habitat suitability models are used to estimate the ability for a given habitat to support a selected species or group of species. The HSM developed for Owens Lake is focused on describing the suitability of habitat for identified target guilds. As stated above, the HSM can be used to track habitat conditions and to guide the design and/or management of projects within the plan area. The HSM improves understanding of the habitat preferences of guilds at Owens Lake.

To construct the Owens Lake HSM, a set of parameters were chosen that best describe the suitable habitat for each target guild. There are three basic approaches to selecting these parameters: a) expert-knowledge from scientific literature and local expert opinion; b) empirical measurements of environmental factors; and c) population viability studies. Typically, a combination of these approaches is used in conservation efforts, reflecting the need to use the best science available at that time. The selection of parameters for the Owens Lake HSM is based on a combination of local expert knowledge, scientific literature, and locally-collected empirical data. Habitat parameters also were selected: 1) to use the minimum number that would best describe the habitat for each guild, 2) that could be reasonably measured to construct the model, and 3) that included efficiency considerations for future monitoring and management purposes. For example, salinity is used to describe abundance of food source (invertebrates) because various invertebrate production is linked to specific ranges of the salinity of water. Salinity can be reliably measured and monitored, whereas reliable measurements of invertebrates are extremely difficult. Appendix F, Habitat Suitability Models, describes the details of each parameter and the relevance to specific target guilds, as well as the methods used to measure the value of each parameter.

In developing the Owens Lake HSM, a Habitat Suitability Index (HSI) model initially was developed for four guilds. The HSI model was validated using 2010 bird counts and was found to accurately rank areas for bird use, but it did not correlate well for abundance of guild species. An independent scientific panel reviewed the initial HSI model and validation. The model was refined based on the independent scientific review panel's comments. Appendix G identifies the independent scientific review panel and documents the written comments from each member. Additional refinement of

the model also incorporated verbal comments during three meetings with the independent scientific review panel. Scientists with Audubon California also reviewed the original HSI model. The revisions to the HSI model based on comments from these scientists are contained in the current Owens Lake HSM.

The refinements to the initial model included the following:

- Separated breeding shorebirds and migrating shorebirds into separate guilds, and adjusted habitat parameters and suitability index values accordingly
- Separated breeding waterfowl and migrating waterfowl into separate guilds, and adjusted habitat parameters and suitability index values accordingly
- Redefined the "Open Water" guild to the "Diving Waterbird" guild, adding diving ducks
- Defined water depth value measurements for ponds of a critical size (≥ 40 acres) for the Diving Waterbird guild
- Refined salinity suitability index values for all affected guilds
- Adjusted suitability index value of the island parameter for shorebirds and waterfowl guilds to reflect benefit relative to other parameters
- Adjusted vegetation cover to scale to the proportion of area in the Meadow guild

Once adjustments were made to the initial model, the second version was validated using 2010 bird counts. The HSM improves the correlation of habitat suitability with abundance of birds for most guilds (see validation section of Appendix F, Habitat Suitability Models).

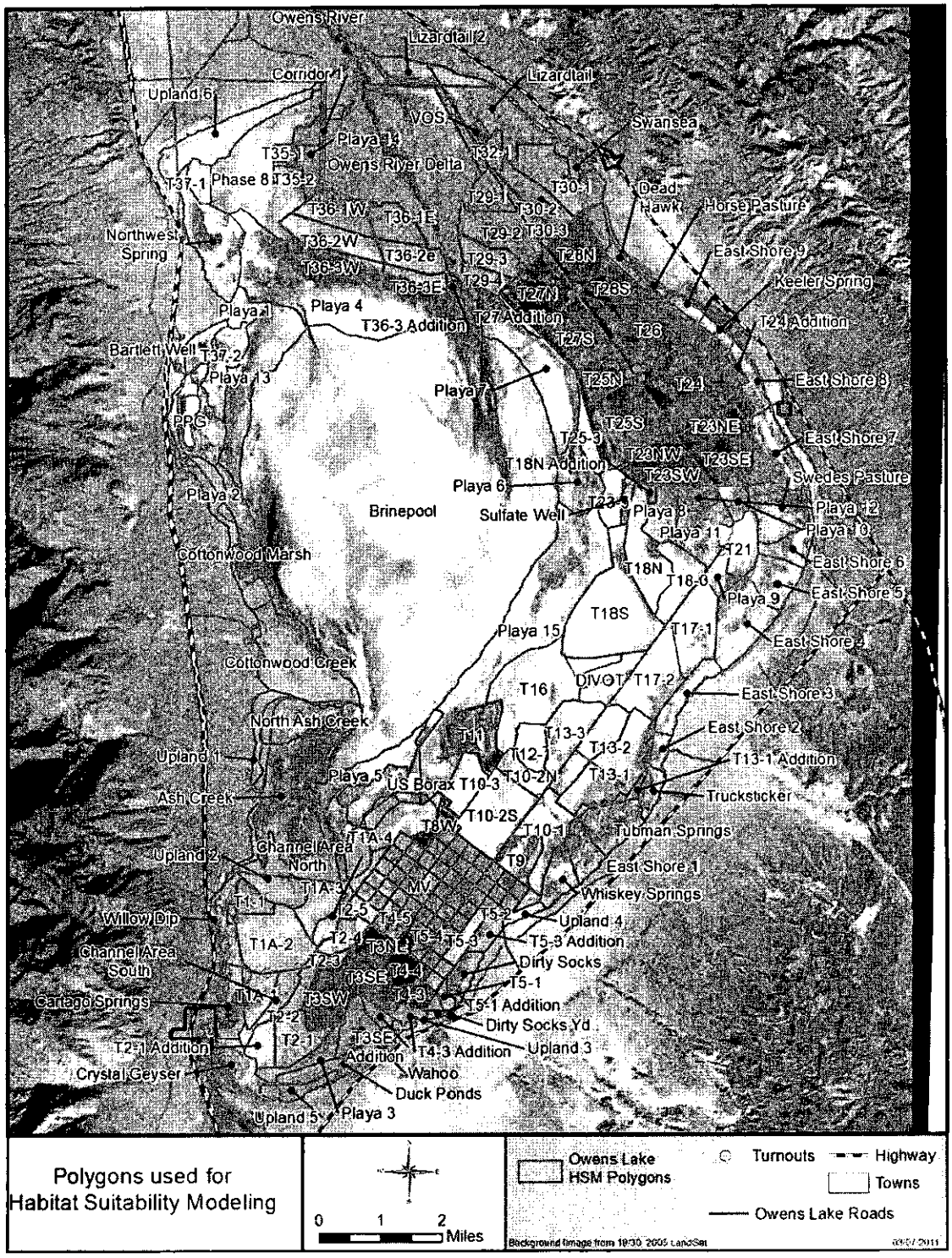
It is the consensus of the independent scientific review panel, Audubon California scientists, and the Habitat Working Group that the HSM is the version of the model to be adopted for the Master Plan framework; however, it is understood that the model will continue to be refined during implementation of the Master Plan as additional survey data and new information are added in subsequent years, consistent with the adaptive management process.

6.2.2 Habitat Management in Dust Control Cells and Non-Dust Control Units

To assess existing habitat value for target guilds, the plan area was divided into defined areas for landscape-scale management based on existing dust control project cells and non-dust control units. The management cells and units are defined in this manner because the dust control project is generally more highly managed than non-dust control areas. In the dust control project, current BACM dictate dust control compliance operations and management for each dust control project cell; therefore, the naming of cells for habitat modeling follows the dust control project nomenclature.

The non-dust control units are defined by natural breaks in physical areas outside of the dust control project (e.g., the brine pool or areas surrounding specific springs form individual units). Figure 6-1 shows all the defined management polygons as specific dust control project cells and the specific non-dust control project units within the plan area.

FIGURE 6-1. POLYGONS (DUST CONTROL PROJECT CELLS AND NON-DUST CONTROL PROJECT UNITS) WITHIN THE PLAN AREA



6.2.3 Habitat Suitability Model for Each Target Guild

As previously described, the Owens Lake HSM is comprised of six separate suitability models for each of the target guilds that currently use habitat at Owens Lake: Diving Waterbirds, Breeding Waterfowl, Migrating Waterfowl, Breeding Shorebirds, Migrating Shorebirds, and Meadow Guilds. Each model is a mathematical equation that represents the hypothesized relative contribution of each parameter to the suitability of the habitat defined for each guild. The resulting guild HSM value can range from 0 (non-suitable habitat) to 1 (highly suitable habitat).

Figure 6.2 conceptually shows the Owens Lake Diving Waterbird Guild HSM habitat parameters. Table 6.2 shows the details of this model, including habitat parameters, habitat value measurements, and the suitability index values for each parameter's habitat value measurement. The mathematical equation that represents the relative contribution of each parameter to the suitability of the habitat is defined for the Diving Waterbird Guild.

FIGURE 6-2. CONCEPTUAL OWENS LAKE DIVING WATERBIRD GUILD HABITAT SUITABILITY MODEL

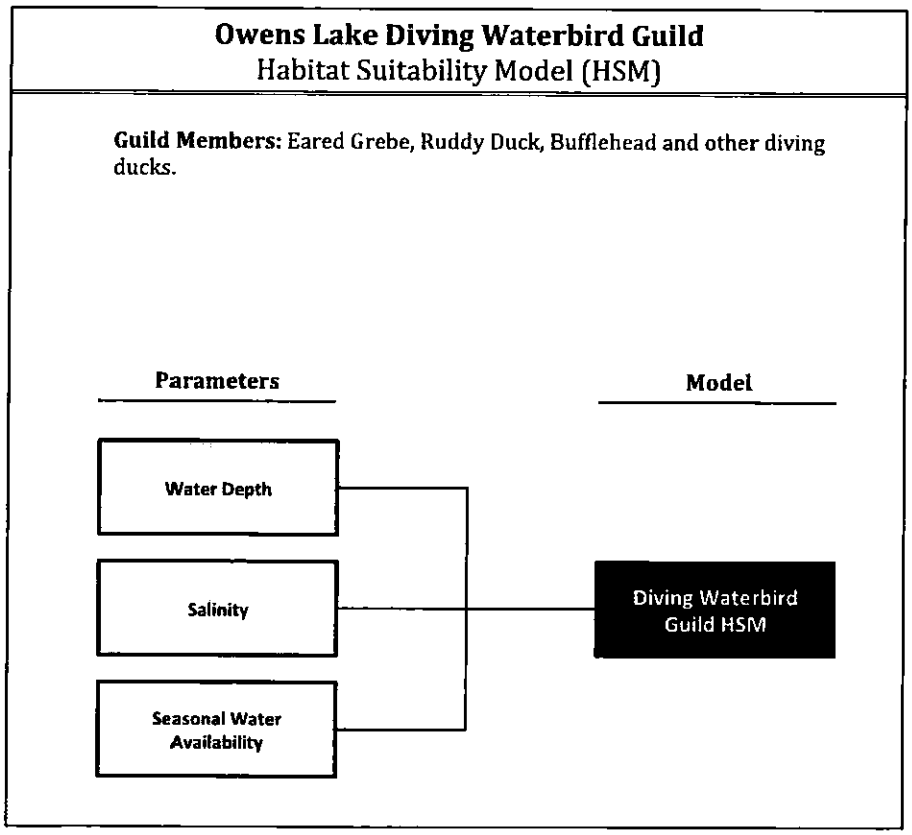


TABLE 6-2. OWENS LAKE DIVING WATERBIRD GUILD HABITAT SUITABILITY MODEL DETAILS

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth in ponds greater than 40 acres	0cm (no water) 0<x<10 cm 10≤x<25 cm 25≤x<40 cm ≥40 cm	0 * proportion of pond 0.05 * proportion of pond 0.1 * proportion of pond 1 * proportion of pond 0.8 * proportion of pond [Sum total]
Salinity Average for polygon	Fresh (up to 5 mS/cm) Brackish (5-15 mS/cm) Productive Saline (15-50 mS/cm) Saline (50-70 mS/cm) Saline to Hypersaline (70-100 mS/cm) Hypersaline (>100 mS/cm)	0.4 0.8 1 0.6 0.4 0
Seasonal Water Availability Each applicable season	Spring Summer Fall Winter	0.4 0.05 0.5 0.05 [Sum total]
Model Equation: Diving Waterbird HSM = (Water Depth SIV)*(Salinity SIV*Seasonal Water SIV)$^{1/2}$		

Figure 6.3 conceptually shows the Owens Lake Breeding Waterfowl Guild HSM habitat parameters. Table 6.3 shows the details of this model, including habitat parameters, habitat value measurements, and the suitability index value for each parameter's habitat value measurement. The mathematical equation that represents the relative contribution of each parameter to the suitability of the habitat is defined for the Breeding Waterfowl Guild.

FIGURE 6-3. CONCEPTUAL OWENS LAKE BREEDING WATERFOWL GUILD HABITAT SUITABILITY MODEL

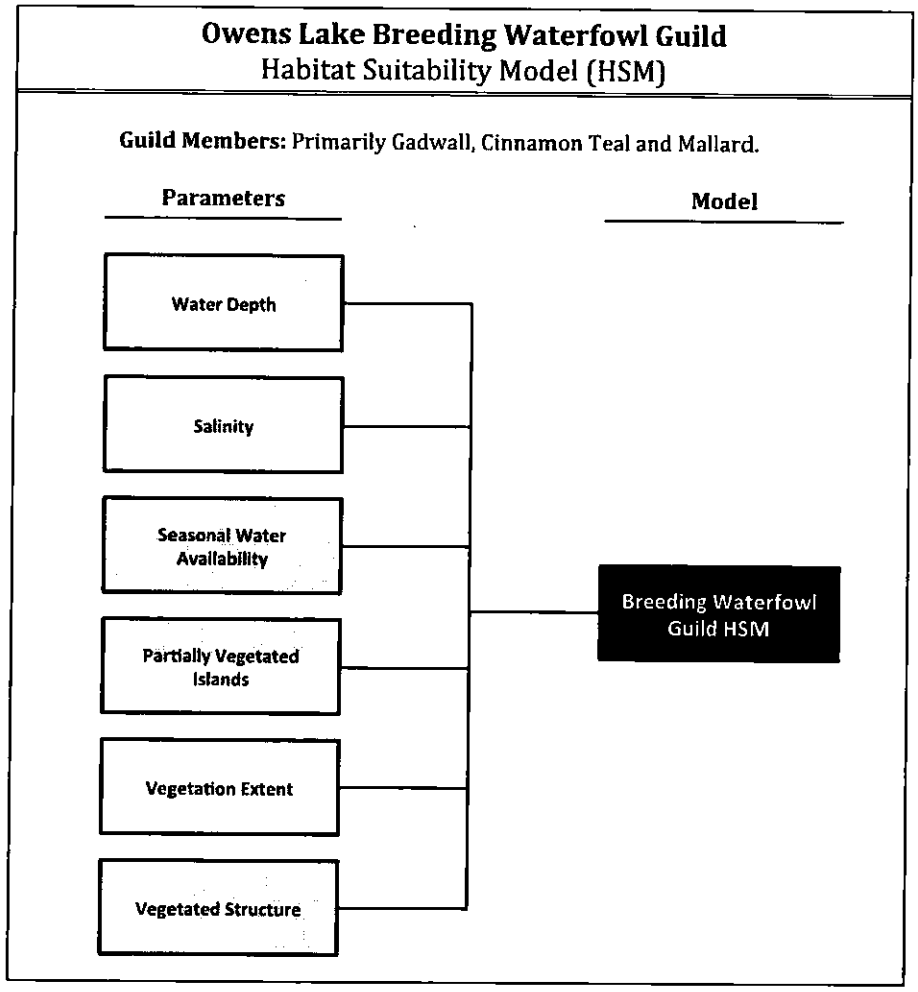


TABLE 6-3. OWENS LAKE BREEDING WATERFOWL GUILD HABITAT SUITABILITY MODEL DETAILS

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth	0cm (no water) 0<x<13 cm (up to 80% of polygon) 13≤x<30 cm (up to 80% of polygon) ≥30 cm	0 * proportion of polygon 0.8 * proportion of polygon 1 * proportion of polygon 0.01 * proportion of polygon [Sum total * 1.25]
Salinity Average for polygon	- Fresh (up to 5 mS/cm) Brackish (5-15 mS/cm) Productive Saline (15-50 mS/cm) Saline (50-70 mS/cm) Saline to Hypersaline (70-100 mS/cm) Hypersaline (>100 mS/cm)	1 0.8 0.4 0.1 0 0
Seasonal Water Availability Each applicable season	Spring Summer Fall Winter	0.35 0.4 0.25 0 [Sum total]
Partially Vegetated Islands Proportion of acreage of land surrounded by water to total acreage	<4% Islands For each additional percentage of islands add 0.1 to a maximum of 1 where; ≥10% Islands	0.3 1
Vegetated Extent Percentage of grass dominated vegetation over entire polygon	≥60% Cover 40≤x<60% Cover 25≤x<40% Cover 5≤x<25% Cover 0≤x5% Cover	0.4 1 0.8 0.2 0
Vegetation Structure Structure based on dominant community	High herbaceous structural diversity Additional herbaceous layer common above saltgrass Isolated areas of additional herbaceous structure above saltgrass Low growing, usually saltgrass dominant Shrub dominant No vegetation	1 0.8 0.5 0.2 0.1 0
	Tamarisk presence	-0.3

Model Equation: Breeding Waterfowl HSM = (Water Depth SIV*Salinity SIV)$^{1/2}$ (Vegetated Extent SIV*Vegetation Structure SIV*Island SIV*Seasonal Water SIV)$^{1/5}$

Figure 6.4 conceptually shows the Owens Lake Migrating Waterfowl Guild HSM habitat parameters. Table 6.4 shows the details of this model, including habitat parameters, habitat value measurements, and the suitability index value for each parameter's habitat value measurement. The mathematical equation that represents the relative contribution of each parameter to the suitability of the habitat is defined for the Migrating Waterfowl Guild.

FIGURE 6-4. CONCEPTUAL OWENS LAKE MIGRATING WATERFOWL GUILD HABITAT SUITABILITY MODEL

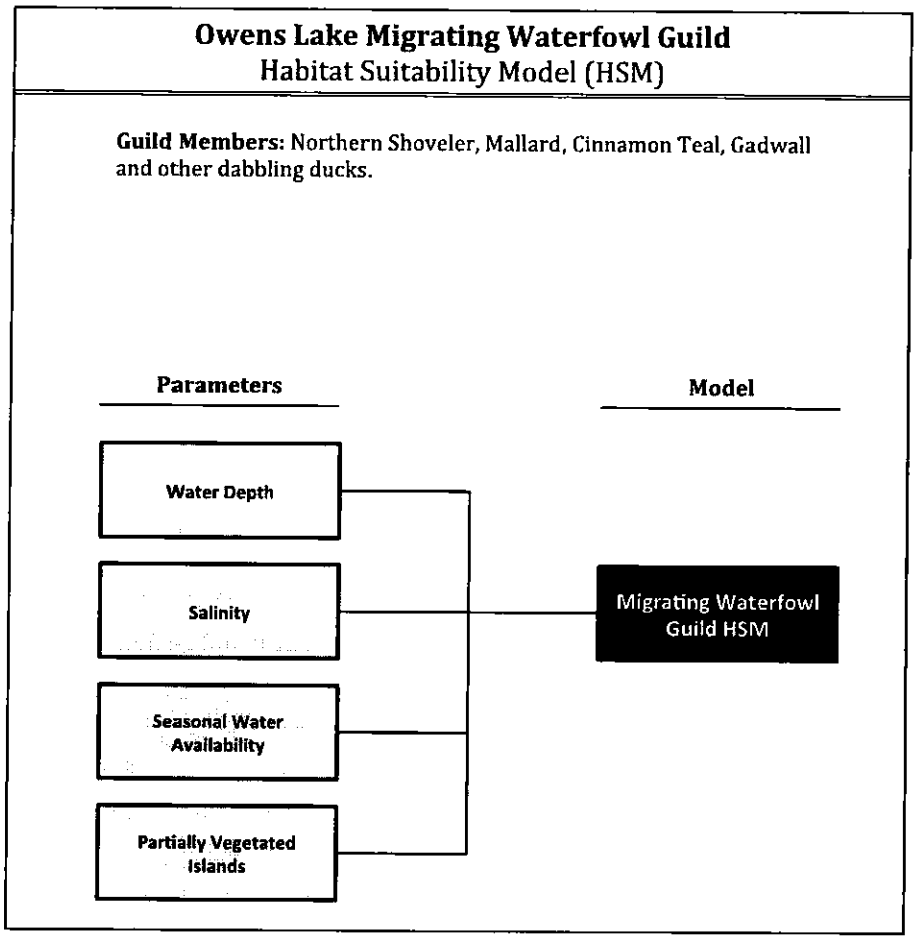


TABLE 6-4. OWENS LAKE MIGRATING WATERFOWL GUILD HABITAT SUITABILITY MODEL DETAILS

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth	0 cm (no water) 0<x<13 cm (up to 80% of polygon) 13≤x<30 cm (up to 80% of polygon) ≥30 cm	0 * proportion of polygon 0.8 * proportion of polygon 1 * proportion of polygon 0.01 * proportion of polygon [Sum total * 1.25]
Salinity Average for polygon	Fresh (up to 5 mS/cm) Brackish (5-15 mS/cm) Productive Saline (15-50 mS/cm) Saline (50-70 mS/cm) Saline to Hypersaline (70-100 mS/cm) Hypersaline (>100 mS/cm)	0.8 1 1 0.5 0.1 0
Seasonal Water Availability Each applicable season	Spring Summer Fall Winter	0.3 0.05 0.6 0.05 [Sum total]
Partially Vegetated Islands Proportion of acreage of land surrounded by water to overall acreage	<4% Islands For each additional percentage of islands add 0.1 to a maximum of 1 where; ≥10% Islands	0.3 1
Model Equation: Migrating Waterfowl HSM = Water Depth SIV*(Island SIV*Salinity SIV*Seasonal Water SIV)$^{1/3}$		

Figure 6.5 conceptually shows the Owens Lake Breeding Shorebird Guild HSM habitat parameters. Table 6.5 shows the details of this model, including habitat parameters, habitat value measurements, and the suitability index value for each parameter's habitat value measurement. The mathematical equation that represents the relative contribution of each parameter to the suitability of the habitat is defined for the Breeding Shorebird Guild.

FIGURE 6-5. CONCEPTUAL OWENS LAKE BREEDING SHOREBIRD GUILD HABITAT SUITABILITY MODEL

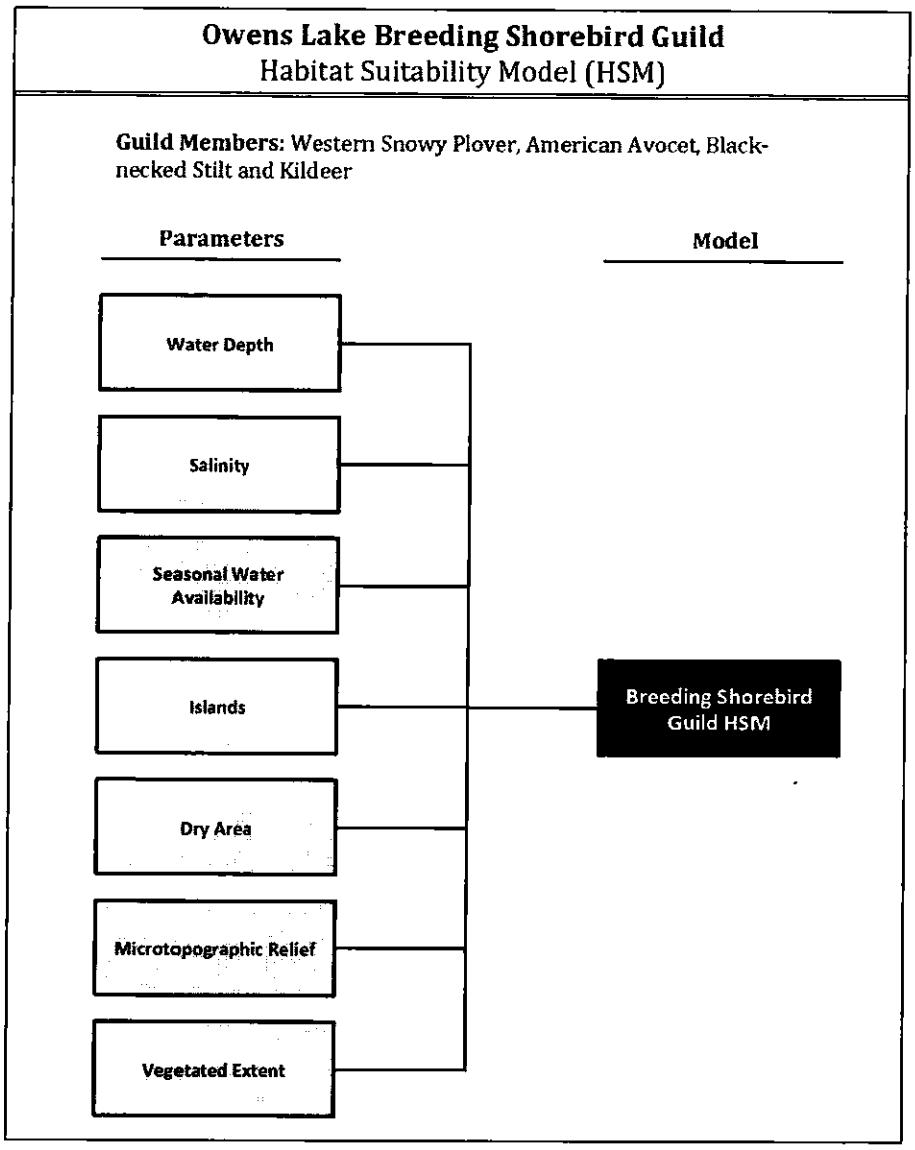


TABLE 6-5. OWENS LAKE BREEDING SHOREBIRD GUILD HABITAT SUITABILITY MODEL DETAILS

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth	0 cm (no water) 0<x<10 cm (up to 50% of polygon) 10≤x<25 cm (up to 50% of polygon) ≥25 cm	0.01 * proportion of polygon 1 * proportion of polygon 0.4 * proportion of polygon 0.05 * proportion of polygon [Sum total * 2]
Salinity Average for polygon	Fresh (up to 5 mS/cm) Brackish (5-15 mS/cm) Productive Saline (15-50 mS/cm) Saline (50-70 mS/cm) Saline to Hypersaline (70-100 mS/cm) Hypersaline (>100 mS/cm)	0.1 0.5 1 1 0.6 0.2
Seasonal Water Availability Each applicable season	Spring Summer Fall Winter	0.5 0.5 0 0 [Sum total]
Islands Proportion of acreage of land surrounded by water to overall acreage	<4% Islands For each additional percentage of islands add 0.1 to a maximum of 1 where; ≥10% Islands	0.3 1
Dry Area Percentage of dry area	0%≤x<10% 10%≤x<20% 20%≤x<30% 30%≤x<60% 60%≤x<80% 80%≤x<100% 100% (but standing water within ~0.5 mile) No water within 0.5 mile	0.1 0.3 0.6 1 0.7 0.4 0.1 0
Microtopographic Relief (of dry areas) Average difference between local maximum and local minimum	0≤x<2 cm 2≤x<5 cm 5≤x<20 cm ≥20 cm (tillage)	0.2 0.7 1 0.7
Vegetated Extent (Percentage of vegetation over entire area)	≥50% Cover 25≤x<50% Cover 10≤x<25% Cover 0≤x<10% Cover	0.3 0.4 0.6 1

Model Equation: Breeding Shorebird HSM = (Dry Area SIV*Water Depth SIV)$^{1/2}$*(Relief SIV*Vegetated Extent SIV*Salinity SIV*Seasonal Water SIV*Islands SIV)$^{1/5}$

Figure 6.6 conceptually shows the Owens Lake Migrating Shorebird Guild HSM habitat parameters. Table 6.6 shows the details of this model, including habitat parameters, habitat value measurements, and the suitability index value for each parameter's habitat value measurement. The mathematical equation that represents the relative contribution of each parameter to the suitability of the habitat is defined for the Migrating Shorebird Guild.

FIGURE 6-6. CONCEPTUAL OWENS LAKE MIGRATING SHOREBIRD GUILD HABITAT SUITABILITY MODEL

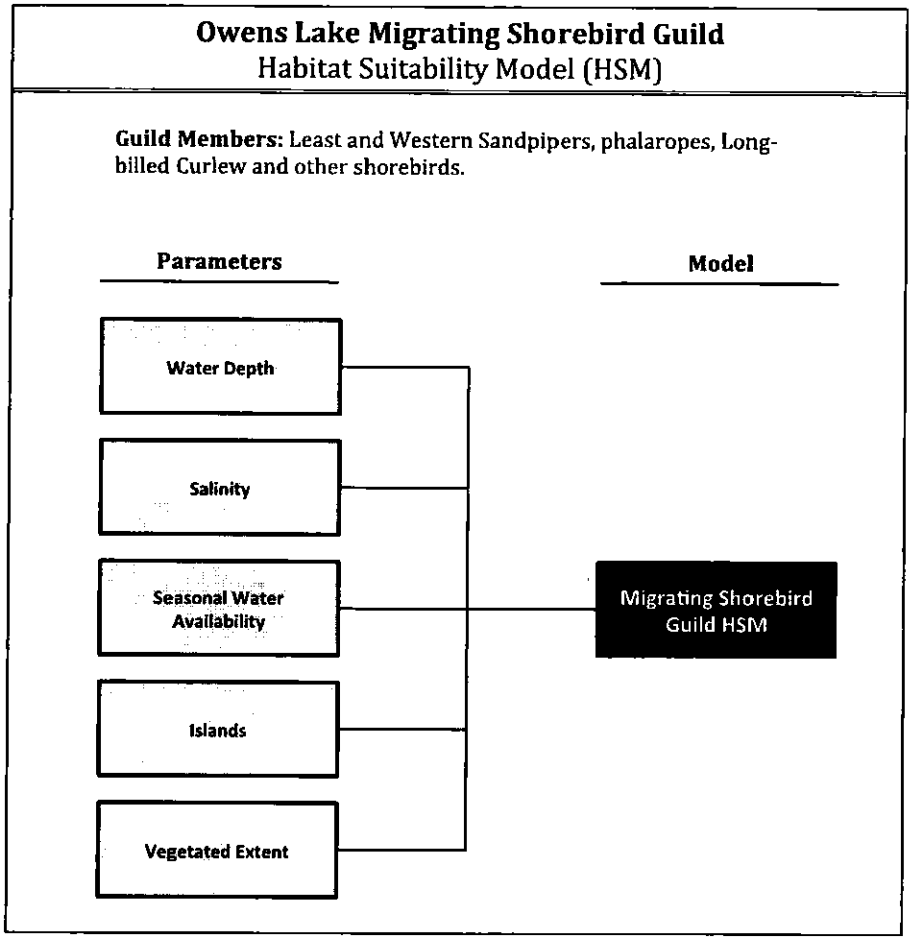


TABLE 6-6. OWENS LAKE MIGRATING SHOREBIRD GUILD HABITAT SUITABILITY MODEL DETAILS

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth	0 cm (no water) 0<x<10 cm (up to 50% of polygon) 10≤x<25 cm (up to 50% of polygon) ≥25 cm	0 * proportion of polygon 1 * proportion of polygon 0.4 * proportion of polygon 0.05 * proportion of polygon [Sum total * 2]
Salinity Average for polygon	Fresh (up to 5 mS/cm) Brackish (5-15 mS/cm) Productive Saline (15-50 mS/cm) Saline (50-70 mS/cm) Saline to Hypersaline (70-100 mS/cm) Hypersaline (>100 mS/cm)	0.2 0.8 1 0.4 0.1 0
Seasonal Water Availability Each applicable season	Spring Summer Fall Winter	0.4 0.05 0.5 0.05 [Sum total]
Islands Proportion of acreage of land surrounded by water to overall acreage	<4% Islands For each additional percentage of islands add 0.1 to a maximum of 1 where; ≥10% Islands	0.3 1
Vegetated Extent (Percentage of vegetation over entire area)	≥50% Cover 25≤x<50% Cover 10≤x<25% Cover 0≤x<10% Cover	0.3 0.4 0.6 1
Model Equation: Migrating Shorebird HSM= (Water Depth SIV)*(Vegetated Extent SIV*Island SIV*Salinity SIV*Seasonal Water SIV)$^{1/4}$		

Figure 6.7 conceptually shows the Owens Lake Meadow Guild HSM habitat parameters. Table 6.7 shows the details of this model, including habitat parameters, habitat value measurements, and the suitability index value for each parameter's habitat value measurement. The mathematical equation that represents the relative contribution of each parameter to the suitability of the habitat is defined for the Meadow Guild.

FIGURE 6-7. CONCEPTUAL OWENS LAKE MEADOW GUILD HABITAT SUITABILITY MODEL

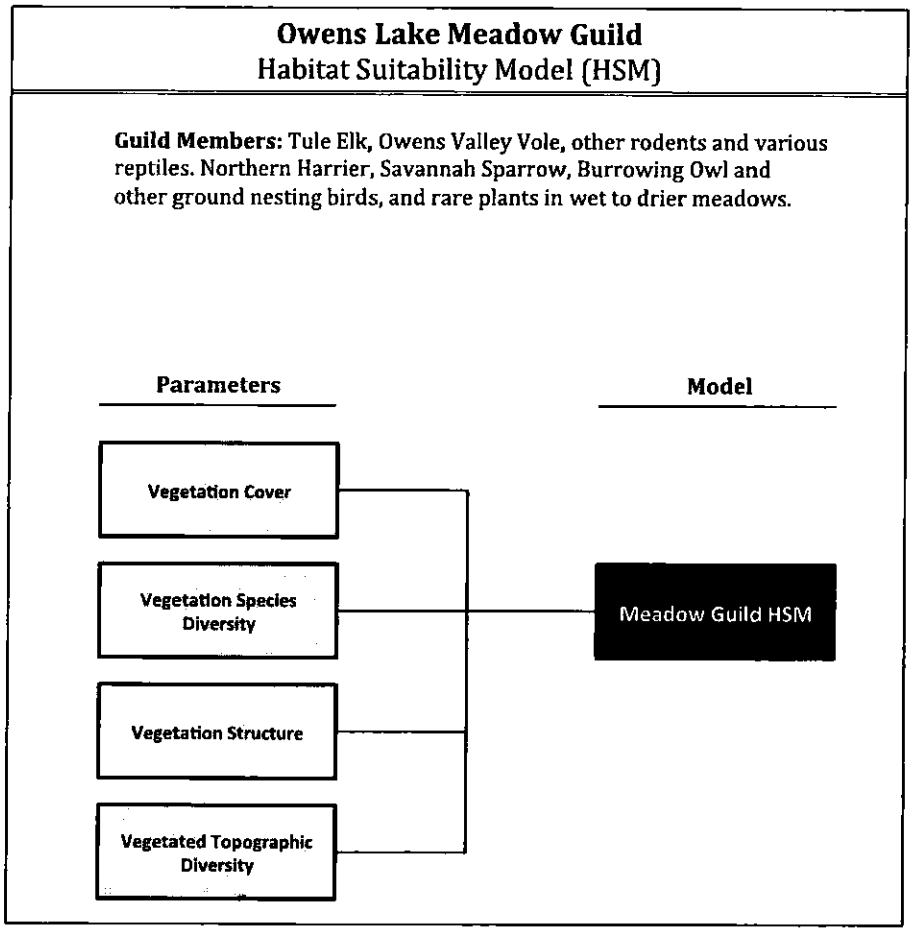


TABLE 6-7. OWENS LAKE MEADOW GUILD HABITAT SUITABILITY MODEL DETAILS

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Vegetation Cover	≥50% Cover 25≤x<50% Cover 10≤x<25% Cover 0<x<10% Cover 0% Cover	1 * proportion of polygon 0.8 * proportion of polygon 0.6 * proportion of polygon 0.4 * proportion of polygon 0 * proportion of polygon [Sum total]
Vegetation Richness (Number of species)	>40 species 31-40 species 21-30 species 10-20 species 1-9 species 0 species	1 0.9 0.8 0.6 0.4 0
	Tamarisk presence Other noxious weed presence Species status species presence	Subtract 0.3 Subtract 0.1 Add 0.1 per species
Vegetation Structure Structure based on dominant community	Multiple herbaceous layers and some native woody riparian Additional herbaceous layer common above saltgrass, potentially some shrubs Isolated areas of additional herbaceous structure above saltgrass Low-growing, usually saltgrass-dominant Shrub-dominant No vegetation	1 0.9 0.8 0.6 0.2 0
Vegetated Topographic Diversity	Flat (Swales of vegetation that exist with little slope) Mostly flat with short, steep slope (historic shoreline) Vegetated areas with shallow slope or short feature with steep slope Vegetated areas with multiple breaks in slope and often steeper slopes (e.g., berms, hummocks, and could include influence of various woody material and rocks)	0.7 0.8 0.9 1

Model Equation: Meadow Guild HSM = Cover SIV*(Richness SIV*Structure SIV*Topographic Diversity SIV)$^{1/3}$

6.3 Baseline Habitat Value-Acres for Landscape-Scale Management

Once all guild HSMs were described, reviewed, and refined, all delineated management cells and units were assessed through the HSM for each guild. In other words, each delineated cell and unit (as shown in Figure 6.1) was assessed for each habitat parameter based on area-specific habitat value measurements (see Appendix F for how each parameter was measured). Suitability index values were determined for each parameter. The suitability index values were then applied to the mathematical equation for each of the six guilds (as described in the previous section), and a value was computed for each guild for each cell and unit.

To obtain a meaningful management measure, the suitability index value for each guild is applied to the acreage of each cell and unit. Each cell and unit value from each guild HSM is multiplied by the acreage of each cell and unit to produce habitat value-acres for each guild. Therefore, each defined cell and unit has six habitat value-acres appraisals, one for each of the six target guilds. Table 6.8 gives the average habitat value-acres (averaged from May and November 2010) for each target guild within each defined cell and unit. The seasonal variability of total habitat value-acres for each guild is the absolute difference between habitat value in May and November, expressed as a percent (see Table 6.8).

The results from the HSM for each of the six guilds can be visualized in a general suitability map of the plan area using geographic information system (GIS) technology. The HSM value-acres derived for each guild are divided into general categories defined as marginal through optimal, which allows the model results to be presented visually within these suitability ranges. Figure 6.8 through Figure 6.13 show the habitat suitability for all cells and units for each target guild.

TABLE 6-8. AVERAGE HABITAT VALUE-ACRES (MAY–NOVEMBER 2010) FOR EACH TARGET GUILD WITHIN EACH DEFINED CELL AND UNIT

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
Channel Area North	133	Project	0	6	6	19	12	0
Channel Area South	190	Project	0	10	6	22	10	1
Corridor 1	88	Project	0	0	0	2	0	0
Phase 8	1290	Project	0	0	0	35	0	0
T10-1	448	Project	162	0	135	198	175	0
T10-2N	197	Project	73	0	76	74	122	0
T10-2S	695	Project	336	0	229	184	336	0
T10-3	281	Project	66	0	47	135	86	0
T11	432	Project	31	0	64	52	54	0
T1-1	155	Project	24	0	74	38	115	0
T12-1	220	Project	0	0	0	5	0	0
T13-1	745	Project	377	0	216	217	370	3
T13-1 Addition	80	Project	0	0	1	12	3	0
T13-2	390	Project	390	0	130	57	192	0
T13-3	438	Project	124	0	61	70	84	0
T16	1056	Project	906	0	184	202	223	0
T17-1	529	Project	243	0	165	228	246	0
T17-2	598	Project	408	0	96	154	172	0
T18-0	339	Project	128	0	186	70	179	0
T18N	545	Project	476	0	216	152	285	0
T18N Addition	21	Project	0	0	11	4	10	0
T18S	1167	Project	909	0	622	622	844	0
T1A-1	249	Project	0	10	10	37	21	2
T1A-2	708	Project	484	0	174	194	272	1
T1A-3	503	Project	0	0	0	11	0	0
T1A-4	616	Project	0	0	0	7	0	0
T21	317	Project	192	0	104	102	123	1
T2-1	333	Project	180	0	86	104	145	0
T2-1 Addition	187	Project	56	0	90	66	131	0
T2-2	134	Project	43	0	30	33	44	0
T2-3	75	Project	6	0	13	16	23	0
T23-5	199	Project	73	0	44	75	57	1
T23NE	266	Project	17	0	110	63	124	0
T23NW	221	Project	70	0	127	41	110	0
T23SE	474	Project	112	0	112	206	193	1
T23SW	225	Project	161	0	128	32	139	0
T24	1087	Project	120	0	177	298	320	6
T2-4	181	Project	0	0	0	19	0	0
T24 Addition	42	Project	0	0	0	6	0	0
T2-5	66	Project	0	0	0	18	0	0
T25-3	167	Project	0	0	14	47	36	0

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
T25N	259	Project	239	0	140	71	141	1
T25S	820	Project	682	0	331	352	381	3
T26	852	Project	289	0	320	223	470	21
T27 Addition	50	Project	0	0	0	15	0	0
T27N	548	Project	32	0	136	200	259	37
T27S	545	Project	0	0	141	234	248	27
T28N	453	Project	0	101	156	88	250	46
T28S	300	Project	0	82	109	54	167	35
T29-1	220	Project	72	0	50	31	53	1
T29-2	480	Project	252	68	100	109	147	16
T29-3	258	Project	46	0	30	32	42	0
T29-4	163	Project	0	0	0	32	0	0
T30-1	693	Project	324	217	89	64	73	262
T30-2	316	Project	154	0	96	46	153	1
T30-3	172	Project	45	0	59	33	82	0
T32-1	115	Project	0	0	0	2	0	0
T35-1	79	Project	42	0	16	16	26	0
T35-2	85	Project	26	0	6	14	9	0
T36-1E	289	Project	98	94	101	54	157	9
T36-1W	357	Project	120	0	120	92	192	14
T36-2E	276	Project	135	0	99	47	112	1
T36-2W	393	Project	0	0	0	70	0	0
T36-3E	144	Project	0	0	0	34	0	0
T36-3W	83	Project	0	0	0	28	0	0
T36-3 Addition	20	Project	0	0	0	2	0	0
T37-1	137	Project	0	0	0	2	0	0
T37-2	378	Project	0	0	0	10	0	1
T3NE	150	Project	0	0	0	15	0	0
T3SE	314	Project	0	0	0	69	0	0
T3SE Addition	78	Project	0	0	0	23	0	0
T3SW	389	Project	0	0	0	46	0	0
T4-3	152	Project	0	0	21	47	57	0
T4-3 Addition	87	Project	0	0	6	26	16	0
T4-4	166	Project	36	0	51	25	68	0
T4-5	70	Project	6	0	8	13	9	0
T5-1	87	Project	0	16	30	28	49	4
T5-1 Addition	20	Project	0	0	0	2	0	0
T5-2	20	Project	0	4	6	9	8	0
T5-3	141	Project	0	21	42	56	67	2
T5-3 Addition	137	Project	87	0	9	35	14	7
T5-4	40	Project	0	0	21	6	4	0
T8W	133	Project	0	0	0	27	0	0
T9	293	Project	173	0	41	102	92	0
Managed Vegetation	2260	Project	0	75	32	192	60	1131
Ash Creek	1203	Non-project	0	55	14	85	25	109

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
Bartlett Well	178	Non-project	0	11	6	22	10	24
Brine Pool	16308	Non-project	0	0	0	193	0	0
Cartago Springs	311	Non-project	0	40	20	59	29	109
Cottonwood Creek	1041	Non-project	0	7	1	67	2	47
Cottonwood Marsh	596	Non-project	0	55	28	104	44	192
Crystal Geyser	374	Non-project	0	20	5	37	9	165
Dead Hawk	81	Non-project	0	3	1	9	2	28
Dirty Socks	176	Non-project	0	17	12	42	23	24
Dirty Socks Yd	10	Non-project	0	0	0	0	0	0
DIVOT	309	Non-project	0	0	1	25	4	0
Duck Ponds	302	Non-project	21	54	69	80	66	37
East Shore 1	238	Non-project	0	5	2	21	3	10
East Shore 2	97	Non-project	0	2	0	7	1	12
East Shore 3	252	Non-project	0	6	2	22	3	33
East Shore 4	594	Non-project	0	4	1	41	3	18
East Shore 5	324	Non-project	0	16	11	43	21	19
East Shore 6	210	Non-project	0	9	3	22	6	26
East Shore 7	489	Non-project	0	46	66	168	128	43
East Shore 8	198	Non-project	0	8	4	24	9	12
East Shore 9	82	Non-project	0	2	1	7	2	14
Horse Pasture	51	Non-project	0	4	3	8	5	21
Keeler Spring	83	Non-project	0	5	2	10	4	12
Lizardtail	740	Non-project	0	0	0	33	0	45
Lizardtail 2	395	Non-project	0	0	0	19	0	0
North Ash Creek	554	Non-project	0	5	0	28	1	16
Northwest Spring	712	Non-project	0	69	33	84	58	132
Playa 1	163	Non-project	0	0	0	4	0	2
Playa 10	140	Non-project	0	0	1	15	3	0
Playa 11	389	Non-project	0	0	0	24	1	0
Playa 12	157	Non-project	0	0	26	15	5	0
Playa 13	912	Non-project	0	0	0	22	0	0
Playa 14	269	Non-project	0	0	0	17	0	1
Playa 15	2245	Non-project	0	0	0	110	0	0
Playa 2	270	Non-project	0	0	0	14	0	26
Playa 3	201	Non-project	0	0	0	13	1	0
Playa 4	2286	Non-project	0	0	1	136	2	0
Playa 5	799	Non-project	0	0	6	81	19	0
Playa 6	418	Non-project	0	0	4	45	11	1
Playa 7	929	Non-project	0	0	0	34	0	0
Playa 8	262	Non-project	0	0	4	34	14	0
Playa 9	152	Non-project	0	0	0	4	0	0
PPG	605	Non-project	0	5	1	44	3	22

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
Sulfate Well	70	Non-project	0	7	24	47	47	6
Swansea	89	Non-project	0	6	3	12	5	9
Swedes Pasture	512	Non-project	0	68	59	161	107	93
Trucksticker	146	Non-project	0	8	3	17	5	28
Tubman Springs	378	Non-project	0	45	27	78	50	61
Upland 1	241	Non-project	0	1	0	10	0	18
Upland 2	403	Non-project	0	0	0	18	0	2
Upland 3	1	Non-project	0	0	0	0	0	0
Upland 4	69	Non-project	0	0	0	5	0	4
Upland 5	166	Non-project	0	1	0	10	0	13
Upland 6	630	Non-project	0	3	1	44	2	27
US Borax	487	Non-project	0	0	0	15	0	0
VOS	57	Non-project	0	1	0	4	0	13
Wahoo	304	Non-project	0	7	1	16	2	28
Whiskey Springs	242	Non-project	0	9	4	27	7	25
Willow Dip	322	Non-project	0	44	18	54	32	131

Project	**9025±8%**	**703±18%**	**6107±19%**	**6604±11%**	**8664±8%**	**1637**
Non-project	**21±17%**	**651±10%**	**470±16%**	**2388±8%**	**773±2%**	**1658**
Total Planning Area	**9046**	**1354**	**6577**	**8992**	**9438**	**3295**

FIGURE 6-8. DIVING WATERBIRD HABITAT VALUE IN THE PLAN AREA

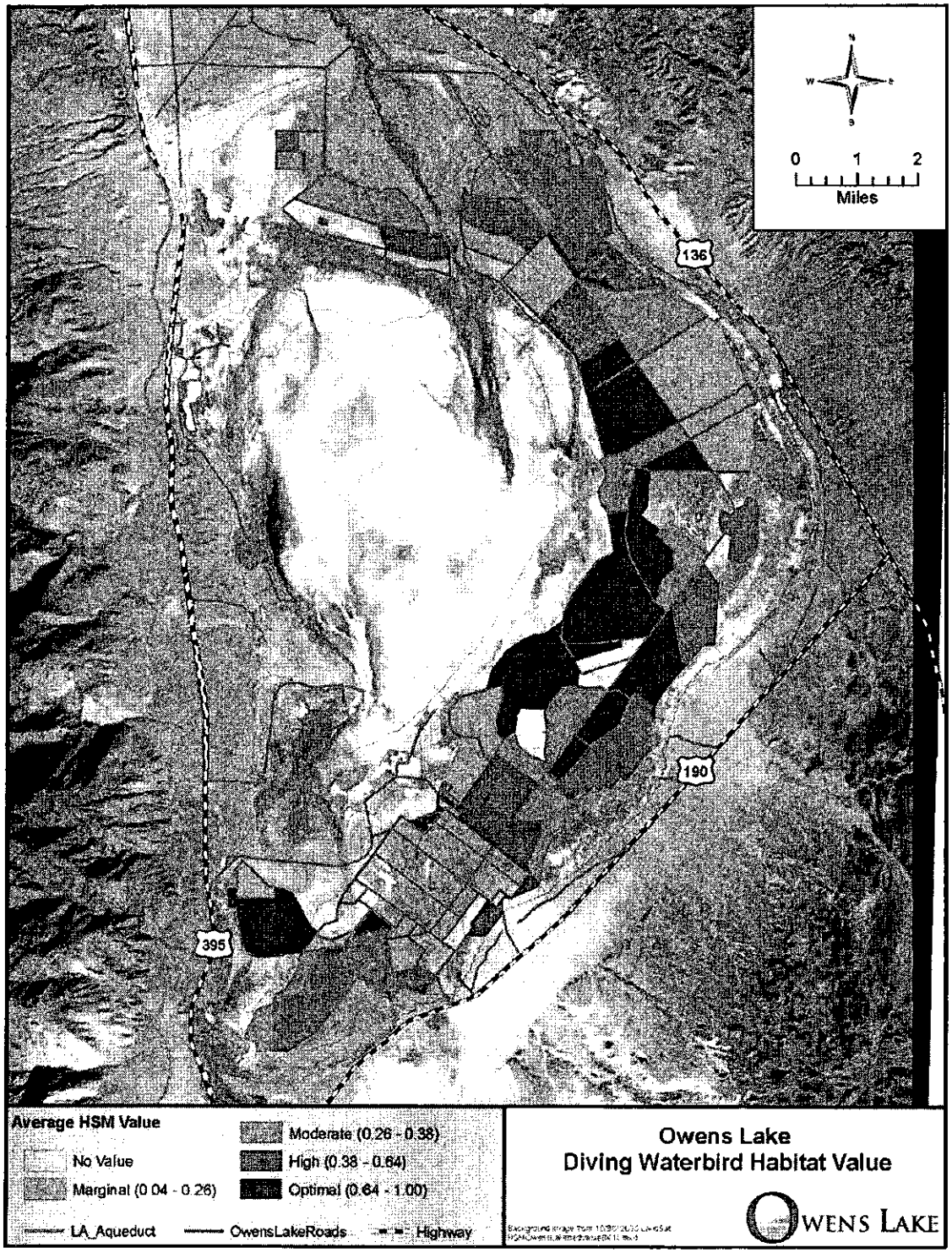


FIGURE 6-9. BREEDING WATERFOWL HABITAT VALUE IN THE PLAN AREA

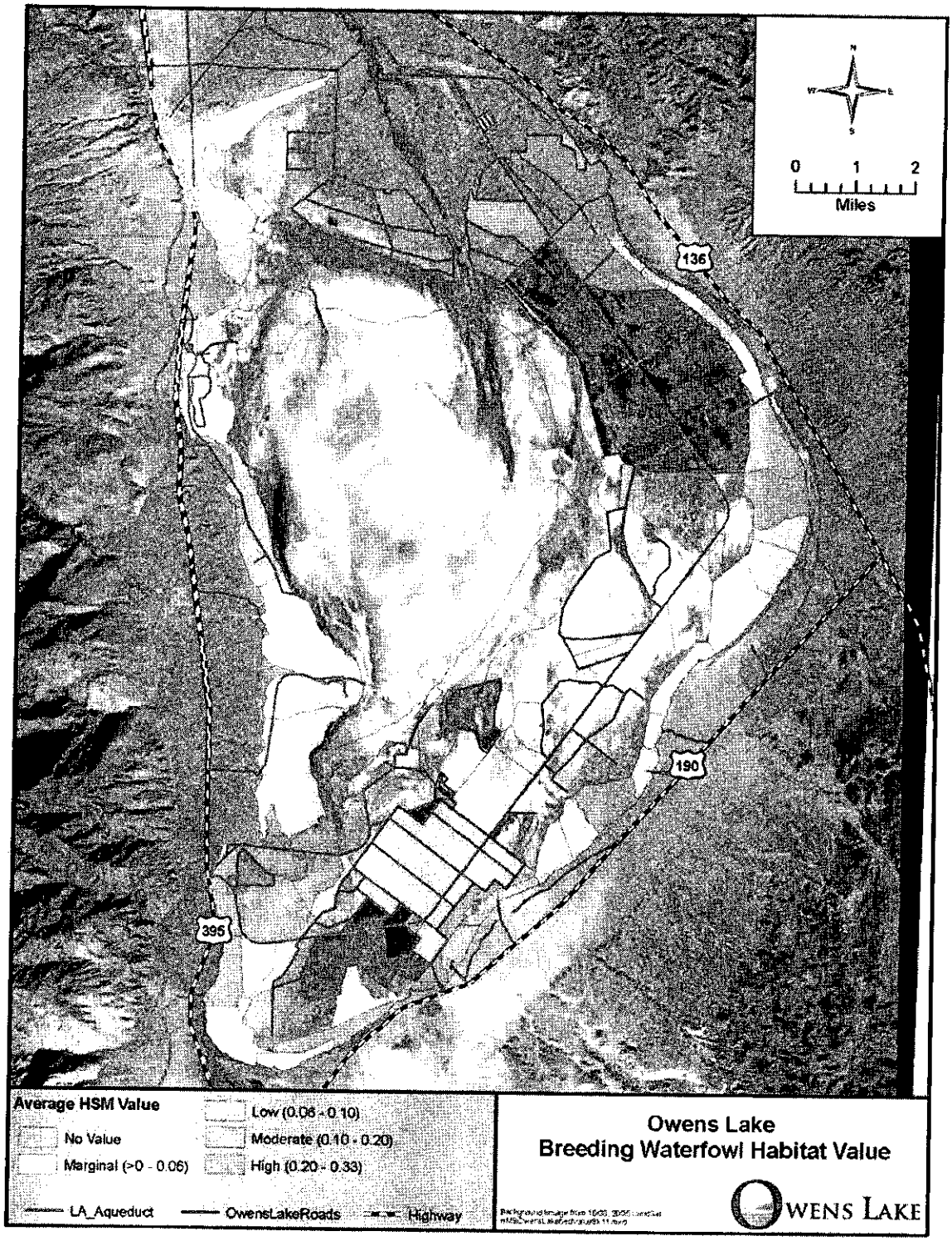


FIGURE 6-10. MIGRATING WATERFOWL HABITAT VALUE IN THE PLAN AREA

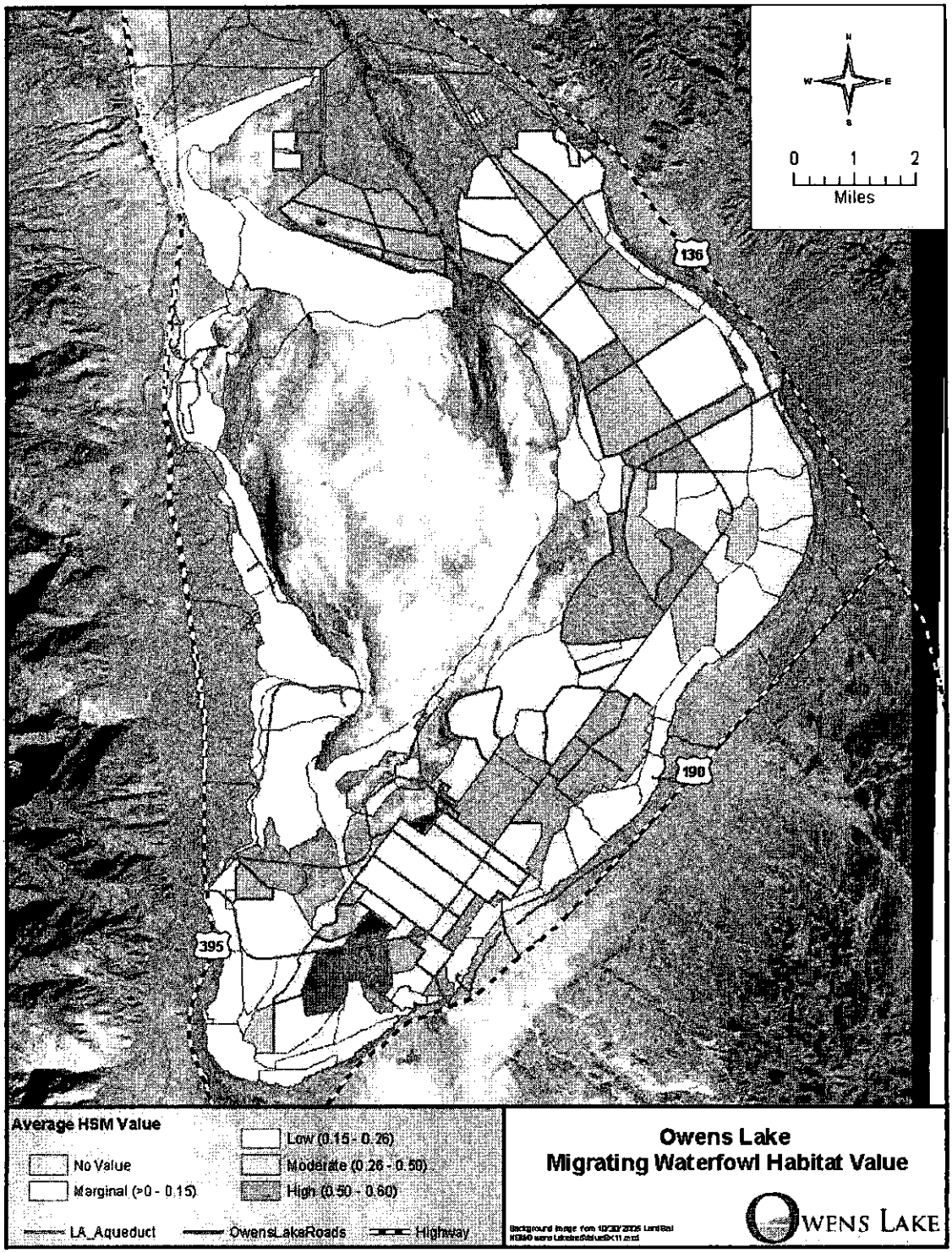


FIGURE 6-11. BREEDING SHOREBIRD HABITAT VALUE IN THE PLAN AREA

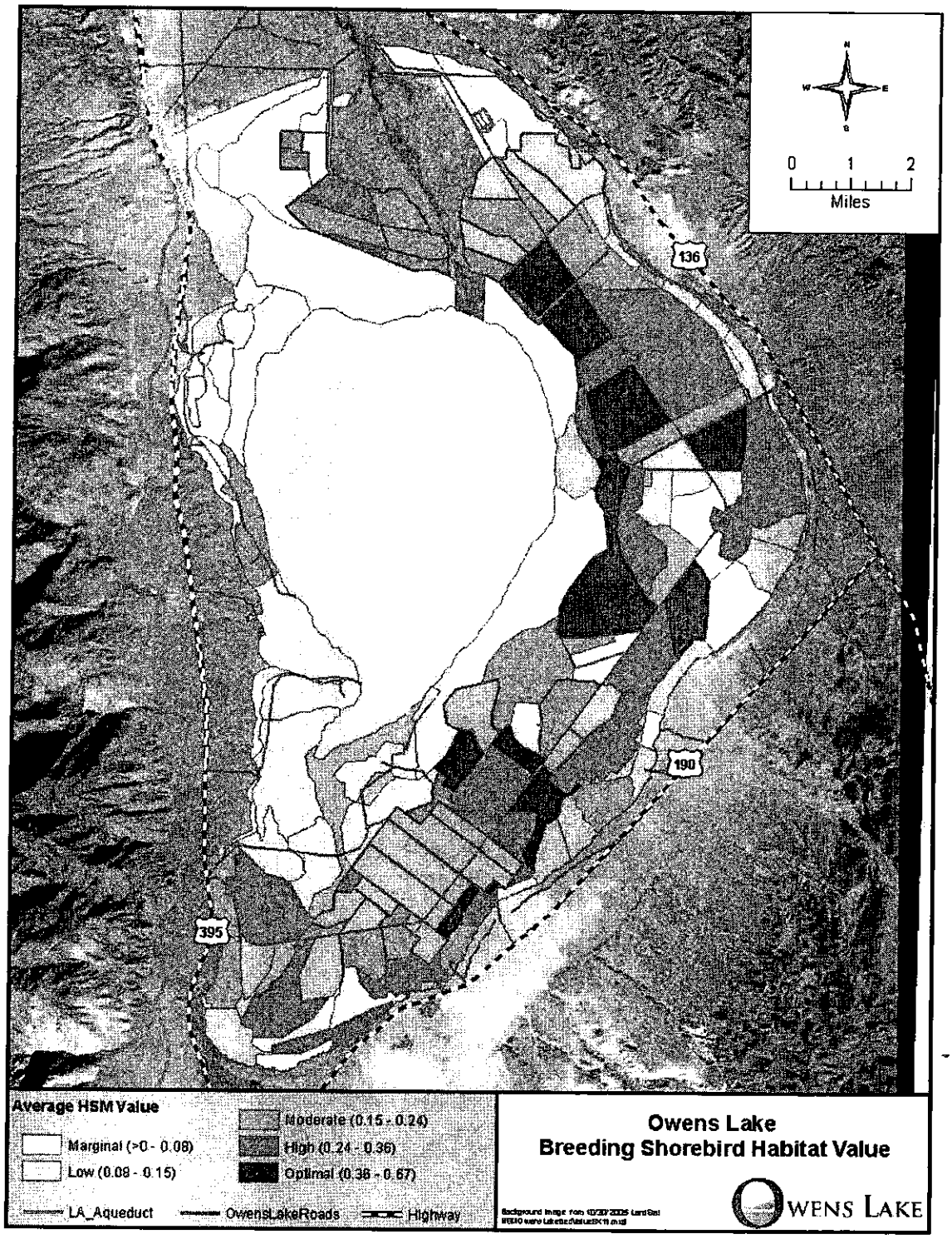


FIGURE 6-12. MIGRATING SHOREBIRD HABITAT VALUE IN THE PLAN AREA

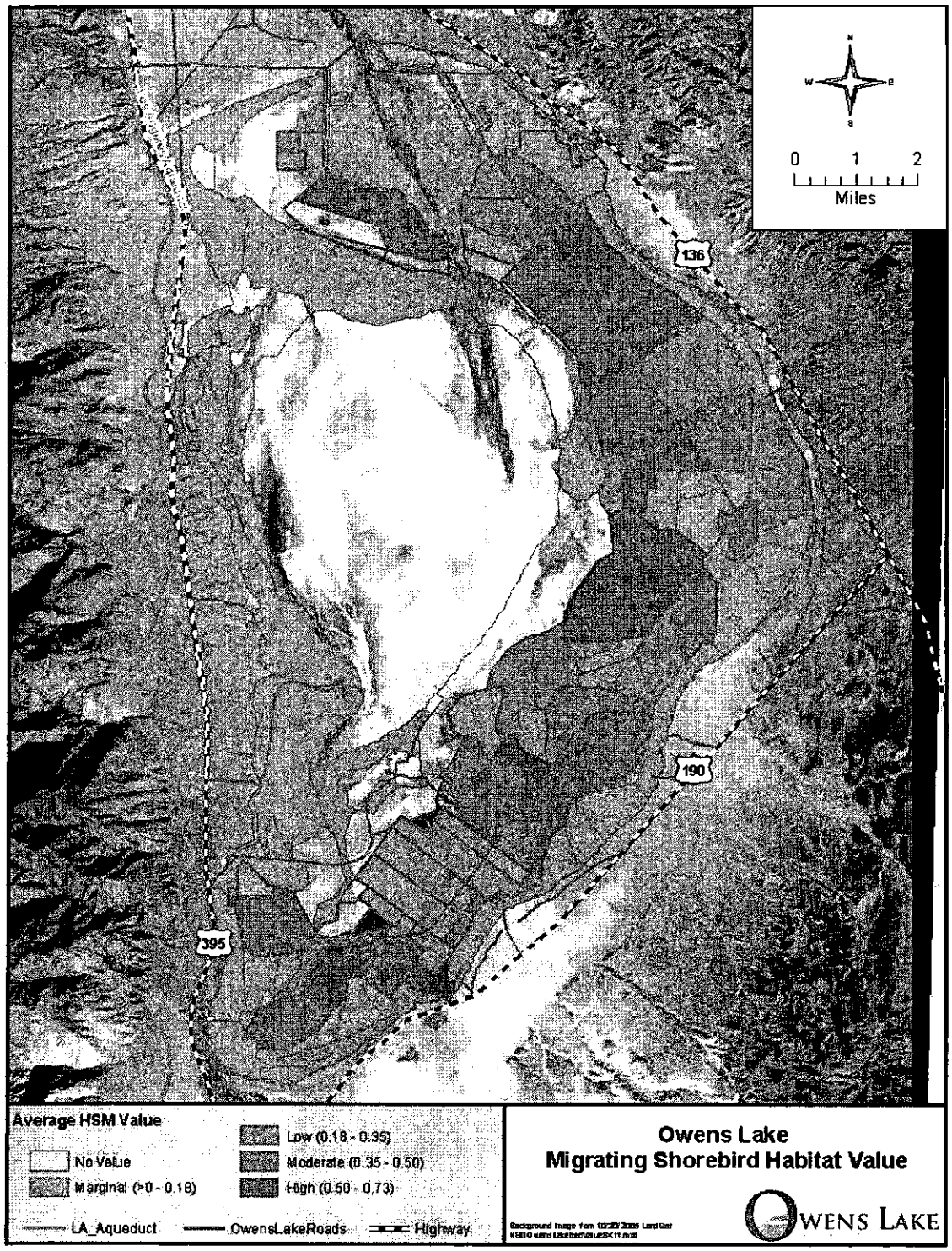
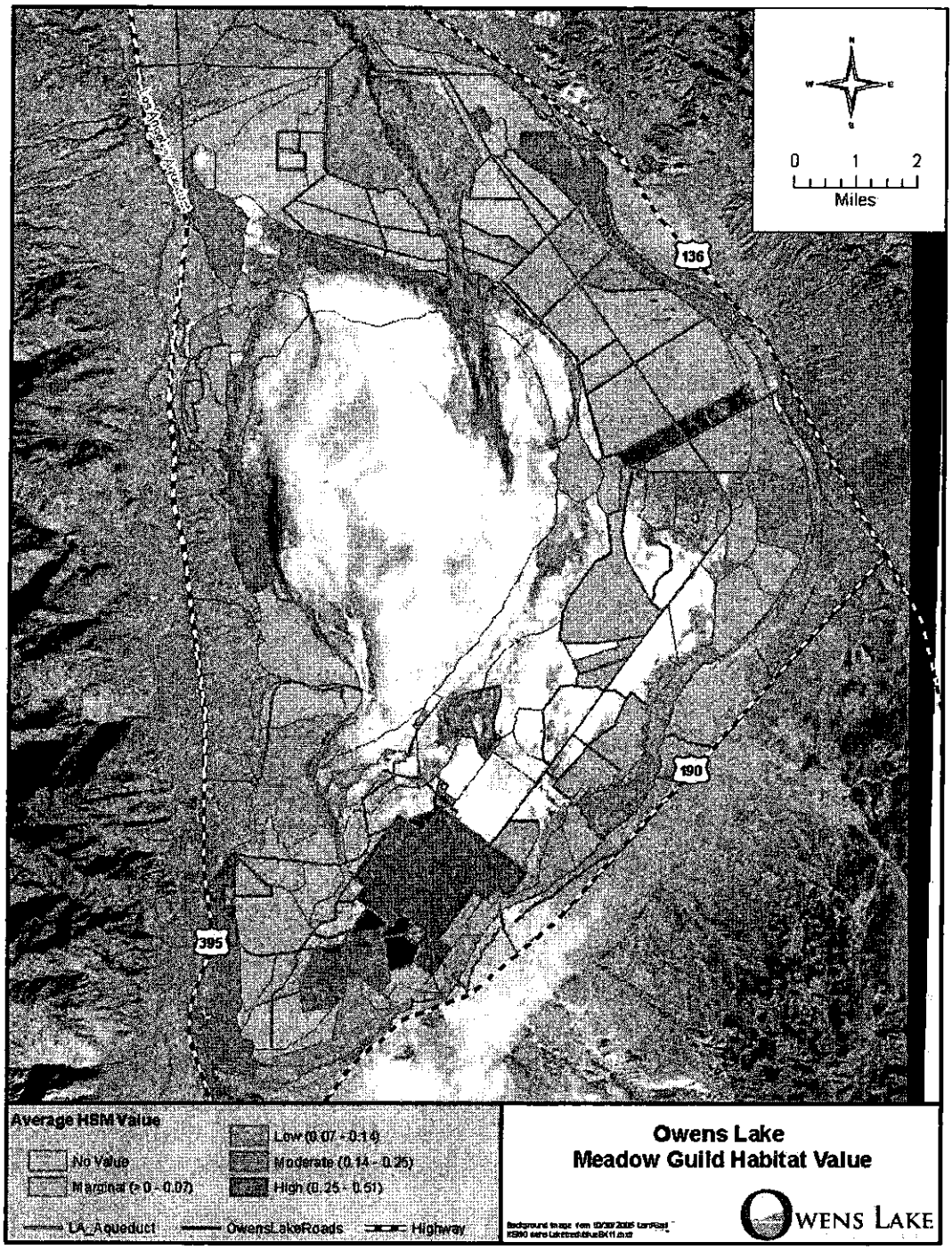


FIGURE 6-13. MEADOW GUILD HABITAT VALUE IN THE PLAN AREA



6.4 Managing Habitat Value-Acres Over Time

The habitat objective of the Master Plan is to maintain the total baseline value-acres for each guild over time, while also achieving the other goals of the Master Plan. A clear tool for understanding and tracking total baseline value-acres (i.e., the HSM) is necessary for flexibility in habitat management to achieve this objective within each guild. Under the Master Plan framework, habitat values can be increased for a guild in one cell, while decreasing in another cell. Total habitat value-acres are maintained over the plan area rather than within each cell. This management approach will be used to achieve three Master Plan goals: to maintain dust control compliance, maintain habitat value-acres over time, and achieve water conservation. The following subsections describe anticipated refinement of the HSM during implementation of the Master Plan framework, management priorities for the six guilds, and habitat management and project planning.

6.4.1 Habitat Suitability Model Revision Process

The ongoing refinement of the current HSM is anticipated as part of adaptive management within the Master Plan framework. The current HSM will be run for three years based on monitoring habitat parameters and validated using effectiveness monitoring data from bird counts in those three years. After three years, the current model may be refined based on additional information provided from the monitoring results. Baseline parameters will remain the same, but some habitat parameters' categories or weighting may change. Model refinement for specific guilds may include changing the parameter categories defined for habitat value (as was done for salinity in refining the HSM) or weighting suitability index values differently within each guild model. Therefore, the relative habitat value may change with model refinement, and baseline values would be reset to reflect the refinements. Model refinement will be recommended by the Habitat Technical Advisory Committee (Habitat TAC) and follow the steps outlined in Section 6.6, Adaptive Management, and in Section 8, Implementation.

6.4.2 Management Priorities for the Target Habitat Guilds

All six guilds are given equal weight in the HSM, and no guild is identified as a priority for management relative to other guilds. The independent science review panel agreed with this management principle because conditions at Owens Lake have changed relatively recently through dust control management over the past 11 years, and wildlife, particularly birds, are still discovering this resource. However, the independent science review panel thought prioritization should be reconsidered after an initial period of management. Therefore, the Habitat TAC will assess the "State of the Lake" in a five-year timeframe. At that time, the Habitat TAC may consider prioritization of guilds. Such a consideration will follow steps outlined in Section 6.6, Adaptive Management, and in Section 8, Implementation.

6.4.3 Habitat Management and Project Planning

The HSM will be used to track habitat value over time. It is also an important predictive tool to guide the design and/or management of projects within the plan area to ensure that baseline value-acres for each guild are maintained over time. This section describes management responsibilities, a toolbox to manage habitat value within the dust control project, and how the HSM can be used to plan and guide management and projects. The section also describes how the HSM will be used to maintain the balance sheet for habitat value-acres in dust control project cells and non-dust control units.

6.4.3.1 Management Responsibilities and Toolbox for the Dust Control Project

Within the Master Plan framework, management of habitat value-acres within the dust control project is the responsibility of LADWP. Based on habitat parameters, a number of tools are available currently to manage habitat while controlling dust and managing water more efficiently. As new and modified dust control methods are designated as BACM (as described in Section 4.4, Potential New and Modified Dust Control Methods), additional management tools will become available. Table 6-9 presents a management toolbox based on identified habitat parameters and potential management methods. This list is meant to be general and can be expanded as monitoring guides future management.

TABLE 6-9. HABITAT PARAMETERS AND TOOLBOX TO MANAGE HABITAT VALUE FOR THE DUST CONTROL PROJECT

Habitat Parameter[1]	Dust Control Method	Potential Management	Framework Level	
			Operations & Maintenance[2]	Transition Project[3]
Water Depth	Pond Flood	Manage for critical sized ponds at appropriate depths w/in current compliance criteria	X	
	Shallow Flood	Improve sheet flow w/modified whip lines w/in current compliance criteria	X	
Salinity	Pond Flood	Manage slat flux w/in current compliance criteria	X	
	Shallow Flood		X	
Islands (Dry)	Pond Flood	Increase proportion w/in current compliance criteria	X	
Islands (Dry or Vegetated)	Modified, Hybrid or New BACM	Increase proportion under new compliance criteria		X
Dry Area	Modified BACM	Increase dry areas in sheet flow under new compliance criteria		X

Habitat Parameter[1]	Dust Control Method	Potential Management	Framework Level	
			Operations & Maintenance[2]	Transition Project[3]
Microtopographic Relief	Shallow Flood	Manage water for more microtopography w/modified whiplines w/in current compliance criteria	X	
	Modified, Hybrid, or New BACM	Manage sheet flow for more microtopography under new compliance criteria		X
Seasonal Water Availability	Pond Flood Shallow Flood Managed Vegetation	Manage water for seasonal breeding and migrating wildlife w/in current compliance criteria	X X X	
Vegetation Structure and Vegetation Richness	Managed Vegetation	Add plant species to increase structural diversity w/in current compliance criteria	X	
Vegetation Extent	Managed Vegetation	Manage for optimal extent of vegetation w/in existing compliance criteria	X	
	Modified, Hybrid or New BACM	Add vegetation under new compliance criteria		X
Topographic Diversity	Modified or New BACM	Tillage with or without flooding, or design hummocks under new compliance criteria		X
	Managed Vegetation	Add raised beds or hummocks w/in current compliance	X	

[1] The parameters reflect those in the HSM.
[2] Operations and maintenance include activities that do not change the existing basis of dust control compliance in a cell.
[3] Transition projects include activities that change the existing basis of dust control compliance in a cell.

6.4.3.2 HSM Balance Sheet for the Dust Control Project

The HSM can be used to predict habitat value of BACM transitions and of operations and maintenance activities within the dust control project. The HSM balance sheet will be used to compare specific suitability index values before and after operations and maintenance activities or a transition project. Accordingly, the balance sheet will evaluate the lake-wide balance of total value-acres for each guild. This evaluation will be included in annual Work Plans and Annual Reports, as described in Section 8, Implementation.

Once a project is implemented, the results on suitability index values will be assessed after implementation. However, cells will not be included in the HSM balance sheet during the period of implementation and habitat establishment. The following timeframes for habitat establishment will be allowed for projects:

- Transition to Shallow Flood/Pond Flood BACM – implementation period
- Transition to Managed Vegetation BACM – three years after implementation
- Modified and New BACM – range from implementation to three years after implementation

6.4.3.3 HSM Balance Sheet for Other Management and Project Planning

Any non-LADWP project proposed within the dust control project would also be required to use the HSM to demonstrate consistency with the Master Plan and maintenance of baseline habitat value-acres.

6.4.3.4 Habitat Management in Non-Dust Control Areas

In non-dust control areas, management of habitat is limited to lease conditions for mining and grazing. No additional management of non-dust control areas is proposed under the Master Plan. However, if a project is proposed in a non-dust control area, the objective of maintaining habitat value-acres over time would apply. The management and maintenance of habitat value-acres would be the responsibility of landowners, primarily the Commission and LADWP, and their lease-holders.

The Habitat Working Group did not consider groundwater pumping during the development of the Master Plan. However, if the Owens Lake Groundwater Evaluation Project sponsors (LADWP, the District, and the County) find that groundwater pumping is sustainable in the plan area, and with resolution of issues relating to groundwater pumping described in Section 5.3, then LADWP would be responsible for management of habitat resources consistent with the Master Plan and agreements for resource protection criteria.

6.5 Habitat Monitoring

Habitat monitoring within the Master Plan framework will be accomplished in two ways: 1) monitoring for guild habitat parameters and habitat value-acres, and 2) validation monitoring to assess whether management of habitat parameters is effective and reflected in wildlife use. The monitoring plan is designed to provide the data needed to determine whether management strategies are achieving the objective of maintaining baseline habitat value-acres for the target guilds. Accordingly, the monitoring plan will also provide the data needed to inform decision-making during adaptive management. This section describes habitat parameter monitoring, validation monitoring, and monitoring responsibilities.

6.5.1 Habitat Parameter Monitoring

The habitat parameter monitoring methods are outlined in this section. Monitoring includes the parameters that are used to define the HSM and associated habitat value-acres. Methods for monitoring each parameter have been initially defined as the same methods used in developing the

model (see Appendix F, Habitat Suitability Models, for detailed measurement methodology for each parameter).

6.5.1.1 Dust Control Project Cells

Timing and frequency of habitat parameter monitoring will depend on whether a dust control cell is identified for a transition project. Table 6-10 lists habitat parameters, monitoring methods, and monitoring frequency.

TABLE 6-10. HABITAT PARAMETER MONITORING

Habitat Parameter	Monitoring Method	Monitoring Frequency
Water depth	Daily levels (currently monitored for dust control project)	October - July
Salinity	Measure Ec of water	Annually in spring
Seasonal water availability	Visual reconnaissance and water records for dust control project	Annually in fall and spring
Dry area	Remote sensing for dust control compliance monitoring	After change for operations or implementation of transition project
Islands and partially vegetated islands	Remote sensing for dust control compliance monitoring	After change for operations or implementation of transition project
Microtopographic relief	Light Detection and Ranging (LIDAR) or field observation where LIDAR not available	After change for operations or implementation of transition project
Vegetation cover/extent	Remote sensing for dust control compliance monitoring, and visual assessment	Annually in late summer/early fall to capture full growing season
Vegetation richness	Field species counts	Every third year after implementation in late summer/early fall to capture the majority of species
Vegetation structure	Field evaluation	Every fifth year after implementation in spring to capture the majority of species
Invasive species	Visual systematic surveys (currently required in the dust control project area)	Annually during the growing season

6.5.1.2 Non-Dust Control Project Habitat Parameter Monitoring

Generally, the non-dust control project units within the plan area are less managed and less subject to perturbation than the dust control project cells. As part of requirements for current permits for the dust control project, LADWP currently monitors many of the seeps and springs that had been monitored for the past decade by the District.

The Habitat TAC will review current monitoring and develop a monitoring plan for non-dust control units within the plan area in accordance with the adaptive management process defined in Section 6.6. This review and planning process will begin immediately.

The Habitat Working Group did not consider groundwater pumping during the development of the Master Plan. However, if the Owens Lake Groundwater Evaluation Project sponsors (LADWP, the District, and the County) find that groundwater pumping is sustainable in the plan area, and with resolution of issues relating to groundwater pumping described in Section 5.3, then LADWP would be responsible for monitoring habitat resources consistent with the Master Plan and agreements for resource protection criteria.

6.5.2 Wildlife Monitoring for Validation

Validation for the HSM will be accomplished through habitat effectiveness monitoring based on lake-wide bird counts each year. The bird censuses will be conducted by LADWP, with assistance by volunteers when available. Since December 2008, LADWP and/or volunteers have conducted up to four lake-wide surveys per year, including the summer Western Snowy Plover breeding survey. For the initial HSM validation monitoring, seven lake-wide surveys per year are proposed for a three-year period, starting in 2012. These validation surveys will include two during spring migration, three during fall migration, one in winter, and the Western Snowy Plover breeding survey in late May, which is considered a survey for all breeding waterbirds.

Timing of validation monitoring for the initial three years will be as follows:

- Two annual spring surveys – conducted within the last two weeks of both March and April
- One Western Snowy Plover/all species breeding survey – conducted in late May
- Three fall surveys – conducted in the last two weeks of August, September, and October
- One winter survey – conducted in January

Monitoring protocols will be consistent over the three-year period, and in particular, Western Snowy Plover monitoring will adhere to previous survey methods defined in the Owens Lake Resource Management Plan (LADWP 2010) so that comparisons can be made with previous years. For the lake-wide surveys as well as the breeding survey, bird survey counts will be

location-specific (cell or unit) so that comparisons can be made with habitat parameter monitoring.

Wildlife monitoring for validation may be revised to reduce or focus monitoring efforts after the initial three years based on analysis of results and recommendations from the Habitat TAC. In revising monitoring, the Habitat TAC will follow the adaptive management process outlined in Section 6.6, Adaptive Management, and in Section 8, Implementation.

6.5.3 Potential Additional Monitoring

The Habitat TAC may adjust the validation monitoring with recommendations for additional information to be collected during the initial validation studies or additional types of surveys.

It may be useful to include additional information on basic features within each cell and/or unit where species are recorded, such as "standing water," "mud," or "vegetation," for example. Such information could be useful to help define spatial distribution of species within cells and/or units, but the statistical relevance will need to be assessed before adding it as a component of the annual surveys. Any proposed methodology will be reviewed and recommended by the Habitat TAC for adoption into the monitoring program following steps outlined in Section 6.6, Adaptive Management, and in Section 8, Implementation.

6.5.4 Habitat Monitoring Responsibilities

LADWP will be responsible for implementing the monitoring plan because they are currently responsible for monitoring biological resources within the dust control project, as well as many seeps and springs resources on a lake-wide basis. The annual monitoring report will be shared with the Habitat TAC, and other stakeholders as requested, each year by December 31.

The Habitat Working Group did not consider groundwater pumping during the development of the Master Plan. However, if the Owens Lake Groundwater Evaluation Project sponsors (LADWP, the District, and the County) find that groundwater pumping is sustainable in the plan area, and with resolution of issues relating to groundwater pumping described in Section 5.3, then LADWP would be responsible for monitoring and reporting on habitat resources consistent with the Master Plan and agreements for resource protection criteria.

LADWP will assign a qualified biologist and associated staff to implement monitoring, record and analyze monitoring data, and prepare an annual monitoring report. This structure will maintain transparency and facilitate enhanced coordination between dust control operations and habitat monitoring and management because dust control operations and management are linked to habitat resources. LADWP has demonstrated the ability to monitor Owens Lake resources including development of an approved resource management plan. Additionally, LADWP has recently assumed monitoring responsibilities for a majority of seeps and springs within the plan area. Participation of other stakeholders will enhance certain monitoring, such as the bird surveys,

including Big Day bird counts with Eastern Sierra and California Audubon, or rare plant surveys by the Bristlecone Pine Chapter of the California Native Plant Society.

Monitoring will be performed for the duration of the Master Plan and associated agreements. The Habitat TAC is responsible for reviewing the basis for monitoring refinements, reduction, or additional monitoring, and monitoring methods based on the adaptive management process defined in Section 6.6. The Habitat TAC will recommend adoption of changes in monitoring to the Advisory Committee, as described in Section 8, Implementation.

6.6 Adaptive Management

Owens Lake is a large and complex system that has been significantly altered by human intervention. Management of the natural resources and habitat value in this system involves decision-making at various levels of uncertainty due to gaps in current knowledge and unpredictable future conditions. The adaptive management process acknowledges these uncertainties and systematically reduces them in decision-making, and it improves the likelihood of achieving management goals (Lee 1999; Murray and Marmorek 2004; Walters and Hilborn 1978; Walters and Holling 1990). The adaptive management process is illustrated in Figure 6-8. The adaptive management process includes a feedback loop for the assessment of testable hypotheses (based on monitoring) and the adjustment of mathematical models, management objectives, or management activities. A successful adaptive management program ensures that the best available practices are consistently used and appropriately adjusted to current conditions.

The adaptive management program at Owens Lake will be consistent with the process illustrated in Figure 6-14. The adaptive management process will be implemented by the Habitat TAC, which includes LADWP. Refer to Section 8, Implementation, for more information about the Habitat TAC and the review process for adaptive management activities.

The adaptive management process for the Master Plan includes the following elements:

1. **Management objectives that are regularly revisited and revised, as needed**

   The overarching management objective is to maintain baseline habitat value-acres for each of the six target guilds over time. The specific management objectives include managing the parameters identified in each guild's HSM (Tables 6-2 through 6-7).

   Initially in the Master Plan framework, no guild is given priority for management. The Habitat TAC will evaluate whether this objective should be revised based on effectiveness monitoring results in the next five years, as described in Section 6.4, Managing Habitat Value-Acres Over Time.

   Similarly, the Habitat TAC may evaluate other objectives and recommend management objectives for revisions based on monitoring results. Activities or occurrences, such as

climate change, not specifically associated with activities in the plan area may affect guild trends that might trigger a change in management objectives.

2. **A Habitat Suitability Model for the system being managed**

Based on local knowledge and literature, the HSM was developed for the six target guilds to define the critical habitat parameters for each guild. The HSM is thoroughly described in Section 6.2 and in Appendix F. The HSM was developed through a partnership of stakeholders, managers, and scientists to describe baseline conditions and to establish a framework to measure future management activities. As part of the adaptive management process, it is anticipated that the HSM will be refined based on knowledge accumulated from management and monitoring. A refined HSM will provide a statistical model for management that more closely tracks abundance of the target guilds.

The Habitat TAC will review the results of HSM model runs and wildlife validation monitoring over three years to assess the HSM's correlation of habitat suitability with abundance of wildlife. Based on the results, refinements to the HSM may be recommended by the Habitat TAC to the Advisory Committee.

3. **A range of management options (i.e., existing, modified, hybrid, and new BACM)**

Management options include a range of dust control project operations and maintenance activities for existing BACM, and potential options from modified, hybrid, and new BACM. These options are described in Section 4, Dust Control, and in Section 6.4, Managing Habitat Value-Acres Over Time.

Management options will be monitored to ensure that they result in the desired habitat values to maintain habitat value-acres over time. Adjustments will be made to management options based on monitoring results for both habitat parameter monitoring and wildlife validation monitoring.

4. **Monitoring and evaluation of outcomes of management activities**

Following the implementation of management activities (i.e., operations and maintenance or transitions of the dust control project), the adaptive management process includes monitoring of habitat parameters and evaluation of effectiveness (i.e., wildlife validation monitoring) to determine the success of management activities in achieving habitat objectives.

After a project has been completed, monitoring measurements will be made for the parameters identified in the HSM to order to run the model and evaluate the balance sheet for habitat value-acres. The wildlife validation monitoring will evaluate the overall effectiveness of habitat management.

The evaluation of monitoring data and the use of the results to modify future management activities closes the loop of the adaptive management process (Murray and Marmorek 2004). Adaptive management activities shall be made, as appropriate, if performance criteria for maintenance of habitat value-acres or other conditions are not met. There are four general management alternatives if habitat value-acres are not being maintained for each of the target guilds. These management alternatives may be used individually or in combination:

1. Continue current monitoring for a defined period to verify a trend or result in habitat value-acres;
2. Enhance data gathering using methods that reduce errors in data;
3. Adjust management actions to help achieve objectives; and/or
4. Re-evaluate goals and objectives.

The Habitat TAC will propose to project proponents and the Advisory Committee what combination of alternatives should be followed if performance criteria are not met, consistent with the implementation process outlined in Section 8.

5. **Mechanisms for incorporating learning into future decisions (e.g., TAC review and annual Work Plans)**

Management activities and monitoring will be documented in Work Plans and Annual Reports. Section 8, Implementation, outlines the review processes for these documents. Annual Reports will be reviewed by the Habitat TAC and presented at a meeting of the Master Plan Advisory Committee. The Annual Report will document: monitoring results, a description of progress made toward management goals and objectives, and any adjustments made or recommended in response to monitoring results and the associated rationale.

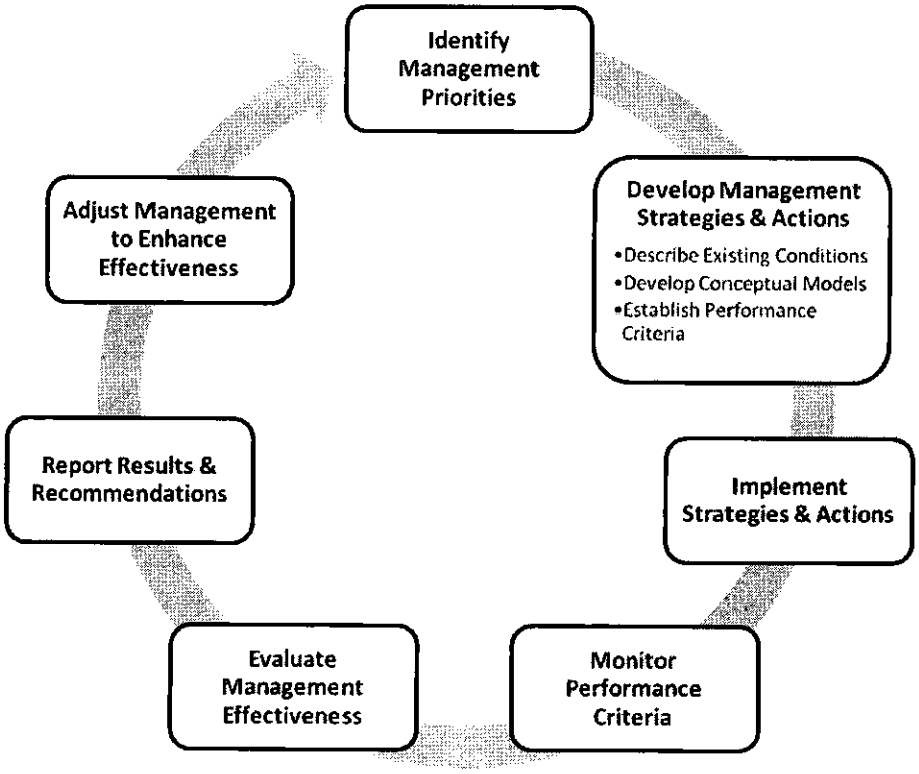
LADWP staff will coordinate the timing of annual monitoring and the monitoring methods with the Habitat TAC. Following the adaptive management process, monitoring methods may change over time due to advances in technology and with increased knowledge of the resources being managed. Any changes in monitoring must be recommended by the Habitat TAC to the Advisory Committee and to the resource agencies (e.g., CDFG), as appropriate.

6. **A structure for incorporating stakeholder involvement and learning (e.g., Habitat TAC)**

As described under items 4 and 5 and detailed in Section 8, Implementation, the adaptive management process includes review and coordination with the Habitat TAC and the Master Plan Advisory Committee.

The adaptive management process will give project proponents, in coordination with the Habitat TAC, the flexibility to address the shortcomings of management activities in meeting the Master Plan goals by making adjustments to the habitat areas to maintain habitat value. Specifically, adaptive management changes may include modifications to the guild habitat parameter values as indicated by effectiveness monitoring and HSM validation. The adaptive management program may also indicate refinements to the habitat objectives, such as changes in the priorities of management for specific guilds, and changes to the monitoring program as indicated by new scientific information.

FIGURE 6-14. DIAGRAM OF THE ADAPTIVE MANAGEMENT PROCESS



7.0 OTHER OWENS LAKE RESOURCES

This section provides a description of other resources present at Owens Lake, including public access, education, and recreation, open space and scenic amenities, cultural resources, renewable energy, grazing, and mining. Some of these resources are currently recognized by the Commission as Public Trust resources, and others are considered generally consistent with the Public Trust. The Planning Committee included recommendations for these resources in order to enhance public access, education, recreation, and cultural resources; protect scenic amenities; and maintain economic opportunities on the lake, such as renewable energy, grazing, and mining. Each section includes a description of the existing resources in the plan area and recommendations to manage the resources on a landscape scale.

7.1 Public Access, Education, and Recreation

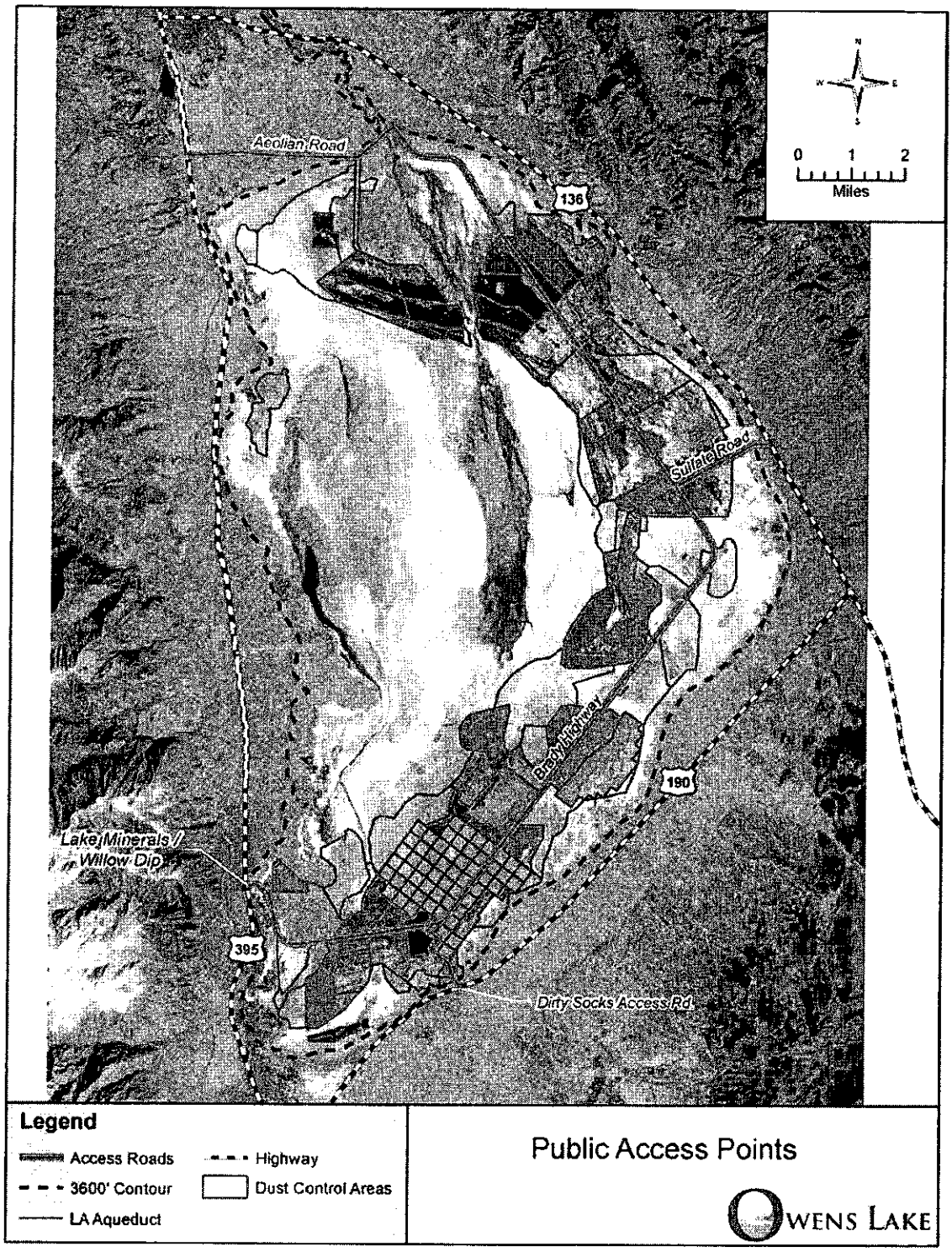
Public access and recreation are currently recognized by the Commission as Public Trust resources at the lake. The Planning Committee considers public access, education, and recreation as opportunities for economic development. This section provides a summary of existing public access infrastructure and educational and recreational activities in the plan area. It also describes opportunities to enhance these resources, including development of an Owens Lake Interpretive/Education Plan.

7.1.1 Existing Public Access Infrastructure

There are three main highways in the plan area: United States Highway (U.S.) 395, State Route (SR) 136, and SR 190. U.S. 395 is the main transportation route through Inyo County. Adjacent to Owens Lake, most of U.S. 395 is a divided four-lane highway used by commercial traffic traveling within the Owens Valley and by recreational traffic traveling between Death Valley and the Sierra Nevada Mountain Range. SR 136 is a two-lane highway that is oriented northwest to southeast between U.S. 395 to the north and SR 190 to the south. Primary access to the northern and eastern portions of Owens Lake is provided via this highway. SR 190 is a two-lane highway that is oriented southwest to northeast between U.S. 395 to the west and SR 136 to the east. This highway serves as primary access to the southern portions of Owens Lake.

Four entry roads provide public access to Owens Lake (Figure 7-1). Two roads are off U.S. 395: Brady Highway and Lake Minerals/Willow Dip Road. A third road, Sulfate Road, is off SR 136. The fourth road, currently unnamed, is off SR 190 and leads to Dirty Socks Yard.

FIGURE 7-1. PUBLIC ACCESS POINTS



Brady Highway is the mainline access road that traverses the lake, primarily in a north-south direction. It is a gravel road maintained in good condition and is wide enough for two cars to pass carefully. Smaller side roads provide access to the dust control project for maintenance and monitoring. These smaller access roads are narrow and some are dead-ends with narrow turning facilities. Speed limits are clearly posted on all access roads. Operators for the dust control project use the access roads seven days a week.

Dust control project roads are posted with informational signs about the dust control project, its operations, and the general requirements to protect resources on the lake. The signage includes contact information for LADWP Operations. The signage also states the requirements for safety training to enter the dust control project area, including training to avoid impacts to cultural resources and Western Snowy Plover nests and broods.

LADWP is also currently designing a two-mile trail and thirty-space parking lot in conjunction with construction of Phase 7a of the dust control project. The trail will likely be constructed in 2013 and will likely be located in the northeast section of the lake.

7.1.2 Existing Education Opportunities

Owens Lake has many important historic, cultural, and wildlife values. Opportunities for education on the lake include tours conducted by LADWP and Eastern Sierra Audubon. LADWP conducts informational tours of the dust control project for various interest groups on an "as requested" basis. Eastern Sierra Audubon also conducts educational programs on the lake, organized tours, field trips, and spring and fall bird censuses.

The Eastern Sierra Interagency Visitor Center (IAVC) is located approximately one mile south of Lone Pine, on U.S. 395 at SR 136. This facility provides regional information and orientation to travelers in the Eastern Sierra Nevada and Northern Mojave Desert. The IAVC has limited information about Owens Lake, but it does include information panels regarding the dust control project.

7.1.3 Existing Recreation Opportunities

The primary recreational activities at the lake are hunting and wildlife viewing. Hunting within the plan area is mainly for ducks. Duck hunting season is November through January. It is assumed that most people hunt Friday through Sunday, in groups of two to six. Using these assumptions, it is estimated that there are 288–432 person-days of use annually for hunting on the lake (B. Ivey, personal communication; J. Olin, personal communication). Most hunters are residents of the Eastern Sierra and it is estimated that many hunters have repeat visits in a season.

Hunting areas correspond with the locations of high numbers of waterbirds reported in the Owens Lake Habitat Management Plan (LADWP 2010). Hunting within the dust control project area occurs most heavily in the northern Shallow Flood areas on either side of the Lower Owens River Delta

transition area (dust control areas: T30-1, -2, -3; T29-1, -2; T36-1, -2; and T28). Relatively few hunters are observed in the eastern dust control project area at T-18 and in the southwest dust control project area in T1 and T2-1 (J. Olin, personal communication).

Wildlife viewing or birdwatching are also popular activities on the lake. The Eastern Sierra Audubon leads birding tours for interested groups and individuals. Birding tours generally revolve around spring and fall bird migration periods. Based on records of each birding tour from 2007 through 2009, the annual average for birding is 226 person-days. Participants in the bird tours include residents of the Eastern Sierra communities, school groups from both local and southern California communities, as well as tourists visiting the Eastern Sierra. The Eastern Sierra Audubon organizes volunteers to participate in spring and fall "Big Day" counts of birds lake-wide.

Unregulated off-highway vehicle (OHV) activity also occurs on the lake, but information regarding frequency is very limited. The lake is not ideal for OHV use due to air quality, habitat (e.g., nesting birds), and safety concerns (e.g., mining trucks and possible sink holes), as well as the potential to disrupt cultural resource sites. Given these constraints, active OHV recreation is directed to the Olancha Dunes. The Olancha Dunes OHV area is managed by the Bureau of Land Management (BLM), includes approximately 1,000 acres, and is located two miles east of Olancha, just south of the plan area.

7.1.4 Enhancement of Public Access, Education, and Recreation

Existing public access, education, and recreation activities will continue under the Master Plan. The Planning Committee identified additional elements to draw visitors onto the lake for recreation and interpretive education. New recreational activities could include a scenic loop or a hiking trail. Interpretive education could include habitat, cultural resources, water conservation, the dust control project, and economic development opportunities.

The Planning Committee identified guidelines and specific projects that can be implemented to enhance public access, education, and recreation in the plan area. The guidelines and projects will be developed in an Owens Lakebed Interpretive/Education Plan (Interpretive Plan). The Interpretive Plan will include the following elements:

- **Enhanced public access points.** Current and future public access points to the lake are expected to be largely the same; no new points of entry are proposed. However, the Interpretive Plan may identify opportunities to: enhance access points to be easily identifiable and include signage; direct visitors to informational kiosks or more formal facilities such as trails, viewpoints, or boardwalks; or to formalize turnouts along highways or other roadways to showcase a scenic viewshed or to provide interpretive signage. The Planning Committee supports the use of OHVs for access to various parts of the lake, where OHV recreation is not the main purpose. For example, hunters or birdwatchers may use OHVs to access wildlife areas.

- **An interactive visitor-based website.** The website will include, but not be limited to, a history of Owens Lake and information about habitat, cultural resources protection, water conservation, the dust control project, and economic development opportunities. This website will also be interactive and include web-based mapping, such that photographs could be tied to specific locations on the lakebed. The website may also have the capability for users to post bird sightings. The website may link to other sites, including: local weather, regional cities and counties, LADWP, the District, the Commission, and the Eastern Sierra Audubon Society. When it is developed, the Interpretive Plan will document who will control and maintain the website.

- **A partnership with the Interagency Visitor Center.** The IAVC, which is located northwest of the lake, will provide a clearinghouse for Owens Lake information and interpretive materials. The Master Plan Advisory Committee will partner with the IAVC to increase the availability of lake-related materials at the IAVC. In the short term, the IAVC staff will distribute brochures and maps of the lake. In the long-term and with funding, the IAVC staff could provide interpretive talks, lead guided tours, and promote use of new recreational opportunities (e.g., scenic loop, hiking trail).

  The IAVC's long-term plans include expansion of the existing facility, but it does not currently have a theme or funding source for construction, maintenance, and staffing. The proximity of the lake to the IAVC makes the lake an ideal theme. The partners (i.e., IAVC and Master Plan Advisory Committee) may collaborate to design an Owens Lake Wing at the IAVC. Interpretive materials and displays would focus on habitat, cultural resources protection, effective dust control, water conservation, and economic development opportunities. Development of an Owens Lake Wing would require funding for planning, design, and construction of the expansion, as well as long-term staffing and operation.

- **An Owens Lake scenic loop.** The centerpiece of the first phase of the plan, the Owens Lake scenic loop, is a ring of Highways (395, 136, and 190) that will provide a self-guided tour around the lake. The scenic loop will be developed for motorized and non-motorized vehicles (e.g., bicycles). Various viewpoints exist along the proposed scenic loop, such as Cartago Springs, Cottonwood Marsh, and an unnamed turnout one to two miles south of Boulder Creek (off U.S. 395) that shows an eastern view of the lake and its historic shoreline. Turnouts may be created near Swansea and Dirty Socks, and additionally as appropriate to meet interpretive and educational needs. Vehicle traffic will be limited to existing paved roadways. The scenic loop will be tied into the IAVC. Brochures, site-specific maps, and other interpretive signage will be used as appropriate along the loop.

Interpretive projects on/around the Owens Lakebed (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts, etc.). Trails may be created to allow visitors to experience the geologic or cultural history of the region or to explore the natural environment of the lake.

Some conceptual ideas include, but are not limited to: (1) a wildlife viewing platform near designated habitat areas, (2) a boardwalk at Cartago Springs Wildlife Area to provide access to spring/meadow habitat and for wildlife viewing, and (3) a short loop trail that begins and ends at the IAVC and includes interpretive panels and a natural view of the lake. The Interpretive Plan will describe potential lessees, as appropriate, for any projects located on public lands.

Primary story lines and themes would be developed for all interpretive materials (brochures, panels, kiosks, etc). Interpretive education would emphasize the plan area's cultural history. Educational materials would be developed with direct and active participation by willing tribal members, and potentially include guided tours of the lake by local tribal members. Educational materials would identify procedures of what to do if a lakebed visitor encountered artifacts on the lakebed, and it would stress the importance of leaving all artifacts in place.

- **Protocol for organized tours.** The Interpretive Plan will establish a protocol for organized tours on the lake. If organized tours become routine, information about tours will be posted at the IAVC and on the website. Informational materials (i.e., brochures, maps) would be generated for self-guided tours of Owens Lake. These brochures would be available online and at the IAVC. All guidelines and materials will be in compliance with applicable regulations, including cultural resource protection, the dust control project, and habitat protection. The guidelines will also address hunting practices. As a best practice, tour organizers would notify cultural resource monitors about any planned tours outside of the dust control project.

Development of the Interpretive Plan is subject to funding and will occur with oversight from a Technical Advisory Group (Section 8, Implementation, describes Technical Advisory Groups). Implementation of the Interpretive Plan will likely be conducted in a phased approach according to the priorities that are deemed most critical or are otherwise able to be implemented expeditiously. The Interpretive Plan will be subject to applicable permitting, leasing, and funding. Funding may occur from grants, private foundation funds, or from Federal or State funds.

The first step is to develop the actual Interpretive Plan, including the specific elements described in Section 7.1.4, Enhancement of Public Access, Education, and Recreation. This may include a feasibility analysis for the long-term management of public access, recreation, and educational programs on the lake, including financial feasibility. The Interpretive Plan will address any potential change in public services (e.g., county sheriff, fire, and emergency services) due to increased public access and visitation to the plan area.

Development of the Interpretive Plan, including determination of open and guided access areas, location and extent of trails, and guided-tour and hunting protocols, will be developed in

coordination with local tribes in order to minimize potential impacts associated with increased public access. The Planning Committee identified three phases for implementation of the Interpretive Plan. The goal of Phase 1 is to bolster the educational/interpretive component of the lake while keeping most users on its perimeter. The goal of Phases 2 and 3 is to enhance users' experiences and bring them onto the lake to recreate. Activities and projects are summarized by phase in Table 7-1. The actions and phases are subject to change and may be revised during development of the Interpretive Plan. All potential actions would be implemented to ensure public and worker safety, avoid operational facilities for dust control, avoid or minimize disturbances to resources (i.e., wildlife, cultural, grazing, mining), and be consistent with all applicable agreements and regulations.

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TABLE 7-1. PROPOSED IMPLEMENTATION SCHEDULE OF THE OWENS LAKE INTERPRETIVE PLAN

Phase 1	**Develop Owens Lake Interpretive Plan**	
		Develop and design an interactive visitor-based website for the Owens Lakebed
		Partner with the IAVC a) Develop interpretive talks that staff could conduct for visitors b) Develop interpretive displays and/or panels for the IAVC c) Plan and design an Owens Lakebed Wing at the IAVC
		Plan and design the Owens Lake scenic loop, including: a) Brochures for self-guided tours (to be disseminated at IAVC) b) Signage c) Interpretive kiosks
		Develop and prioritize interpretive projects on/around lake (trails, viewing platforms, boardwalks, kiosks, pullouts, etc.)
		Generate protocol for organized tours and hunting
	Implement Phase 1 of the Owens Lake Interpretive Plan	
		Activate interactive visitor-based website
		Designate the Owens Lake scenic loop with turnouts and appropriate interpretive materials
		Begin implementing interpretive projects that are priority or funded, if possible
		Stock brochures at IAVC and begin IAVC interpretive talks
Phase 2	**Implement Phase 2 of the Owens Lake Interpretive Plan**	
		Install interpretive displays and/or panels at IAVC
		Secure funding and construct the IAVC Owens Lake Wing and associated displays
		Continue implementing additional interpretive projects on/around lake, as needed
Phase 3	**Implement Phase 3 of the Owens Lake Interpretive Plan**	
		Open the IAVC Owens Lake Wing and add staff as necessary
		Continue implementing additional interpretive projects on/around lake, if needed
		Explore an endurance trail in or around the lake

7.1.5 Monitoring

Progress on the development and implementation of the Interpretive Plan will be reported to the Master Plan Coordinator by the Interpretive Plan authors and/or entities who implement elements of the Interpretive Plan. The Master Plan Coordinator will include the monitoring data in the Annual Report. The Master Plan Coordinator and the Annual Report are described in detail in Section 8, Implementation. Monitoring data will be used to track implementation of these activities and to guide future enhancements to public access, education, and recreation. Monitoring will

include parameters to address the status of implementation, visitor use, and maintenance of elements developed in the Interpretive Plan. Monitoring parameters will include:

- Progress on development of the Interpretive Plan, including those aspects that address cultural resources
- Implementation of Interpretive Plan elements, such as trails and kiosks
- Estimated number of participants in tours and educational activities based on reports from LADWP, Eastern Sierra Audubon, and the IAVC
- Estimated number of hunters based on reports from LADWP operations staff

Specific maintenance monitoring requirements will be developed in the Interpretive Plan and could include elements such as trail conditions.

7.2 Open Space and Scenic Amenities

Note to reviewers: This section is new. It has not been previously reviewed by the Planning Committee. It was included because "open space and scenic amenities" are currently recognized by the Commission as a Public Trust resource at the lake and it was the only recognized Public Trust resource not specifically addressed in the Master Plan. All elements of this section are subject to change after review by the Planning Committee.

Open space and scenic amenities are typically considered the natural and human-built features of the landscape that can be seen and that contribute to the public's enjoyment of the environment. These resources are typically defined in terms of an area's physical characteristics, potential visibility, and the extent to which a proposed project could change the perceived quality of the environment. The open space and scenic amenities in the plan area are considered valuable and are currently recognized by the Commission as a Public Trust resource at the lake.

The Planning Committee expressed the desire to create a viewshed that is in harmony with the surrounding rural environment, but recognized the need for flexibility and balance between current and potential future uses, including renewable energy projects. This section describes the existing open space and scenic amenities in the plan area and outlines a BLM landscape-scale, systematic process that can provide a consistent evaluation of projects planned for the lake.

7.2.1 Existing Open Space and Scenic Amenities

The area surrounding Owens Lake is characterized by a relatively flat desert at the floor of the Owens Valley. The valley floor is surrounded by the eastern Sierra Nevada Mountain Range to the west and the Inyo Mountains to the east, and the Coso Range rises to the south. The valley floor is interspersed with small, rural communities (e.g., Cartago, Olancha, Keeler) surrounded by a dry, desert environment with generally sparse vegetation. At the outer edges of the valley floor, the eastern Sierra Nevada and Inyo Mountains create a panoramic background. The eastern Sierra

Nevada particularly stands out from the other mountain ranges because of their significantly higher appearance, greater steepness, and granite rock formations.

Views of Owens Lake are characterized by pockets of desert vegetation, vegetated areas related to seeps and springs and the Delta, vast areas of barren playa, mining operations, the brine pool (which fluctuates in size and color), and the dust control project, including bermed areas seasonally filled with water, areas of managed native vegetation, and the internal road network. There are no light sources and no major landform features or rock outcroppings in the plan area.

Representative photographs of views within the plan area are shown in Figure 7-2 through Figure 7-6. These photographs were taken from viewpoints that provide common views for the greatest number of people (i.e., travelers along nearby roadways). One set of panoramic photos was taken from a viewpoint from SR 136 (Figure 7-2). Three sets of panoramic photographs show viewpoints from U.S. 395 (Figure 7-3 through Figure 7-5) and a fifth set of panoramic photographs shows a viewpoint from SR 190 (Figure 7-6). These viewpoints are described as follows:

- U.S. 395 is the primary north-south route through the Owens Valley and eastern Sierra Nevada. Motorists have unimpeded views of the open lakebed. Motorists can view the desert landscape and dry vegetation in the foreground, the Inyo Mountains in the distant background, and the Owens dry lakebed in middle-ground views. U.S. 395 in Inyo County is designated as a National Scenic Byway by the National Scenic Byways Program of the U.S. Department of Transportation, Federal Highway Administration (FHA 2010).
- SR 136 is a northwest-southeast route, used to access Death Valley National Park and U.S. 395. Motorists have mostly unimpeded views of the lakebed. Desert landscape and dry vegetation dominate the foreground, the lakebed can be seen in the middle-ground, and the Sierra Nevada creates a panoramic view in the distant background.
- SR 190 is the primary northeast-southwest route used to access Death Valley National Park from U.S. 395. SR 190 converges with SR 136 and forms the eastern boundary of south half of Owens Dry Lake. Motorists have unimpeded views of the open lakebed. Desert landscape and dry vegetation can be seen in the foreground, the lakebed dominates the middle-ground, and the Sierra Nevada creates a panoramic view in the distant background.

The area immediately surrounding Owens Lake includes rural residential and open space land uses. Overall, the visual quality is considered high, with sweeping panoramas of a broad, multi-hued desert landscape, bracketed between steep, rugged, dramatic mountains. The viewshed provides an overall natural feel, interspersed with occasional human-built features such as roads, power lines, and rural residences.

FIGURE 7-2. VIEW FROM SR 136 TO THE WEST TOWARD CELL T32-1

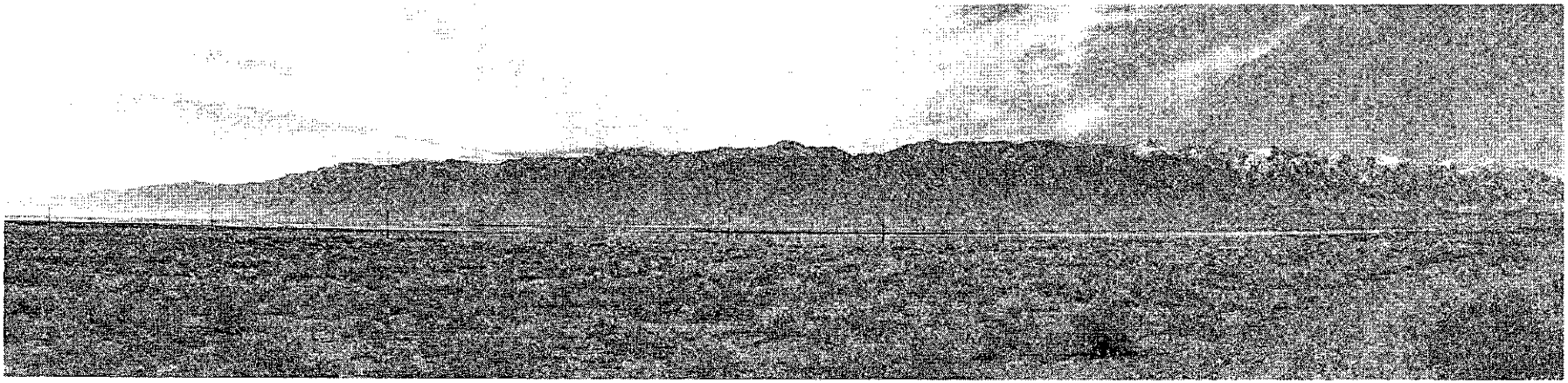

FIGURE 7-3. VIEW FROM U.S. 395 TO THE NORTH-NORTHEAST TOWARD CELL T37-1

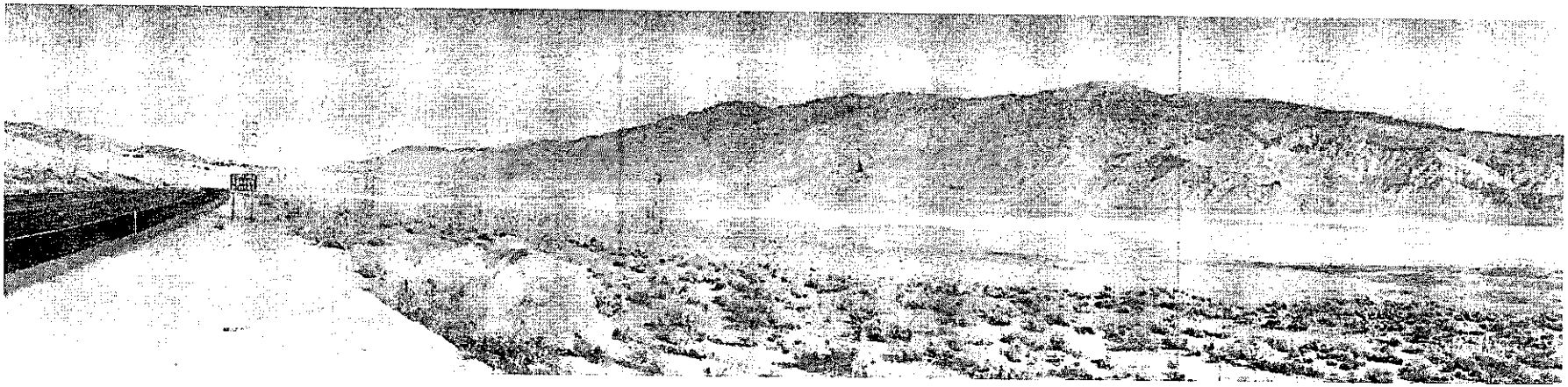

FIGURE 7-4. VIEW FROM U.S. 395 TO THE SOUTHEAST TOWARD CELL T1A-1

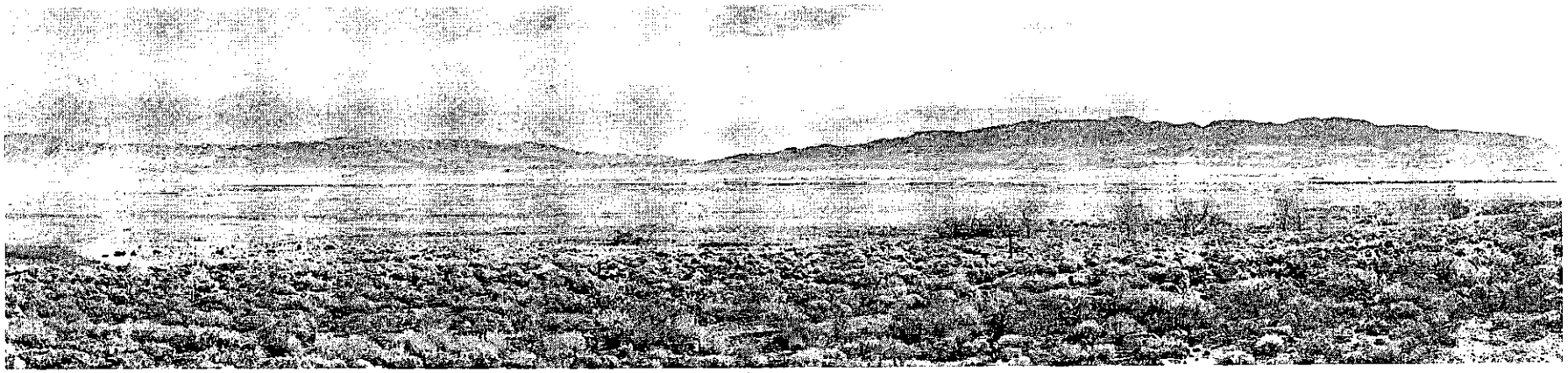

FIGURE 7-5. VIEW FROM U.S. 395 TO THE EAST TOWARD CELL T37-2

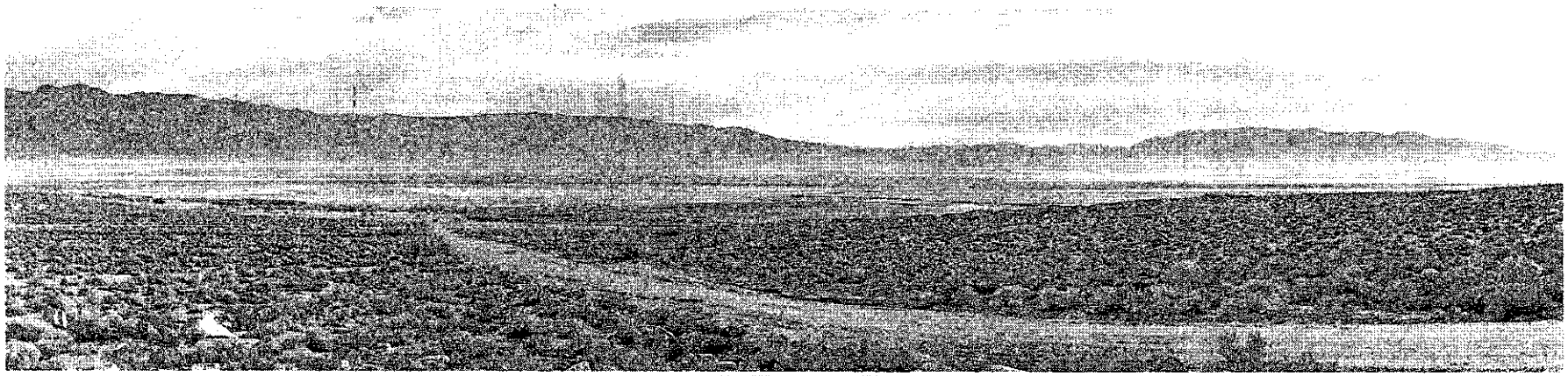

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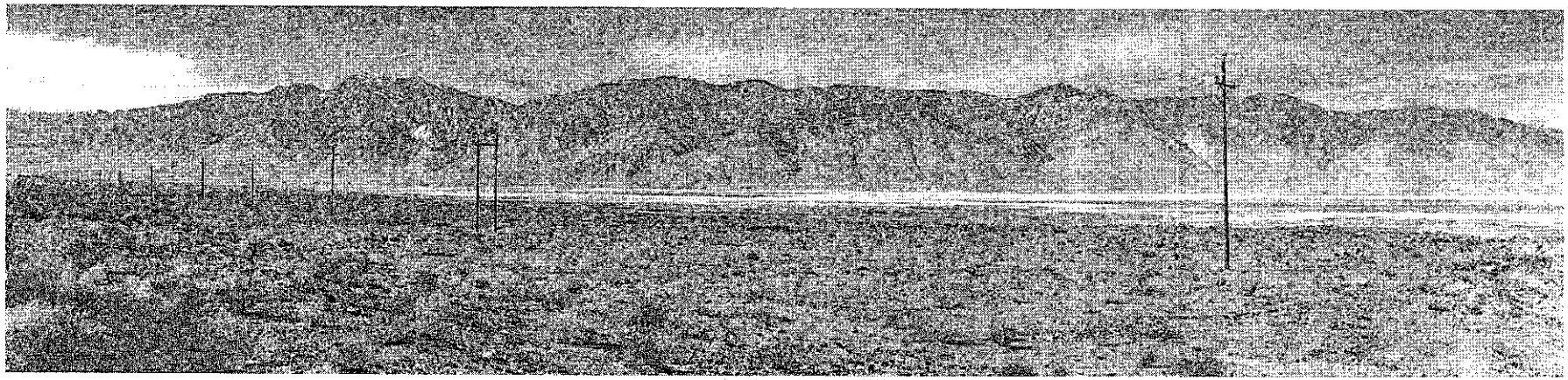
FIGURE 7-6. VIEW FROM SR 190 TO THE NORTHWEST TOWARD CELL T12-1



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7.2.2 BLM Visual Resource Management Program

The Visual Resource Management Program (VRMP) was developed by BLM in order to meets its responsibility to maintain the scenic values of public lands (BLM 2011). The VRMP includes two key steps: inventory and analysis. Inventory involves identifying the visual resources of an area and assigning them to inventory classes. The process includes rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or other key observation points. The inventory classes define objectives, including the following:

- Class I Objective: To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
- Class II Objective: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
- Class III Objective: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
- Class IV Objective: To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

The second step of the VRMP is analysis with the Contrast Rating System. The Contrast Rating System is a systematic process used to evaluate the potential visual impacts of proposed projects. The system was developed for use by personnel who are not formally trained in design as a way to consider and resolve visual impacts.

This system is based on the premise that the degree to which a project affects the visual quality of a landscape depends on the visual contrast between a project and the existing landscape. The contrast can be measured by comparing project features (i.e., form, line, color, and texture) with the major features in the existing landscape. The system includes five main steps, including the following:

1. Obtain a detailed project description, including a description of the key project features.
2. Identify the visual resource objectives for the project area.
3. Select key observation points from the most critical viewpoints, such as roadways.
4. Prepare visual simulations, if appropriate, for projects with potentially high visual impacts.
5. Determine the degree of contrast between the proposed project and the existing landscape from the most critical viewpoints (refer to Table 7-2).

TABLE 7-2. SUMMARY OF CONTRAST ELEMENTS FOR THE CONTRAST RATING SYSTEM

Contrast Element	Definition
Form	Contrast in form can result from changes in the shape of landforms and structures.
Line	Contrast in line can result from changes in edge types and interruption or introduction of edges and silhouette lines.
Color	Contrast in color can result from changes in the hue or reflectivity of a project site.
Texture	Contrast in texture can result from differences in the grain or density of a site.
Other factors, as appropriate	Other factors may include: distance, angle of observation, length of time the project is in view, relative size or scale, season of use, light conditions, recovery time (if vegetation is considered), spatial relationships, atmospheric conditions, and motion.

The degree of contrast can be summarized as follows:

- None: The contrast is not visible or perceived.
- Weak: The contrast can be seen but does not attract attention.
- Moderate: The contrast begins to attract attention and to dominate the landscape.
- Strong: The contrast demands attention, will not be overlooked, and is dominant in the landscape.

If adverse contrasts are identified, minimization or mitigation measures can be developed to lessen the change or to balance the change on a landscape scale. A complete description of the Visual Resource Contrast Rating System is included as Appendix H.

7.2.3 Evaluation of Open Space and Scenic Amenities at Owens Lake

The Commission does not have a similar established process for evaluation of visual resources at Owens Lake. Therefore, the BLM VRMP process is recommended as a method to consistently evaluate future projects in the plan area, such as a renewable energy project or a new BACM for the dust control project. This process is intended to be a guide for new projects. It would not apply to operations and maintenance of existing projects, such as mining or dust control.

7.2.4 Monitoring

Evaluation of open space and scenic amenities will be reported to the Master Plan Coordinator by project proponents. The Master Plan Coordinator will include a summary of the evaluation in the Annual Report. The role of the Master Plan Coordinator and Annual Reports are described in detail

in Section 8, Implementation. Monitoring data will be used to track evaluation of new projects and to track implementation of minimization and mitigation measures. Monitoring parameters will include:

- Summary of the Contrast Rating System evaluation, including a description of minimization and mitigation measures, if identified.
- Implementation of minimization and mitigation measures, if identified.

7.3 Cultural Resources

The plan area includes a rich cultural history, and hundreds of resources have been recorded in the vicinity of Owens Lake (Sapphos 2007). Cultural resources are not considered a Public Trust resource by the Commission, but the protection of cultural resources is considered consistent with the Public Trust. The Planning Committee recognizes the importance of cultural resources and identified opportunities to enhance the protection of cultural resources through education.

There are four primary types of cultural resources in the plan area: paleontological, archeological, ethnographic, and historic. Resources range from vertebrate fossils to prehistoric hunting camps to historic features associated with the soda ash industry. This section provides a summary of key laws and regulations that provide for the protection of cultural resources, a cultural overview of the plan area, and educational opportunities to enhance cultural resource protection.

7.3.1 Regulatory Context

There are numerous laws and regulations related to the protection of cultural resources. All projects on the lake will continue to follow applicable regulations for the protection of cultural resources. Table 7-3 summarizes some of the key laws and regulations.

1 **TABLE 7-3. SUMMARY OF KEY LAWS AND REGULATIONS RELATED TO CULTURAL RESOURCES**

National Historic Preservation Act (NHPA), Section 106	This act and its implementing regulations (35 CFR Part 800, as amended in 1999) require Federal agencies and entities they fund or permit to consider the effects of their actions on properties that may be eligible for listing or are listed in the National Register of Historic Places. To be eligible for listing in the NRHP, a resource must be significant under one or more of the four established criteria.
National Register of Historic Places (NRHP)	The NRHP was established by the NHPA of 1966 as "an authoritative guide to be used by Federal, State, and local governments, private groups and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment." The NRHP recognizes properties that are significant at the national, State, and local levels.
Native American Graves Protection and Repatriation Act (NAGPRA) of 1990	The NAGPRA addresses the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations to human remains and certain cultural items with which they are affiliated. Ultimately, this law provides for the repatriation of human remains and other cultural items to the appropriate lineal descendants or tribe.
California Environmental Quality Act (CEQA)	CEQA requires that public or private projects financed or approved by State or local public agencies be assessed to determine their potential to affect historical resources. Historical resources include buildings, sites, structures, objects, or districts, each of which may have historical, pre-historical, architectural, archaeological, cultural, or scientific importance. If implementation of a project would result in significant effects on significant historical resources, then alternative plans or mitigation measures must be considered. Before impacts and mitigation measures can be identified, the significance of historical resources must be determined.
Native American Heritage Commission (NAHC)	Section 5097.91 of the Public Resources Code established the NAHC, whose duties include the inventory of places of religious or social significance to Native Americans and the identification of known graves and cemeteries of Native Americans on private lands. Section 5097.98 of the Public Resources Code specifies a protocol to be followed when the NAHC receives notification of a discovery of Native American human remains from a county coroner.
California Register of Historical Resources (CRHR)	The CRHR is "an authoritative guide in California to be used by State and local agencies, private groups, and citizens to identify the State's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change." A resource may be listed in the CRHR if it meets one or more of the NRHP criteria.
California Public Records Act Code, Sections 6254(r) and 6254.10	These sections were enacted to protect archaeological sites from unauthorized excavation, looting, or vandalism. The sections authorize public agencies to withhold information from the public relating to "Native American graves, cemeteries, and sacred places maintained by the Native American Heritage Commission." The sections also exempt disclosure requests for records that relate to sensitive information.

7.3.2 Cultural Overview

7.3.2.1 Paleontological Resources

Paleontological resources include the fossilized remains of plants and animals, including vertebrates, invertebrates, and fossils of microscopic plants and animals. Fossils are often preserved in sediments or in areas that trap water, such as lakes and rivers. Owens Lake is mapped as Quaternary lake and sand deposits, edged by Quaternary alluvium (Sapphos 2007). The Quaternary Period is the most recent and ongoing geologic era and it includes two geologic epochs: the Pleistocene (2,588,000 to 12,000 years before present, or BP) and the Holocene (12,000 years BP to present). The older Pleistocene and late Holocene portions of each geological unit are considered to have moderate sensitivity for paleontological resources. Late Pleistocene fossils of mammoth, horse, bison, camel, and puma are known to occur around the lower Owens River and the Owens Lakebed. In addition, a sample from a United States Geological Survey (USGS) core taken in the southwestern portion of the lakebed recovered paleofaunal remains and fossil fish identified as the Owens chub (*Gila bicolor snyderi*) and the Owens sucker (*Catostomus fumeiventris*)(Sapphos 2007). Fossils preserved in sediments of the lakebed have the potential to reveal important paleontological information about the history of life at Owens Lake.

7.3.2.2 Archaeological Resources

Archaeological research describes four primary periods of human occupation in the vicinity of Owens Lake. These periods are typically distinguished by distinct types of projectile points. Projectile points and other archaeological resources are indicators of human society and usually take the form of artifacts (e.g., fragments of tools or ceramic vessels), features (e.g., remnants of walls, cooking hearths, or trash middens), and ecological evidence (e.g., pollen remaining from plants that were in the area when the activities occurred). The plan area includes numerous archaeological resources because Owens Lake provided resources conducive to human occupation. The following subsections provide a brief history of each period. Archaeological resources associated with each period reveal important information about the history of life at Owens Lake.

Lake Mojave Period (9000–6000 BP) and Little Lake Period (6000–3150 BP)

The Lake Mojave period is marked by large-stemmed, basally thinned, concave-base projectile points. The Little Lake period is marked by projectile points of the Little Lake/Pinto/Gatecliff series. These early aboriginal peoples were highly mobile and only sporadically occupied village sites (Basgall and McGuire 1988). Artifacts from this period are primarily percussion flaked, durable, general-use items that served several functions, reflecting an emphasis on mobility.

Newberry Period (3150–1350 BP)

This period is characterized by projectile points of the Elko series (Thomas 1981). Newberry peoples pursued a highly mobile subsistence system with seasonally occupied habitation sites (Basgall and McGuire 1988). Newberry peoples moved across the landscape visiting a series of

fixed lowland villages. Obsidian-source analysis suggests that the range of their movement in the southern Owens Valley spanned 300 km, from the northern edge of the Mojave Desert to Mt. Hicks, Nevada (Delacorte and McGuire 1993).

HAIWEE PERIOD (1350–650 BP)

Rose Spring and Eastgate projectile-point types mark the Haiwee period (Bettinger and Taylor 1974), signaling the introduction to the bow and arrow. Settlement patterns show a reduction in mobility. Tool inventories suggest the use of both plant and animal resources (Basgall and McGuire 1988) and intensified use of particular resources. Increased exploitation of piñon nuts and waterfowl from Owens Lake demonstrated an increase in shoreline camps. This change in resource exploitation during the latter end of the Haiwee period (approximately 700 years ago) is believed to have enabled the Numic expansion out from the Owens Valley, replacing non-Numic speakers throughout the Great Basin.

MARANA PERIOD (650 BP–CONTACT)

Desert Side-Notched and Cottonwood projectile points, as well as Owens Valley Brownware ceramics, mark the Marana period. Mobility patterns are more restricted with evidence of greater trading activity and an increased sedentary settlement pattern (Delacorte et al. 1995; Basgall and Giambastiani 1995). Subsistence efforts were further concentrated on river and lake environments and low-ranked resources, such as freshwater mussels. Pottery also marks the Marana period, including utilitarian brownware pots. Recent studies suggest that pottery only emerged as a result of population densities making ceramic industries sufficiently economical, further suggesting an increase in population in the Marana period.

7.3.2.3 Ethnographic Context

Ethnography is the study of human cultures, primarily concerned with the relationships between culture and behavior and/or how cultural processes develop over time. Ethnographic resources are landscapes, objects, plants, and animals, or sites and structures that are important to a people's sense of purpose or way of life. Ethnographic resources associated with the lakebed also reveal important information about the history of life at Owens Lake.

Owens Valley and its surrounding uplands were occupied during the Contact Period by the Owens Valley Paiute, who spoke, and continue to speak, dialects of the Mono language, a division of the Western Numic branch of the Uto-Aztecan language family (Liljeblad and Fowler 1986; Bettinger and Baumhoff 1982). General territorial boundaries were the Sierra Nevada to the west, the Inyo-White Mountains to the east, the southern shore of Owens Lake to the south, and the Benton Range and Long Valley to the north (Delacorte et al. 1995). Estimates of the aboriginal population vary between 1,000 and 2,000, making Owens Valley the most densely populated area in the Great Basin. This densely-settled valley may have been a source of social and technological innovation for

surrounding areas of the western Great Basin, while itself being influenced by cultures of the North American Southwest and other regions of California.

The inhabitants of the Owens Valley occupied semi-permanent base camps. The basic sociopolitical unit typically consisted of a large main village and several surrounding allied settlements. Each of these villages was a territorial unit with a substantial population presided over by a designated headman (Liljeblad and Fowler 1986). Steward (1933) noted at least seven such units in Owens Valley, which he described as composite land-owning bands. These bands displayed the highest level of organization among any of the Western Numic speakers—the groups sharing broadly similar subsistence techniques and languages.

The relatively high level of organization can be discerned in several important traits. There was communal ownership of seed and piñon nut patches, and irrigation of communal seed patches was coordinated by the hereditary chief. Individual hunting occurred, but the band would also engage in communal rabbit, deer, and pronghorn antelope drives. Individual villages shared a single sweathouse that also functioned as a male dormitory (Steward 1938). The singular nature of this organizational structure is obvious when nearby groups are considered. The neighboring Shoshone had no communal ownership of piñon nut or seed patches except in Saline Valley, where territorial ownership had likely been adopted from, or in response to encroachment by, other groups or the neighboring Owens Valley Paiute (Steward 1938). Rather than lineages with the nuclear family as the dominant unit of production and reproduction, broad kindred relationships seem to have been the basic kinship pattern among the Owens Valley Paiute. Kinship groups were not in and of themselves territorial; however, most settlements excluded all blood kin to the level of third cousin from marrying (Liljeblad and Fowler 1986).

The narrowness of the valley contributed to the presence of several distinct environmental zones. Important food resources for the Owens Valley Paiute included migrating and resident waterfowl, mule deer and bighorn sheep, rabbits and jackrabbits, fish, and freshwater mussels. Important invertebrates included brine shrimp and brine fly larva and pupae from the saline waters of Owens Lake, grasshoppers, and Pandora Moth Caterpillars collected from the yellow-pine belt of the Sierra Nevada. Important vegetable resources included chia, rice grass, numerous grass seeds and tubers from the valley, piñon nuts from the Inyo-White Mountains, and acorns from the eastern slopes of the Sierra Nevada.

In addition to their own rich homeland, the people dwelling in Owens Valley had access through trade to products of the Sierra Nevada and the Great Basin biotic zones as well as those of the Mojave Desert to the immediate south. Trade and marriage ties closely linked the Owens Valley Paiute with surrounding groups such as the Yokuts, Miwok, Tubatulabal, and Mono to the west, and other outlying Paiute-Shoshonean groups to the east. These interactions allowed the accumulation of considerable wealth, contributing to further cultural elaboration. The Owens Valley groups exhibited a highly sedentary orientation to the environment. This orientation distinguished them

from all other Great Basin ethnic groups, who followed a predominately mobile pattern (Binford 1980).

7.3.2.4 Historic Context

Historical resources include those that have been listed in or determined eligible for inclusion in the National Register of Historic Places, or may be deemed eligible upon evaluation. Historic settlement near the plan area began in the early 1800s. The first Euro-Americans to enter the Owens Lake region were in the Joseph Reddeford Walker exploration party in 1834. Several settlements emerged along the edge of Owens Lake; Cartago served as the southern landing for the Bessie Brady and Molly Stevens steamboats. Swansea, nine miles east of Lone Pine, served as a boat dock on the eastern edge of Owens Lake from 1872 to 1873. The Cerro Gordo Landing in Keeler eclipsed the Swansea landing in 1873 and provided the majority of services associated with the Cerro Gordo mines. Soda Ash, used primarily in the production of glass, was extracted from evaporation ponds on the lake beginning in 1887. Up until the late 1920s, Owens Lake was the main source of Soda Ash in the United States.

Several historic resources have been recorded and/or designated within one mile of the historic shoreline, including several resources that have been recognized as California Historical Landmarks or Points of Historical Interest. Some of these resources are associated with the historic town of Cartago, the Natural Soda Products Company, the towns of Keeler and Swansea, the Owens Lake Silver–Lead Furnace, and the Cottonwood Charcoal Kilns (Sapphos 2007).

7.3.3 Enhancement of Cultural Resources

The Planning Committee recognizes the cultural significance of the plan area and that projects on the lake have the potential to affect cultural resources due to public access and other activities, such as construction. Public access can affect cultural resources due to increased traffic, looting, and vandalism. New project construction can impact cultural resources due to ground-disturbing activities, which can cause exposure and damage. Numerous laws and regulations require Federal, State, and local agencies to consider the effects a project may have on cultural resources. Future projects will continue to follow applicable regulations.

In addition, when the Owens Lake Interpretive Plan (as described in Section 7.1, Public Access, Education, and Recreation) is developed, the authors of the plan will consult with local tribes to minimize potential impacts associated with increased public access. Many of the existing access routes were prehistoric access points to lakeshore springs and surrounding drainages and the current routes are only the latest in a long history of use along these corridors. These access areas hold cultural and/or religious importance to Native American communities within the region. Accordingly, the Owens Lake Interpretive Plan will be developed in coordination with tribes, including determination of open and guided access areas, location and extent of trails, and guided-tour and hunting protocols.

In summary, actions to enhance the protection of cultural resources in the plan area include the following:

- All projects on the lake will continue to follow applicable laws and regulations and implement avoidance measures, as appropriate.
- The Owens Lake Interpretive Plan will include a strong educational component about the cultural history of the plan area and the importance of protecting cultural resources.
- The Owens Lake Interpretive Plan will be developed in coordination with local tribes in order to minimize potential impacts associated with increased public access.

7.3.4 Monitoring

There is no monitoring associated with this plan element because monitoring protocols are already required by applicable laws and regulations. However, progress on the development and implementation of the Interpretive Plan, including those aspects that address cultural resources, will be reported to the Master Plan Coordinator by the Interpretive Plan authors and/or entities who implement elements of the Interpretive Plan. The Master Plan Coordinator will include the monitoring data in the Annual Report. The role of the Master Plan Coordinator and Annual Reports are described in detail in Section 8, Implementation.

7.4 Renewable Energy

In California, Executive Order S-14-08 established a policy goal of producing 33 percent of California's electrical needs with renewable energy sources by 2020. A substantial increase in the development of qualified renewable energy projects is needed to meet this goal. Renewable energy projects also contribute to the State's climate change goals of reducing greenhouse gases to 1990 emissions levels by 2020, and 80 percent below 1990 levels by 2050. Accordingly, implementation of renewable energy projects is a key priority for California.

Renewable energy projects at Owens Lake are not currently considered by the Commission as consistent with the Public Trust. However, it may be recognized as consistent with the Public Trust in the future. The Planning Committee considers renewable energy an opportunity for economic development and supports renewable energy in the plan area. This section includes a brief overview of renewable energy resources and a list of considerations for future projects developed by the Planning Committee.

7.4.1 Renewable Energy Resources in the Plan Area

Inyo County provides excellent opportunities for wind, solar, and geothermal renewable energy development, and the Owens Valley has excellent solar energy potential. Based on data from the U.S. Department of Energy's National Renewable Energy Laboratory, much of the floor of the Owens Valley has solar resource potential greater than or equal to six kilowatt hours per square

meter per day. This resource potential is considered suitable to support commercial-scale solar development. Given this resource potential, the valley floor is highly suitable for implementation of small-scale and commercial-scale solar development.

Solar energy resources, including photovoltaic and thermal technologies, have the most potential in the plan area. Solar photovoltaic uses solar panels to collect light and produce electricity. Solar thermal uses solar concentrators to heat a liquid, usually water, and run the liquid through a turbine or an engine to produce electricity. These technologies are well developed. Salt gradient solar ponds also have potential in the plan area. Salt gradient solar ponds gather and store solar energy, which can be used for generating electricity or direct heating; however, this technology is not well developed.

Other renewable energy resources include wind and biomass. Wind energy is typically captured by wind turbine towers. Wind resources in the plan area are poor because of intermittent high winds, rather than sustained high winds. Biomass energy could be produced from open pond algae. The algae can be used as feedstock for oil extraction, or converted to a petroleum-like feedstock for refining; however, this technology is not well developed.

There is currently minimal renewable energy produced or used in the plan area, except for some dust control monitoring equipment powered by solar-battery-operated units. LADWP is currently preparing a conceptual design for a one-megawatt solar energy demonstration project on up to 20 acres of the lakebed. The energy generated from this project will likely be used at the LORP pump-back station. The demonstration project will serve as a proof of concept for future development of various solar energy generating designs and technologies on much larger portions of the lakebed. The project will be located within the Phase 8 dust mitigation project area, about 6 miles southeast of Diaz Lake and about 10 miles south of Lone Pine. LADWP is currently completing a geotechnical study and will also complete all required environmental review, leasing, and permitting prior to implementation of the demonstration project.

7.4.2 Renewable Energy Projects at Owens Lake

Renewable energy represents an opportunity for economic development in the region. Generated energy could be used for dust control operations, locally in the Owens Valley, or in the City of Los Angeles. Solar energy has the highest potential in the plan area. The Planning Committee supports the development of renewable energy in the plan area and developed a list of considerations for future projects, including the following:

- Solar projects should be cited appropriately for the resource, including being south-facing and avoiding existing buildings, structures, or commercial operations that may shade the panels and affect energy output or reliability.

- Projects should be integrated with the dust control project (i.e., placed within existing dust control areas) and demonstrate the ability to contribute to the control of dust. However, other areas not identified as critical habitat may also be considered.
- Projects should avoid areas where there is a high level of existing or potential habitat. When it is not possible to avoid existing habitat, the project should consider the opportunity for grazing.
- Projects should be adjacent to existing power lines. LADWP has an existing 34.5 kV distribution system and a 230 kV transmission line on the lakebed. The 34.5 kV system has about 25 MW (10 MW/circuit) of available capacity, and the 230 kV system has about 300 MW of available capacity. It would be advantageous for projects to be installed as close as possible to existing systems to eliminate the need for building new distribution or transmission lines. This would also streamline interconnection and lower overall costs.
- Projects should be located where the surface and subsurface can reliably support system foundations at a reasonable cost. Suitable areas can be evaluated from preliminary data from previous geotechnical reports and construction projects; however, a thorough geotechnical study will be necessary for site-specific analysis.
- Projects should be close to existing powered operations, such that the energy output could be used on the lakebed, if appropriate.
- Projects should be close to existing paved or graveled roads for construction equipment and material loading and unloading. This would minimize the need to build new access roads and minimize ground disturbance. Projects should also minimize disturbance to existing county infrastructure.
- Projects should be evaluated for their visual impact on the local viewshed, and impacts should be mitigated to the degree feasible.
- Projects should include interpretive education, where possible, to enhance the public's understanding of the project. Existing public access points or main viewsheds should be considered for interpretative locations.

7.4.3 Monitoring

There is no monitoring associated with this plan element.

7.5 Grazing

Cattle grazing is the only agricultural use in the plan area and it is currently considered consistent with the Public Trust. Grazing contributes to the local economy, and the Planning Committee supports continued grazing in the plan area.

Grazing within the plan area is regulated by leases granted by landowners, namely the Commission and LADWP. Currently, there are approximately three ranching entities with leases that cover approximately 300 to 400 acres. LADWP has recently reviewed and revised all grazing leases in the Owens Valley, including those within the plan area. Renewal of grazing leases for land managed by the Commission is currently under negotiation.

Owens Lake has likely been grazed since the formation of the Transmontane Alkali Meadow habitat. Grazing generally occurs along the margins of the lakebed within suitable areas (i.e., for foraging and available water). The number of cattle is variable and is regulated by terms of leases and the availability of resources. There is limited fencing within the leaseholds, and cattle generally have access to outfalls of seeps and springs found along the edge of the lakebed.

The Planning Committee supports grazing in the plan area with the following considerations:

- Grazing should occur with valid and current leases (i.e., expired leases should be renewed).
- Grazers should follow a Grazing Management Plan that includes stocking rates, the protection of sensitive resources, including seeps and springs, and potentially fencing to manage cattle access to these areas.

Monitoring for this plan element includes annual reporting from LADWP and the Commission regarding the status of existing leases and whether the lessees are following a Grazing Management Plan. LADWP and the Commission will report the data to the Master Plan Coordinator. The Master Plan Coordinator will include the monitoring data in an Annual Report. The role of the Master Plan Coordinator and Annual Reports are described in detail in Section 8, Implementation.

There is no sensitive resource monitoring associated with this plan element because monitoring of seeps and springs is already conducted by LADWP. This monitoring is based on the previous monitoring program conducted by the District for the past decade. Refer to Section 6.5, Habitat Monitoring, for a description of this monitoring.

7.6 Mining

Mining is currently considered consistent with the Public Trust. Mining contributes to the local economy, and the Planning Committee supports continued mining in the plan area. Mining of minerals, including trona, sodium chloride, and sodium sulfate, has been undertaken on Owens Lake for over a century (District 1997a). Trona is the current mineral of interest and Owens Lake has the third largest supply of trona in the United States. Trona, a hydrated double salt of sodium bicarbonate and bicarbonate, is mined from the brine pool. The process of mining trona includes de-watering, excavating approximately two to five feet, extracting, drying, and pulverizing. Samples of the trona are analyzed in Lone Pine.

The Commission leases over 15,000 acres for trona extraction under the amended U.S. Borax lease, now owned and managed by Rio Tinto Minerals. The lease includes the majority of the brine pool as well as associated areas for infrastructure, including 10 miles of road located on the western edge of the brine pool. Mining is mainly outside the areas designated for dust control, but the mining lease was recently amended to eliminate an area on the eastern edge of the brine pool that became designated for dust control.

There is no monitoring associated with this plan element.

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8.0 IMPLEMENTATION

Implementation of the Master Plan is structured in order to encourage an open, collaborative, and cooperative process. The Master Plan will require cooperation and coordination among all entities responsible for implementation; it will involve a variety of governmental agencies, tribes, and non-governmental stakeholders. This section describes the participant groups, review processes, dispute resolution, and schedule and funding of projects implemented under the framework of the Master Plan. This section also addresses the Master Plan amendment process and changed and unforeseen circumstances.

It is anticipated that the governmental agencies involved in development of the Master Plan will sign a Memorandum of Agreement (MOA) that will provide for Master Plan implementation. The MOA would include operating procedures for the Advisory Committee, including processes for decision-making, calling Advisory Committee meetings, and forming subcommittees. Non-governmental stakeholders and Conservation NGOs may execute their own MOA(s) that will outline participation in the Advisory Committee and the associated roles and responsibilities.

Note to reviewers: It has not been determined whether there will be one, two, or three MOAs (governmental, non-governmental, and Conservation NGOs). This section will be updated pending resolution of this issue.

8.1 Participant Groups

The Planning Committee designed this structure to create efficiencies and assurances during implementation and to support adaptive management of lake resources. The implementation process includes five main participant groups: project proponents, the Advisory Committee, the Master Plan Coordinator, Technical Advisory Committees (TACs), and the Agency Forum. Implementation progress will be reported in annual Work Plans and Annual Reports. This section describes the roles and responsibilities of the five participant groups and the contents and timelines for the annual Work Plans and Annual Reports.

8.1.1 Project Proponents

Project proponents are those who pursue implementation of projects under the framework of the Master Plan. Project proponents are referred to as Lessees/Permittees because, generally speaking, all project proponents will be required to receive a land lease from the Commission and/or a Lake and Streambed Alteration Agreement from the Department of Fish and Game. The terms and conditions of the land lease and/or Lake and Streambed Alteration Agreement will be consistent with the terms of the Master Plan and associated MOA(s), and will also provide an enforcement mechanism for compliance with the Master Plan.

LADWP will be the primary Lessee/Permittee because LADWP is the key implementing organization for the dust control, water conservation, and habitat elements of the Master Plan. Other Lessee/Permittees may include those proposing recreational amenities (e.g., trails) or renewable energy projects on the lakebed. Lessees/Permittees will be responsible for all elements associated with implementation of their projects. Responsibilities will include the following:

- Prepare annual Work Plans in consultation with the appropriate TACs and the Master Plan Coordinator, consistent with the review process, that:
    - Describe proposed projects to be implemented in the following year, including how the projects are consistent with the Master Plan, including the predicted balance of habitat value-acres (see Section 6.4.3).
    - Describe adaptive management activities for existing projects.
    - Describe current and potential funding for all actions described within the Work Plan.
- Perform monitoring and, as necessary, participate in the adaptive management process.
- Participate in the Advisory Committee.
- Submit annual Work Plans and monitoring data to the Master Plan Coordinator by December 31 of each year for posting to the website and distribution to the Advisory Committee.

8.1.2 Advisory Committee

The Advisory Committee will be comprised of member organizations that represent all the major interests in the plan area. Planning Committee members that developed the Master Plan are listed in Table 1-1; these members will form the Advisory Committee. Members of the Advisory Committee will likely be signatories to an MOA. The Advisory Committee will work collaboratively with all its members to seek consensus on implementing the Master Plan.

Additional stakeholders may join the Advisory Committee with the concurrence of existing members. If an interest group already has representation on the Advisory Committee, individuals or organizations will be encouraged to communicate issues and concerns to existing representatives as an alternative to formally joining the Advisory Committee. Member organizations may change their individual representatives by notifying the Master Plan Coordinator.

The Advisory Committee will meet annually or more often if necessary. Advisory Committee meetings will be scheduled in the spring to review the Annual Report each year. All Advisory Committee meetings will be open to the public. Roles and responsibilities will include the following:

- Participate in Advisory Committee meetings to review annual Work Plans and Annual Reports for consistency with the Master Plan and submittal to the resource agencies, if required by leases and permits.
- Develop an annual Advisory Committee Work Plan if there are activities that Advisory Committee members want to move forward, such as the Interpretive Plan.
- Report to constituents on Master Plan implementation activities.
- Advocate for the Master Plan and seek funding for implementation.
- Participate in any revisions or amendments to the Master Plan.
- Consider and make decisions on disputes elevated to the Advisory Committee by project proponents and/or TACs, consistent with the dispute resolution process.
- Document areas of agreement and disagreement for the Agency Forum to reach agreement on disputes.
- Provide recommendations to the Agency Forum on policies, programs, or activities needed to support Master Plan implementation.

In addition to being members of the Advisory Committee and signatories to an MOA, the CDFG and the Commission also have the role of issuing permits and leases that are consistent with the Master Plan framework.

8.1.3 Master Plan Coordinator

A Master Plan Coordinator will be selected by a subcommittee of the Advisory Committee. The Coordinator's primary role will be to coordinate actions between the five participant groups and to provide transparency in the implementation process. Responsibilities of the Master Plan Coordinator will include the following:

- Develop and coordinate website content (i.e., Work Plans, monitoring data, Annual Reports) and maintenance.
- Act as the point person for all Master Plan activities, including public outreach.
- Coordinate with the TACs and the Advisory Committee on issues that need immediate attention.
- Distribute or make available to the Advisory Committee all materials related to implementation of the Master Plan.
- Convene and facilitate, or enlist a facilitator as needed, all meetings related to the Master Plan, including the dispute resolution process.

- Summarize annual Work Plans and adaptive management activities to TACs for their consideration (note: the Master Plan Coordinator does not provide technical review).
- Prepare and submit Annual Reports to the Advisory Committee, at least one month prior to the annual spring Advisory Committee meeting, that:
    - Detail Master Plan projects, monitoring, and adaptive management activities throughout the plan area for the preceding year
    - Summarize consistency of projects with the Master Plan, including the realized balance of habitat value-acres in accordance with the established timeframes for habitat recovery (see Section 6.4.3).
    - Summarize monitoring data collected and compiled by the Lessees/Permittees.
    - Summarize TAC conclusions on whether projects are meeting objectives, and if not, document the TAC recommendations for adaptive management.
    - Document any proposed amendments or revisions to the Master Plan based on analysis of monitoring data.

8.1.4 Technical Advisory Committees

TACs will be designated to advise on technical matters and to develop recommendations for consideration by the Lessees/Permittees and the Advisory Committee. A TAC for Habitat and a TAC for Public Access, Education, and Recreation are necessary from initial implementation of the Master Plan. Other TACs may form as needed throughout implementation. Entities on each TAC may choose their own representative and may change their representative by notifying the Master Plan Coordinator.

TACs recommendations on technical matters may also be submitted to regulatory agencies, as appropriate. One or more TACs will participate in review of annual Work Plans, monitoring data, and adaptive management activities, as appropriate. Roles and responsibilities will include the following:

- Review and refine annual Work Plans.
- Review monitoring data and analyses in order to evaluate whether projects are meeting objectives.
- Elevate disputes to the Advisory Committee, consistent with the dispute resolution process.
- Review and refine management activities and recommend modifications in monitoring and data analyses through the adaptive management process.

- Review proposed Master Plan revisions or amendments and/or propose revisions to the Advisory Committee, as appropriate.

8.1.5 Agency Forum

The Agency Forum was established during plan development and it will continue to meet on an as-needed basis to discuss regulatory and policy issues that affect implementation of the Master Plan. The Agency Forum consists of the California State Lands Commission, Great Basin Unified Air Pollution Control District, California Department of Fish and Game, California Department of Water Resources (CDWR), County of Inyo, Los Angeles Department of Water and Power, plus two ex-officio members of the Planning/Advisory Committee. Member agencies of the Agency Forum will likely be signatories to the governmental MOA. Roles and responsibilities will include the following:

- Consider recommendations from the Advisory Committee on policies, programs, or activities needed to support Master Plan implementation.
- Consider and make decisions on disputes elevated to the Agency Forum by the Advisory Committee.

8.2 Review Processes

This section provides a description of the review processes for Work Plans, adaptive management activities, and Annual Reports.

8.2.1 Work Plan Review Process

As described in Section 8.1.1, project proponents (or Lessees/Permittees) will prepare annual Work Plans that describe proposed projects (including the predicted balance of habitat value-acres), adaptive management activities for existing projects, and current and potential funding for all actions described within the Work Plan. The Work Plans will be reviewed consistent with the following process:

1. The project proponent develops a draft annual Work Plan. The project proponent will meet with the Master Plan Coordinator and the appropriate TAC at least once during Work Plan development.
2. The project proponent submits the draft Work Plan to the Master Plan Coordinator for review. The Master Plan Coordinator reviews the Work Plan for consistency with the Master Plan (the Master Plan Coordinator will not provide technical review). The Master Plan Coordinator prepares a written summary of the Work Plan and transmits the Work Plan and summary to the TAC for review within 15 calendar days.
3. The TAC provides technical review within 15 calendar days.

4. If the Master Plan Coordinator identifies inconsistencies and/or the TAC proposes changes, then the Master Plan Coordinator and/or the TAC and project proponent will reconvene to discuss and resolve concerns. If the concerns are resolved (or if no concerns are identified), then the project proponent finalizes the Work Plan.

5. If the concerns are not resolved, then TAC members, individually or as a committee, or the Master Plan Coordinator will provide a written summary of proposed changes, including areas of agreement and disagreement, to the project proponent within 7 calendar days of the meeting. The project proponent will fully consider the proposed changes. If the project proponent does not incorporate the proposed changes, then the project proponent must provide written justification to the TAC and Master Plan Coordinator within 15 calendar days. If the justification is rejected, then the dispute will be resolved according to the dispute resolution process.

6. Upon resolution of any issues, the project proponent will prepare a final Work Plan and submit it to the Master Plan Coordinator for posting to the Master Plan website and distribution to the Advisory Committee.

8.2.2 Adaptive Management Review Process

The adaptive management process is described mainly for habitat management and is covered in Section 6.6. The following section describes the adaptive management review process for habitat management by LADWP; however, the process will also apply to all other project proponents in the plan area if adaptive management is required for their projects. Adaptive management activities will be reviewed consistent with the following process:

1. LADWP evaluates monitoring data and develops draft adaptive management activities, if necessary. LADWP summarizes monitoring data and meets with the Habitat TAC at least once to discuss data and any potential adaptive management activities.

2. LADWP submits the draft adaptive management activities to the Habitat TAC for review.

3. The Habitat TAC provides technical review within 30 calendar days.

4. If the Habitat TAC proposes changes, then the Habitat TAC and LADWP will reconvene to discuss and resolve concerns. If the concerns are resolved (or if no concerns are identified), then LADWP finalizes the adaptive management activities.

5. If the concerns are not resolved, then Habitat TAC members, individually or as a committee, will provide a written summary of proposed changes, including areas of agreement and disagreement, to LADWP within 7 calendar days of the meeting. LADWP will fully consider the proposed changes. If LADWP does not incorporate the proposed changes, then LADWP must provide written justification to the Habitat TAC within 15 calendar days. If the

justification is rejected, then the dispute will be resolved according to the dispute resolution process.

6. Upon resolution of any issues, LADWP will finalize the adaptive management activities and submit them to the Master Plan Coordinator for inclusion in the Annual Report and distribution to the Advisory Committee.

8.2.3 Annual Report Review Process

As described in Section 8.1.3, the Master Plan Coordinator will prepare Annual Reports that describe Master Plan projects, monitoring and the results, and adaptive management activities; summarize the consistency of projects with the Master Plan (including the realized balance of habitat value-acres after the established timeframes for habitat recovery); and summarize TAC conclusions on whether projects are meeting objectives. The Annual Reports will be reviewed consistent with the following process:

1. The Master Plan Coordinator prepares a draft Annual Report and distributes it to the Advisory Committee for review.
2. The Advisory Committee reviews the draft Annual Report and provides comments to the Master Plan Coordinator within 30 calendar days.
3. The Master Plan Coordinator prepares the final Annual Report, distributes it to the Advisory Committee, and posts it on the website.

8.3 Dispute Resolution

Disputes may arise during plan implementation regarding: 1) the consistency of projects with the Master Plan framework and/or the associated leases and permits and 2) the adequacy of projects in achieving the goals and objectives of the Master Plan. It is expected that all participant groups will make reasonable efforts to resolve a dispute prior to commencing the dispute resolution process.

If a dispute cannot be resolved at a TAC meeting or through problem-solving with the Master Plan Coordinator, then the Advisory Committee will convene to address the issue. The Master Plan Coordinator will organize the Advisory Committee meeting, and the disputing parties will present their perspectives and interests and discuss them with Advisory Committee members. The Advisory Committee will fully consider all the disputing parties' issues and make a decision, consistent with its decision-making rule, as defined in the MOA. If the disputing parties are dissatisfied with the Advisory Committee's decision, then any member of the disputing party may choose to elevate the issue to the Agency Forum. The MP Coordinator would convene the Agency Forum and the disputing parties would present their interests and perspectives. The Agency Forum will fully consider all the issues and make a final decision.

As noted in Section 8.1.1, a project proponent's land lease from the Commission and/or the Lake and Streambed Alteration Agreement from CDFG will provide the enforcement mechanism(s) for compliance with the Master Plan framework. Final responsibility for compliance with the Master Plan will remain with the Lessee or Permittee. If the issuing agency (i.e., the Commission or CDFG) determines that a Lessee or Permittee is out of compliance, then the agency will follow the violation and/or enforcement protocols outlined in the lease or permit.

8.4 Revisions or Amendments to the Master Plan

Implementation of the Master Plan will require frequent and ongoing interpretation of the Master Plan framework. Actions taken on the basis of these interpretations that do not substantively change the purpose or intent of the framework will not require revision or an amendment to the Master Plan. Such actions may include, but are not limited to, the following:

- Clerical corrections that do not change the intended meaning.
- Adaptive management activities consistent with the adaptive management process described in Section 6.6, including variations in the day-to-day management of habitat areas and refinements to the HSM.
- Adjustments to survey, monitoring, or reporting protocols that are approved by a TAC.

Revisions to the Master Plan may occur from time to time to respond appropriately to new information, scientific understanding, technological advances, and other such circumstances. Revisions will likely be technical in nature. Revisions may include, but are not limited to, the following:

- Prioritization of target habitat guilds, such that value-acres are maintained overall, but not within each guild.

A TAC or a member of the Advisory Committee may propose revisions to the Master Plan by providing a written request to the Advisory Committee. Such a request will include a description of the proposed revision and an explanation of why the proposed revision is necessary and how it conflicts with the provisions of the Master Plan framework as originally approved. The Advisory Committee will consider and make a decision on the proposed revision consistent with their decision-making process outlined in the MOA.

8.5 Schedule and Funding

The Master Plan provides a framework to manage the diverse resources of the lake, while continuing to control dust. The Master Plan does not propose specific projects for implementation; therefore, a schedule of implementation has not been developed. However, habitat monitoring will begin immediately, and in the first three years the Habitat TAC will evaluate and recommend refinements to the HSM. In the first few years, the Advisory Committee also will evaluate funding

opportunities for development of the Interpretive Plan. Other activities, such as operations and maintenance of the dust control project or transitions to different BACM, will occur over time, as funding and other resources allow.

Project proponents are responsible for all elements associated with implementation of their projects, including funding. When project proponents develop Work Plans, the Work Plans must identify current and potential funding for all associated project elements. Project proponents may fund these activities directly through their own budgets or in-kind services, seek grant or private foundation funds, or seek Federal or State funds. The Master Plan Coordinator position will likely be funded on pro-rated project fees and grants.

8.6 Changed and Unforeseen Circumstances

Conditions in the plan area may change as a result of future events and unforeseen circumstances. Changed circumstances are reasonably foreseeable and may include failure of infrastructure or a new species listing. Table 8-1 presents a list of potential changed circumstances and the associated planned responses.

TABLE 8-1. POTENTIAL CHANGED CIRCUMSTANCES AND PLANNED RESPONSES

Potential Changed Circumstance	Planned Response
Failure of Water Operations Infrastructure	
This would occur if there is a malfunction or breakdown that substantially inhibits the ability to manage water.	LADWP would repair the affected facilities to restore full operational capacity as soon as reasonable and practicable.
New Species Listing	
This would occur if a new species, such as Western Snowy Plover, is listed by the United States Fish and Wildlife Service (USFWS) or CDFG, or if a new species, such as Desert Pupfish, is introduced to the lake.	Project proponents would evaluate the potential effect their projects could have on each listed species and obtain incidental take authorizations.
Uncontrollable Invasive Species	
This would occur if an uncontrollable non-native species is introduced to the lake and substantially diminished lake habitat values.	Project proponents would identify and implement, to the extent reasonable and practicable, measures to reduce and/or control the adverse effects of invasive species. This would occur within the processes established for adaptive management.
Climate Change	
This would occur if changes in climate, such as temperature and precipitation, caused significant changes in the suite of species using the plan area.	Project proponents would identify and implement, to the extent reasonable and practicable, adjustments to habitat objectives that could reflect changes in species using the plan area. This would occur within the processes established for adaptive management.

Changes in Avian Ecosystem Conditions	
This would occur if changes in migrating bird species' habitat conditions outside the plan area decrease their numbers in the plan area.	Actions to address such impacts would be beyond the capacity of the Master Plan and no response would be required.
Changes in plan area ecosystem conditions (e.g., food web productivity) to a degree that habitat goals cannot be achieved.	Project proponents would identify and implement, to the extent reasonable and practicable, adjustments to habitat parameters to address the change in ecosystem conditions. This would occur within the processes established for adaptive management.

Unforeseen circumstances are those that substantially and adversely affect the plan area, but the results of which could not reasonably have been anticipated and/or planned for. An example of an unforeseen circumstance is a natural disaster, such as a catastrophic earthquake that caused major failure of water operations infrastructure. If unforeseen circumstances occur, project proponents would not be required to commit additional resources to maintain projects under the Master Plan framework until a reasonable time after infrastructure is repaired.

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APPENDIX A OWENS LAKEBED PLANNING COMMITTEE CHARTER

Goal

The goal of the Owens Lakebed Planning Committee is to develop a Master Plan for the Owens Lakebed. The Planning Committee will recommend the plan for adoption by agencies and organizations responsible for implementation.

The plan will be a document that identifies a vision, broadly supported goals, objectives, actions, and projects to enhance the Owens Lakebed, including dust mitigation, habitat and wildlife, water efficiency, renewable energy resources, and economic interests. The plan will build upon concepts and technical information developed during the Conservation Action Plan process and provided within the Owens Lake Habitat Management Plan (LADWP 2010), as well as any other relevant plans and efforts.

To this end, the goals of the Planning Committee are to:

- Work collaboratively in an open process with other members who represent interests in the Owens Lakebed.
- Develop common understanding on present and future conditions of the Owens Lakebed.
- Negotiate in good faith to achieve consensus on how the Owens Lakebed will be managed into the future.

Membership

The Planning Committee consists of members who represent the following interest groups:

- Agriculture/Ranchers
- Air Quality
- Community
- Economic/Local Business
- Energy/Solar
- Environmental: Birds and Native Plants
- Governmental: County, State, and Tribal
- Open Space
- Landowners
- Public Access

- Public Trust
- Recreation
- Water

Members live throughout the Owens Valley or work in agencies that have jurisdiction in or around the Owens Lakebed.

Additional stakeholders may join the Planning Committee after its initial formation with the concurrence of other Committee members. Member organizations may change their individual representatives if necessary by notifying the project manager or facilitator.

Stakeholder Structure

1. **Planning Committee**: The Planning Committee, comprised of organizations representing diverse interests, is the decision-making body of the Owens Lakebed planning process. The Planning Committee has a collaborative governance structure: agencies with jurisdiction over the lakebed will join non-governmental and community organizations, business associations, and individuals to develop the Owens Lake Master Plan.
2. **Agency Forum:** The Agency Forum, comprised of State and local agencies with two ex-officio Planning Committee representatives, will meet periodically to discuss and resolve regulatory and State-wide policy issues. The outcome of these deliberations will be forwarded to the Planning Committee for its consideration and inclusion in the plan.
3. **Coordinating Committee**: The Coordinating Committee, appointed by the Planning Committee, is a smaller, representative group of the Planning Committee that meets between Planning Committee meetings to assist staff with process planning and developing proposals for Planning Committee consideration.
4. **Stakeholder Forum**: The Stakeholder Forum is the term used to describe the broad range of organizations and the general public interested in the Owens Lakebed planning process that seek information about activities either by attendance at meetings or through other means of communication. The Owens Lakebed planning process will include seeking input from the Stakeholder Forum on the Master Plan's direction and content.
5. **Work Groups**: The Planning Committee can establish Work Groups as needed. Work Groups would focus on preparing recommendations for Planning Committee consideration.

Roles and Responsibilities

Planning Committee

1. Organizations and governmental agencies participating in the Owens Lakebed process will select one formal designee to represent them on the Planning Committee. The designee will represent the views of the organization that selected them to participate in the process.

2. Planning Committee members will attend meetings consistently and, if unable to attend any session, will send an alternate also chosen by their participating group. However, use of alternates is not encouraged as this can interfere with the continuity of discussion and decision-making.

3. Planning Committee members agree to arrive at each meeting fully prepared to discuss the issues on the agenda. Preparation would include reviewing meeting summaries, technical information, and draft documents distributed in advance of each meeting.

4. The Planning Committee is the decision-making body of the planning process, and its members will make a good faith effort to achieve consensus to produce a plan with the strongest support possible.

5. Members will present their constituent members' views on the issues being discussed and be willing to engage in respectful, constructive dialogue with other members of the working group.

6. Members will develop a problem-solving approach in which they consider the interests and viewpoints of all group members, in addition to their own.

7. Members will regularly communicate information about the process to their organizations or agencies, as well as to the individual constituencies and communities they represent, and actively seek their constituents' input.

8. The Planning Committee will make decisions in accordance with the rules set out in the section on Decision-Making below.

Agency Forum

1. The Agency Forum consists of the following: California State Lands Commission (Commission), Great Basin Unified Air Pollution Control District (District), California Department of Fish and Game (CDFG), California Department of Water Resources (CDWR), California State Water Resources Control Board, County of Inyo, Los Angeles Department of Water and Power (LADWP), plus two ex-officio members of the Planning Committee.

2. The Agency Forum will consult with other agencies as needed, such as the California Public Utilities Commission or the U.S. Forest Service.

3. The Agency Forum's role is to create an opportunity for the agencies to discuss and coordinate regulatory and State policy issues that affect the Owens Lakebed planning process.

4. The Agency Forum may play a role in the development of the Master Plan, including preparation of substantive proposals for final approval in the Planning Committee. The Planning Committee is the decision-making body on the plan content.

5. The Agency Forum will strive for consensus within the Forum and craft proposals that are responsive to the diverse interests participating in the Planning Committee.

Coordinating Committee

1. The Coordinating Committee consists of the Eastern Sierra Audubon Society, the CDFG, the District, Inyo County, LADWP, and the Owens Valley Indian Water Commission (OVIWC) as determined at the Planning Committee's March 2010 meeting.

2. The role of the Coordinating Committee is that of process planning and logistics to assist staff with scheduling, recommendations for process modifications, communication, and other issues for which staff needs advice between Planning Committee meetings.

3. The Coordinating Committee may play a role in the development of the Master Plan, at the request of the Planning Committee, including preparation of substantive proposals, but it has no decision-making authority.

4. The Coordinating Committee will strive for consensus and, lacking that, will present the full range of opinions on any proposal to inform the Planning Committee's decisions.

Stakeholder Forum

The Stakeholder Forum is the term for the interested organizations and the public. The Planning Committee will provide information and seek input from the Stakeholder Forum on the plan's direction and content.

Strategies for reaching this larger audience include:

1. Public comment time at Planning Committee meetings in a flexible and inclusive manner rather than limited to a single period.

2. Periodic workshops or briefings at Forum member organizations to keep stakeholders abreast of progress on planning and solicit input on planning issues.

3. Interactive communication through a website with full publication of work products, reports, public meeting materials, regional resource databases, and other resources.

4. A master mailing list compiled by the convener consisting of lists contributed by member organizations as well as public inquiries, meeting attendance lists, and website sign-ins.

5. Multi-media materials created by member organizations to assist members in updating constituent and other community groups on planning activities and to inform local and regional media of milestone achievements.

6. Special outreach to tribal governments to elicit their input in a manner consistent with protocols on government-to-government relationships.

7. Other public participation strategies as developed by the Planning Committee or Coordinating Committee.

Work Groups

1. The Planning Committee may establish Work Groups to assist with developing the plan. Work Groups may develop recommendations or proposals for the full stakeholder group's consideration.

2. Work Groups will strive for consensus and, lacking that, will present the full range of opinions on any proposal to the Planning Committee to inform the Planning Committee's decisions.

3. Planning Committee Members may participate in more than one Work Group. Members of the Work Group need not be members of the Planning Committee.

4. Work Groups are encouraged to seek additional participants from outside the Planning Committee to increase the diversity of interests represented, provide additional expertise to the Work Group, or for other reasons deemed necessary by the Work Group. Work Group membership must balance interests and diversity but should be kept to a workable number to facilitate in-depth discussions.

Convener

LADWP is convening the Planning Committee to develop the Plan. The convener will sponsor committee meetings, garner necessary funding to complete the plan, and provide in-kind staff support to manage the project. In addition, the convener has contracted with the Center for Collaborative Policy to facilitate the planning process.

Facilitator

In cooperation with all stakeholders, the facilitator from the Center for Collaborative Policy will design Committee meetings and guide the overall process toward achieving its mutually agreed-upon purpose and goals. The facilitator will:

- Formulate the agenda and desired outcomes for all meetings based on input of stakeholders and facilitate those proceedings.
- Identify and synthesize points of agreement and disagreement for the written meeting summaries.
- Assist in building consensus among members.
- Ensure compliance with all process agreements and working ground rules.
- Serve as a confidential communication channel for members, alternates, and observers who wish to express views privately because they do not feel comfortable doing so in front of the large group.
- Advocate for a fair, effective, and credible process, but remain impartial with respect to the outcome of the deliberations.

Planning Committee Meeting Schedule

The regular meeting day for Planning Committee meetings will be the second Wednesday of each month as much as possible. Planning Committee meetings will be held from 9:30 a.m. to 3:30 p.m. due to the large amount of issues that require discussion and decision-making.

Attendance

Given the volume of information to be considered and the short timeframe, regular attendance by each member is essential. Designated representatives must be identified in advance, fully briefed, and able to represent their members during decision-making.

Communication

1. Meeting summaries will be provided following each Planning Committee meeting.
2. The Planning Committee is encouraged to develop common statements for periodic public release. Suggested text for such statements may be developed by staff and facilitators or may be offered by a group member. The Planning Committee may delegate this responsibility to the Coordinating Committee.
3. Members are asked to speak only for their organization or themselves when asked by external parties, including the media, about the committee's progress, unless there has been

a formal adoption of a statement, concepts, or recommendations by the Planning Committee. When asked about another member's views, the member should refer the inquiry to that party directly.

4. The facilitator will not speak to the media.

5. In addition, staff or members will be available to provide presentations of the group's work at meetings, conferences, or other venues using agreed-upon talking points. Members are strongly encouraged to provide or arrange presentations about the group's work wherever feasible to increase awareness of Owens Lakebed planning. The facilitator and staff can assist with materials and presentations to that end.

6. The Planning Committee will develop a communications plan early in its process that specifies its outreach activities.

Planning Committee Decision-Making

Consensus as the Fundamental Principle: The Planning Committee shall strive for consensus (agreement among all participants) in all its decision-making. Working toward consensus is a fundamental principle of the process.

Definition of "Consensus": In reaching consensus, some Planning Committee members may strongly endorse a particular proposal while others may accept it as "workable." Others may be only able to "live with it." Still others may choose to "stand aside" by verbally noting a disagreement, yet allowing the group to reach a consensus without them if the decision does not affect them or compromise their interests. Any of these actions still constitutes consensus.

Less than 100 Percent Consensus Decision-Making: The Planning Committee shall not limit itself to strict consensus if 100 percent agreement among all participants cannot be reached after all interests and options have been thoroughly identified, explored, discussed, and considered. Less-than-consensus decision-making shall not be undertaken lightly. If after full exploration and discussion the Planning Committee cannot come to 100 percent agreement, the Committee will identify a subcommittee to further explore the issue. With facilitator assistance, the subcommittee will identify the key issues and concerns and attempt to develop one or more proposals for full Planning Committee consideration. Subcommittee representation will be consistent with Work Group guidelines identified above.

If the subcommittee is unable to reach an agreed-upon proposal, the subcommittee will report back to the Planning Committee, presenting its analysis and perhaps one or more proposals for Planning Committee consideration. If the Planning Committee is unable to resolve the issue at that point, it will forward it to the Agency Forum. The Agency Forum will review all the issues and concerns and make a decision on the language to be included in the plan.

Conditional Endorsements: It is also understood that Planning Committee members represent organizations and, in some cases, may not be able to make final commitments without conferring first with their organization. In this case, agreements will be considered conditionally endorsed, pending organizational confirmation.

Approving the Master Plan

The Owens Lake Master Plan will be approved by the Planning Committee and recommended for adoption by the implementing agencies and organizations.

1. The Planning Committee approves the plan as "draft."
2. Planning Committee members take the plan to boards/commissions for conditional support.
3. The California Environmental Quality Act (CEQA) analysis is completed.
4. The Planning Committee recommends the plan for adoption.
5. Implementing agencies/organizations adopt the final plan.

Process Agreements

To hold a successful planning forum, the parties must agree to the procedures that the group will use as well as define individual behaviors or ground rules.

Everyone agrees to negotiate in good faith and hold to the agreement that is reached by participants. All participants agree to participate in decision-making, to act in good faith in all aspects of this Planning Committee, and to communicate their interests in group meetings. Good faith also requires that parties not make commitments they do not intend to follow through with, and that parties act consistently in the Planning Committee and in other forums where the issues under discussion in this planning process are also being discussed.

Everyone acknowledges that Planning Committee members and their organizations live in two worlds. This means that members or their organizations may have to occasionally unilaterally pursue their interests during the planning process. This does not imply that an organization is violating their good faith participation. No one participating in the planning process is being asked to abandon their obligations to their organizations or give up any type of rights.

Everyone agrees to address the issues and concerns of the participants. Everyone who is joining in the planning forum is doing so because the organization that s/he represents or s/he individually has a stake in the issue at hand. For the Planning Committee to be successful, all the parties agree to validate the issues and concerns of the other parties and strive to reach an agreement that takes all the issues under consideration. Disagreements will be viewed as problems to be solved, rather than battles to be won.

Everyone agrees to focus on the present and future, and not dwell on the past. Individual perceptions of the past change over time. While the past informs everyone's thinking and perspectives, the past cannot be changed. The purpose of this Planning Committee is to problem-solve today about how to address the issues and concerns for tomorrow.

Everyone agrees to inform their constituents about the outcome of the Planning Committee. Time will be built into the Planning Committee for participants to inform and seek advice from their constituents about the discussions and the negotiated outcome.

Working Together

The facilitator and participants will work together to create a problem-solving environment and to implement these agreements to that aim.

The group agrees to:

- Listen and openly discuss issues with others who hold diverse views.
- View disagreements as problems to be solved rather than battles to be won.
- Refrain from ascribing motives or intentions to other participants.
- Respect the integrity and values of other participants.
- Honor time.
- Use conversational courtesy.
- Keep cell phones silent during meetings. Please return calls during breaks.
- Appreciate humor but not engage in humor at the expense of others.

Open Process

1. All meetings of the Owens Lakebed planning process are open to the public.
2. Planning Committee agendas will be sent out in advance of the meetings and posted on a website. At each meeting, the public will be given an opportunity to comment.
3. Members of the public are expected to adhere to process agreements.

Amendments to this Charter

The Planning Committee, utilizing the Charter decision-making process as described above, may adopt changes to this Charter.

APPENDIX B VISION STATEMENT

DRAFT

The Owens Lake Master Plan represents a collective vision of the future of the Owens Lakebed developed by the Owens Lakebed Planning Committee (Planning Committee). The Planning Committee is a collaborative decision-making body that draws from the diverse interests of people from throughout the region, and it is comprised of members of nonprofit groups, environmental interests, local business and agriculture, concerned citizens, and governmental agencies. Please refer to the original Planning Committee Charter in Appendix A for more details about the Planning Committee and stakeholder structure, representation, and process.

The underlying objective of the Owens Lake Master Plan is to create a working environment on the Owens Lakebed that is consistent with the Public Trust, meets dust control requirements, uses water efficiently, promotes and enhances local environmental and economic interests, and meshes with the rural Sierra Nevada setting. The Planning Committee also recognizes that on Owens Lakebed lies an opportunity for renewable energy development, and that the Owens Lake Master Plan could serve as a model at State, national, and international levels as a collaborative, multiple-use approach to resolving some extremely complex issues. To ensure that the Owens Lakebed is managed in the future in a way that satisfies the interests of all stakeholders and benefits local residents, the goals and objectives in the Owens Lake Master Plan are based on the following elements:

- Effective Dust Control
- Public Trust
  - Ecological Protection and/or Creation and Enhancement (Wildlife Habitat and Vegetation Communities)
  - Creation of an Aesthetically Pleasing Environment
  - Public Access and Recreation
- Water Use Efficiency/Water Conservation
- Opportunities for Renewable Energy Development
- Opportunities for Economic Development and Tourism
- Cultural Resources Protection

The following statements summarize the Planning Committee's vision for the future of the Owens Lakebed:

- *Control dust on the Owens Lakebed to obtain good air quality and reduce the dust-related public health risk.* The positive future of the Owens Lakebed is dependent on dust being controlled to meet public health and air quality standards so that it can be enjoyed by all.

- *Protect, create, and/or enhance ecological resources on the Owens Lakebed.* The Planning Committee's vision includes sustainable wildlife habitat as well as protection of sensitive plant communities that surround the Owens Lakebed such as springs, seeps, and alkali meadows. The Owens Lakebed has become well recognized for its habitat for the western snowy plover, a California Species of Special Concern, as well as other species of waterfowl and migrating birds. Members of the Planning Committee desire to see a portion of the lakebed set aside as a wildlife sanctuary. While the size of the area has not been specified, the area should provide good quality habitat for the target species and be maintained in perpetuity. There is an opportunity to focus on quality over quantity, and also to enhance adjacent high-quality habitats, such as the LORP Delta Habitat Area, and lakebed-fringing springs and seeps.

- *Water use efficiency and water conservation shall be a priority when implementing dust control efforts on the Owens Lakebed.* Water conservation is currently, and will continue to be, a pressing issue as water resources become increasingly scarce. Future dust control will likely be a combination of current and new technology. The Planning Committee has expressed interest in exploring alternative water sources (e.g., groundwater and brine) and mechanisms of onsite water recycling for dust control on the Owens Lakebed. In addition, the Committee may also pursue alternative methods of dust mitigation that do not require water at all.

- *Create a Master Plan that can be flexible in the future and that is sustainable from a climate-change and water-use-efficiency standpoint.* The Master Plan will be flexible and robust to adapt to changing conditions and technology.

- *Explore opportunities for renewable energy development.* The Planning Committee recognizes that the Owens Lakebed presents favorable conditions for developing renewable energy projects, particularly solar power generation. Such creation of large-scale solar projects could help the State of California and the City of Los Angeles reach considerable goals for green energy conversion and development. In addition, renewable energy projects may possibly be used in conjunction with dust control measures to meet multiple goals while taking the pressure off more sensitive areas across the State that would otherwise be subject to developing green energy projects.

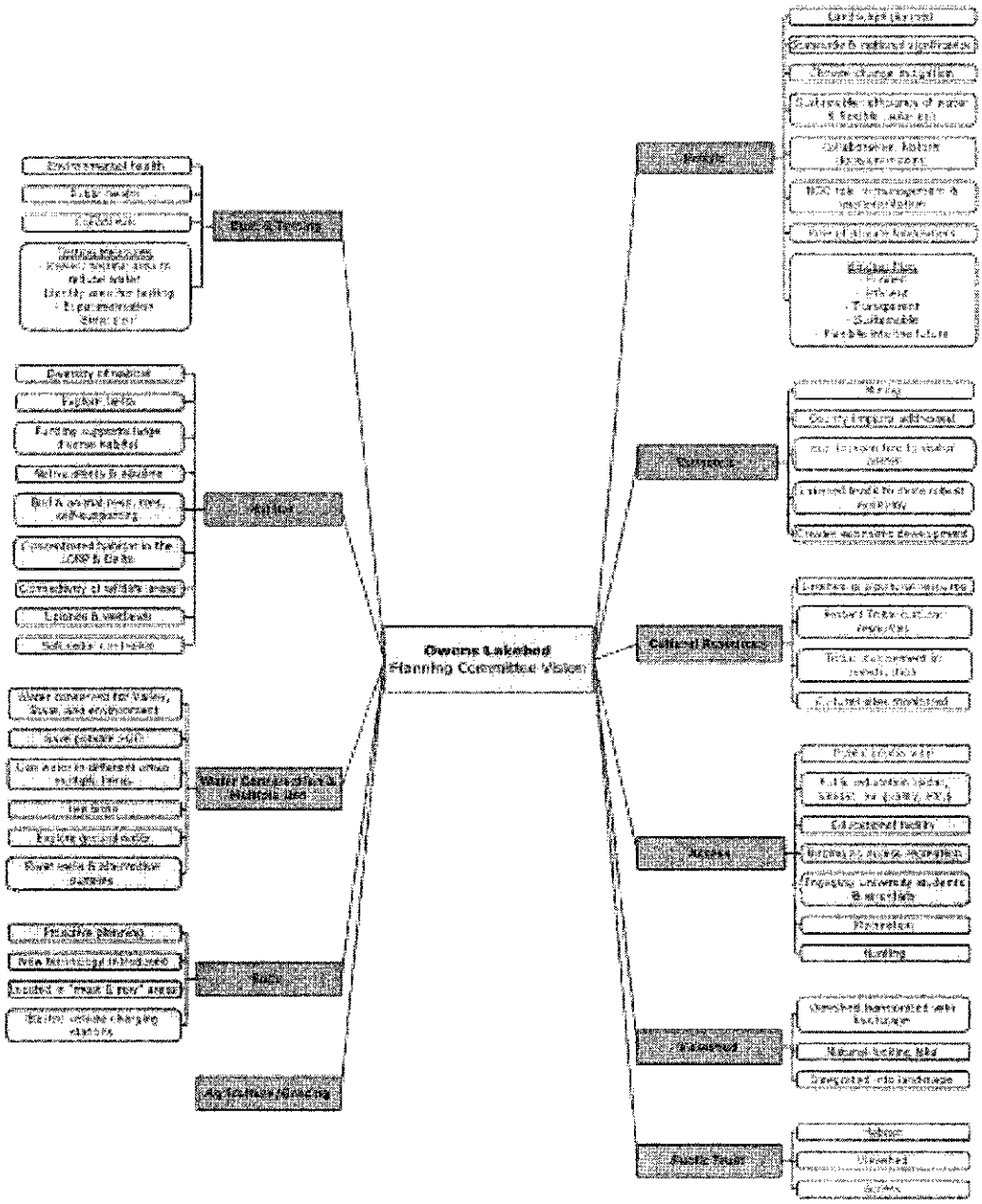
- *Promote economic development in the area as well as tourism, public access, and educational opportunities on the Owens Lakebed.* There is a strong desire among the group to turn the history of the Owens Lakebed into something very positive for the area's communities. The Owens Lake Master Plan will strive to enhance local business interests, jobs in the area, and the existing infrastructure. Recreation and educational opportunities will enhance tourism in the region. There is also an opportunity to use public education not only for recognizing the history and ecological significance of the region, but also as a tool to inform the public about renewable energy projects, water use efficiency, and large-scale dust control efforts.

- *Create a viewshed that is in harmony with the surrounding rural environment* while recognizing the need for flexibility and balance between Public Trust values and potential future uses, including renewable energy projects. There is also the desire to enhance the current natural communities that surround the lakebed, such as lake-fringing springs and seeps that can likely be self-sustaining if properly managed.

- *Protect cultural resources.* The Planning Committee recognizes that the Owens Lakebed sub-watershed contains cultural resources that provide vast insight into the history and significance of the Owens Valley from a cultural perspective. All members have a vested interest in protecting these resources.

Implementing the Owens Lake Master Plan

The Planning Committee acknowledges that the Master Plan must be inclusive and the process transparent. The final plan must be consistent with existing agreements, yet flexible and sustainable. It also must lend itself to adaptive management as new technology is developed and consider the implications of climate change or other issues as they arise. The Planning Committee sees the future of the Owens Lakebed to be a mosaic of solutions, one that will satisfy mutual goals and interests of multiple stakeholders. The final plan will be a product of hard work and honest collaboration, will provide for effective dust control, preservation and/or protection of economic, cultural, visual, natural, and water resources, and will be a possible gateway to renewable energy development.


Owens Lakebed
Planning Committee Vision

APPENDIX C SOIL MAPPING UNITS AND CRITICAL SOIL CHARACTERISTICS

Soil Mapping Units

Table C-1 lists the soil series, soil texture, and approximate acreage of each soil mapping unit. Table C-2 identifies the critical soil characteristics for design and management of projects on the lakebed. Specific soil mapping units are identified in which there is a high prevalence for each critical condition.

Figure C-1 is a map of all soil mapping units (SWWI 2001; CH2M HILL 2003).

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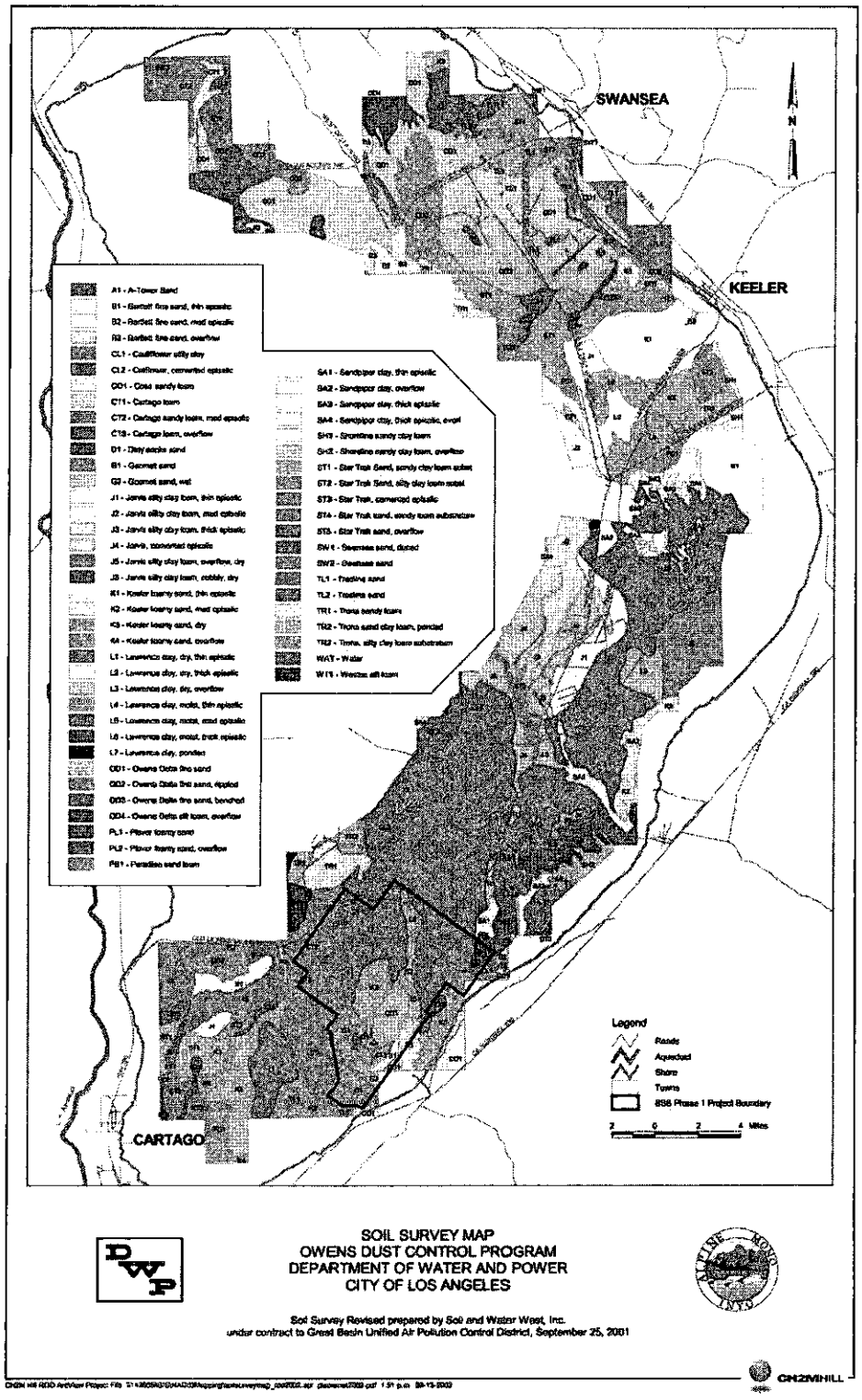
FIGURE C-1. MAP OF ALL SOIL MAPPING UNITS



1 **TABLE C-1. OWENS LAKE PLAN AREA SOIL MAPPING UNITS**

Soil Mapping Unit	Soil Series/Soil Phase	Soil Texture	Acres
A1	A1 - A-Tower Sand	Sand	970
B1	B1 - Bartlett fine sand, thin episalic	Fine Sand	34
B2	B2 - Bartlett fine sand, medium episalic	Fine Sand	138
B3	B3 - Bartlett fine sand, overflow	Fine Sand	437
CL1	CL1 - Cauliflower silty clay	Silty Clay	624
CL2	CL2 - Cauliflower, cemented episalic	Silty Clay	677
CO1	CO1 - Coso sandy loam	Sandy Loam	196
CT1	CT1 - Cartago loam	Loam	146
CT2	CT2 - Cartago sandy loam, medium episalic	Sandy Loam	979
CT3	CT3 - Cartago loam, overflow	Loam	582
D1	D1 - Dirty Socks sand	Sand	145
G1	G1 - Geomet sand	Sand	345
G2	G2 - Geomet sand, wet	Sand	35
J1	J1 - Jarvis silty clay loam, thin episalic	Silty Clay Loam	738
J2	J2 - Jarvis silty clay loam, medium episalic	Silty Clay Loam	190
J3	J3 - Jarvis silty clay loam, thick episalic, dry	Silty Clay Loam	631
J4	J4 - Jarvis, cemented episalic	Clay	984
J5	J5 - Jarvis silty clay loam, overflow, dry	Silty Clay Loam	1,275
J6	J6 - Jarvis silty clay loam, cobbly, dry	Silty Clay Loam	64
K1	K1 - Keeler loamy sand, thin episalic	Loamy Sand	1,755
K2	K2 - Keeler loamy sand, medium episalic	Loamy Sand	249
K3	K3 - Keeler loamy sand, dry	Loamy Sand	1,266
K4	K4 - Keeler loamy sand, overflow	Loamy Sand	350
L1	L1 - Lawrence clay, dry, thin episalic	Clay	7,143
L2	L2 - Lawrence clay, dry, thick episalic	Clay	336
L3	L3 - Lawrence clay, dry, overflow	Clay	519
L4	L4 - Lawrence clay, moist, thin episalic	Clay	579
L5	L5 - Lawrence clay, moist, medium episalic	Clay	225
L6	L6 - Lawrence clay, moist, thick episalic	Clay	45
L7	L7 - Lawrence clay, ponded	Clay	13
OD1	OD1 - Owens Delta fine sand	Fine Sand	4,228
OD2	OD2 - Owens Delta fine sand, rippled	Fine Sand	1,068
OD3	OD3 - Owens Delta fine sand, benched	Fine Sand	23
OD4	OD4 - Owens Delta silt loam, overflow	Silt Loam	234
PL1	PL1 - Plover loamy sand	Loamy Sand	54
PL2	PL2 - Plover loamy sand, overflow	Loamy Sand	21
PS1	PS1 - Paradise sandy loam	Sandy Loam	350

Soil Mapping Unit	Soil Series/Soil Phase	Soil Texture	Acres
SA1	SA1 - Sandpiper clay, thin episalic	Clay	67
SA2	SA2 - Sandpiper clay, overflow	Clay	370
SA3	SA3 - Sandpiper clay, thick episalic	Clay	157
SA4	SA4 - Sandpiper clay, thick episalic, overflow	Clay	159
SH1	SH1 - Shoreline sandy clay loam	Sandy Clay Loam	90
SH2	SH2 - Shoreline sandy clay loam, overflow	Sandy Clay Loam	115
ST1	ST1 - Star Trek sand, sandy clay loam substratum	Sand	1,628
ST2	ST2 - Star Trek sand, silty clay loam substratum	Sand	361
ST3	ST3 - Star Trek sand, cemented episalic	Sand	34
ST4	ST4 - Star Trek sand, sandy loam substratum	Sand	808
ST5	ST5 - Star Trek sand, overflow	Sand	180
SW1	SW1 - Swansea sand, duned	Sand	52
SW2	SW2 - Swansea sand	Sand	190
TL1	TL1 - Treeline sand, duned	Sand	622
TL2	TL2 - Treeline sand	Sand	52
TR1	TR1 - Trona sandy loam	Sandy Clay Loam	260
TR2	TR2 - Trona sand clay loam, ponded	Sandy Clay Loam	278
TR3	TR3 - Trona, silty clay loam substratum	Silty Clay Loam	112
WAT	WAT - Water	Water	81
WT1	WT1 - Westec silt loam	Sandy Clay Loam	135

TABLE C-2. CRITICAL SOIL CONDITIONS AND POTENTIAL EFFECT ON MANAGEMENT

Critical Soil Condition	Potential Effects on Management	Soil Mapping Units in which there is a Higher Prevalence of Critical Condition[1]
Surface Crusts Greater than 10"	Difficulty for tillage and excavation Difficulty in infrastructure installation Increased soil reclamation time Decreased water spreading capability	TR1, TR2, TR3, J3, J4, CL2, L2, L6, SA3, SA4
Soil Stratification	Potential for perched water table Decreased drainage capability Irregular irrigation or Shallow Flood water distribution Plant root restriction Reduced accessibility	B3, CT1, CT2, CT3, G1, G2, PL1, PL2, ST5, TR3 Some less abrupt stratification: A1, B1, B2, PS1, OD1, OD2, OD3, OD4, ST1, ST2, ST3, ST4, SW2, TL1, TL2
Subsurface Hardpan	Excavation difficulty Decreased drainage capacity Irregular irrigation or flood water distribution Plant root restriction Potential for soil subsidence	G1, G2, TR1, TR2, TR3 Potential for intermittent hardpan: A1, OD1, OD2, ST1, ST2
Large Soil Cracks	Areas of increased drainage capacity (water loss) Uneven irrigation or Shallow Flood water distribution Preferential flow paths of applied water Potential challenges in berm water retention	L1, L2, L3, L4, L5, L6, SA2, K3, J5, J6
Oolitic Sand	Increased potential for soil subsidence Increased soil reclamation time	J3, J4, CT1, CT2, CT3, K1, K2, K3, K4, B1, B2, B3, WT1

[1]Occurances of listed critical conditions are common in some listed soil mapping units and infrequent in others. Refer to the 2001 Soil Survey (SWWI 2001) and 2003 Build-out Soil Investigation Report (CH2M Hill 2003) for detailed information.

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APPENDIX D CNPS LETTER REPORT BY MCLAUGHLIN (2010)

Vegetation and Flora of Wetlands at Owens Lake

Compiled by: S. P. McLaughlin
Bristlecone Chapter, California Native Plant Society
Draft: September 16, 2010

Vegetation refers to the physical features of the plant cover, and is typically described in terms of the most abundant plant lifeforms and species, or characteristic habitats. Flora refers to the total inventory of plant taxa occurring in a particular location.

1. Vegetation

Seeps and springs and alkaline meadows were identified as Conservation Targets by the Owens Lake Conservation Action Plan (CAP). Furthermore, the alkaline meadows serve the function of dust control in many areas outside of the Dust Control Project area (CH2H Hill, 2002). Wetland plant communities at Owens Lake are generally found below the historic shoreline (Schultz, 2001), except in the vicinity of Olancha. Many of these communities are therefore relatively recent, having become established after the draining of the lake in the early part of the 20th Century. Most alkaline meadows are located outside of the Dust Control Project area, associated with the various seeps and springs found primarily along the margin of the lakebed. However, significant expanses of alkaline meadow have also developed within the Dust Control Project, particularly in cells T30-1 and T36-1. Finally, most of the delta area is covered by alkaline meadows and riparian vegetation.

The Owens Lake Habitat Management Plan (LADWP 2010) defines three types of Transmontane Alkali Meadows (TAM) for the Owens Lakebed: (1) Dry Transmontane Alkali Meadow (DAM), (2) Moist Transmontane Alkali Meadow (MAM), and (3) Saturated Transmontane Alkali Meadow (SAM). The CAP includes only the MAM and SAM as Conservation Targets. Schultz (2001) was not able to distinguish these three types of meadow communities on Landsat imagery, in part because patches of the different meadow community types are often smaller than the resolution (79 x 79-m) of the Landsat images.

The Owens Lake Habitat Management Plan provides only brief descriptions of these TAMs. DAM is dominated by saltgrass (*Distichlis spicata*) with some alkali pink (*Nitrophila occidentalis*), Parry saltbush (*Atriplex parryi*), and shadscale (*A. confertiflora*). MAM is a more diverse community. Besides saltgrass and alkali pink, yerba mansa (*Anemopsis californica*), bulrushes (mostly *Schoenoplectus americanus* and *S. pungens*), and rushes (*Juncus*) are common. The two common taxa of *Juncus*, Baltic rush (*J. arcticus* var. *balticus*) and Mexican rush (*J. arcticus* var. *mexicanus*) can be difficult to distinguish and are not treated as distinct taxa in the Habitat Management Plan. SAM communities are dominated by bulrushes and cattails (*Typha* spp.). While moisture availability is the primary control on the relative distributions of DAM, MAM, and SAM, other factors, including soil salinity, alkalinity, nutrient levels, and anoxic conditions (Dahlgren et al., 1997) affect the distribution and composition of the vegetation. Dense, nearly monospecific stands of saltgrass can be found in areas of saturated

soils, for example, at Swede's Pasture.

The first attempt at a comprehensive classification of vegetation types in California is that of Holland (1986). Despite being widely used, the classification was never formally published and is currently unavailable. Holland's system includes three types of vegetation that would occur on the Owens Lakebed: alkali meadow, alkali seep, and transmontane alkali marsh. The first edition of the Manual of California Vegetation (MCV1) (Sawyer and Keeler-Wolf, 1995) expanded on and largely replaced the classification of Holland (1986). Other vegetation classifications that address wetlands of Owens Valley include those of Sorenson et al. (1991), Odion et al. (1992), and Manning (1997).

Most recently the California Native Plant Society published its 2nd Edition of the Manual of California Vegetation (MCV2) (Sawyer et al., 2009). The basic unit of vegetation is called the alliance, defined both dominant and indicator species. The latter are not numerically the most abundant, but are characteristic of the alliance. Rarity ratings, both global and state, are given for all alliances, with the explicit hope that these will be used in CEQA and NEPA analyses of environmental impacts. The distribution of each alliance is shown in a small-scale map. The classification of Sawyer et al. (2009) is much more detailed than that of Sawyer and Keeler-Wolf (1995); based on the maps and descriptions it appears that several Herbaceous Alliances may occur wetland at Owens Lake. In Table 1 I attempt to show the relationships between the Owens Lake Habitat Management Plan classification and Manual of California Vegetation systems.

The DAM, Saltgrass series of MCV1, and the *Distichlis spicata* Herbaceous Alliance of MCV2 all appear to represent similar communities. However, there is consider *potential* diversity with the MAM and SAM community-types. In the Manual of California Vegetation systems, most types of moist alkaline meadows are dominated by grasses. The MAM on Owens Lake, however, is dominated by rushes (mostly *Juncus arcticus* var. *mexicanus*) and bulrushes (*Schoenoplectus* spp.) with some saltgrass and yerba-mansa (*Anemopsis californica*).

The differences between alkaline meadows at Owens Lake and those throughout much of the rest of California *may* be due to grazing. The alkaline meadows at Owens Lake have been grazed since their inception and will probably continue to be grazed in the foreseeable future. Many of the palatable grasses of alkaline meadows, including alkali sacaton (*Sporobolus airoides*), creeping ryegrass (*Leymus triticoides*), alkali bluegrass (*Poa secunda* ssp. *juncifolia*) and scratchgrass (*Muhlenbergia asperifolia*), are uncommon to rare at Owens Lake, while many unpalatable species, including *Juncus arcticus* var. *mexicanus*, *Schoenoplectus americanus* and spikerush (*Eleocharis* spp.), are dominant. These patterns are consistent with the history of heavy grazing of the meadows. *Spartina gracilis*, however, is not considered to be particularly palatable, and it is also very rare, if present at all now. It cannot be ruled out that the distributions of the more palatable species may be associated with particular soil features.

Table 1. Vegetation classifications of the Owens Lake Habitat Management Plan, Manual of California Vegetation (MCV1, Sawyer and Keeler-Wolf, 1995), and Manual of California Vegetation, Second Edition (MCV2, Sawyer et al. 2009) for communities potentially present on the Owens Lakebed. In the latter, HA = Herbaceous Alliance; AHA= Aquatic Herbaceous Alliance; PHA = Provisional Herbaceous Alliance

Owens Lake Habitat Management Plan	MCV1 (1995)	MCV2 (2009)
Dry Transmontane Alkali Meadow	Saltgrass series	*Distichlis spicata* HA
Moist Transmontane Alkali Meadow	Alkali sacaton series Cordgrass series Creeping ryegrass series Spikerush series	*Anemopsis californica* HA *Eleocharis macrostachya* HA *Juncus arcticus* (var. *balticus, mexicanus*) HA *Leymus triticoides* HA *Poa secunda* HA *Schoenoplectus americanus* HA? *Spartina gracilis* HA *Sporobolus airoides* HA
Saturated Transmontane Alkali Meadow	Bulrush series Bulrush-cattail series Cattail series Ditch-grass series	*Persicaria lapathifolia-Xanthium strumarium* PHA? *Ruppia* (*cirrhosa, maritima*) AHA *Schoenoplectus americanus* HA? *Schoenoplectus californicus* HA? *Typha* (*angustifolia, domingensis, latifolia*) HA

Several of these alliances of MCV2 are of conservation significance. Sawyer et al. (2009) consider any alliance with a state rarity ranking of S1 through S3 to be "rare and threatened" in California. These would include the *Spartina gracilis* Herbaceous Alliance (GU S1), the *Anemopsis californica* Herbaceous Alliance (G3 S2?), the *Sporobolus airoides* Herbaceous Alliance (G4 S2.2), the *Ruppia* (*cirrhosa, maritima*) Aquatic Herbaceous Alliance (G4? S2), and possibly even the *Leymus triticoides* Herbaceous Alliance (G4 S3) and *Schoenoplectus americanus* Herbaceous Alliance (G5 S3.2).

Sawyer et al. (2009) list just four occurrences for the rarest of these alliances, the *Spartina gracilis* Herbaceous Alliance, one of them at Owens Lake. I contacted Julie Evens, one of the authors of the book, regarding the CNPS occurrence records. She was not able to locate any specific information on precisely where this alliance occurs at Owens Lake. Todd Keeler-Wolf, the second author, also had no specific information for this alliance at Owens Lake. *Spartina gracilis* has been reported from Owens Lake (see below), but the people I have talked

with who are most familiar with the lakebed now do not know of any stands where *S. gracilis* is dominant or co-dominant, and I have yet to find any.

The *Anemopsis californica* Herbaceous Alliance and the *Schoenoplectus americanus* Herbaceous Alliance are common components of the MAM and SAM complexes. The *Sporobolus airoides* Herbaceous Alliance appears to be rare, however, on the Owens lakebed. The *Leymus triticoides* Herbaceous Alliance is probably also rare; there is a small patch of MAM dominated by *L. triticoides* near Cartago. The distribution of the *Ruppia* (*cirrhosa, maritima*) Aquatic Herbaceous Alliance is unknown, but it either is or could soon become quite common, particularly in the ponded DCM cells.

II. Flora

Given the recent origin or alkaline meadows around Owens Lake, these meadows might be expected to have a small number of species. Haller et al. (1992) conducted comparative inventories of 10 areas of alkaline meadows and wetlands from eastern California and western Nevada, and their data appear to support this hypothesis (Table 2). They found just 24 taxa of plants from Owens Lake.

Table 2. Comparison of vascular floras from wetlands in desert basins of the western Great Basin (Haller et al., 1992).

Site	Number of tax
Fish Slough	126
Ash Meadows	83
Deep Springs Valley	52
Fish Lake Valley	42
Klondike Lake	30
Long Valley	27
Bridgeport-Travertine Springs area	24
Owens Lake	**24**
Little Lake	23
Saline Valley	11

Owens Lake wetlands in the Dust Control Project were sampled in June 2001 to establish baseline conditions (CH2M Hill, 2002). Apparently just 14 species were encountered in sampling over 300 plots, reinforcing the impression of low diversity given by Haller et al. (1997).

I have compiled my own draft list of wetland plants occurring at Owens Lake

(Appendix). Sources include the 24 taxa listed by Haller et al. (1992), collection records from the online Consortium of California Herbaria database (accessed on August 4, 2010), my own collections and observations, and a few observations from other workers. The list in the Appendix includes 129 taxa, of which 24 (19 %) are exotic species. The species richness of at Owens Lake, contrary to Haller et al. (1992), is very similar to that of Fish Slough, which has been very thoroughly studied. The comparatively rapid colonization of Owens Lake following its dessication reflects the superior dispersal mechanisms of wetland plants. [On a brief visit to cell T30-1 made on September 12, 2010, I observed 34 species of plants, more than the number reported by Haller et al. (1997) or CH2M Hill (2002).] Many of the exotic species observed are found in the irrigated (?) pastures at Olancha.

Three species mentioned in CH2M Hill (2002) are not included in the Appendix. *Juncus patens* has not been collected from the Eastern Sierra region; it could be easily confused with the variable *J. arcticus*. *Carex douglasii* does occur in alkaline meadows in the Owens Valley. All collections in the Consortium of California Herbaria are from sites somewhat to well above the Valley floor, and there are no known collections from around Owens Lake. *Lessingia lemmonii* is common in saltbrush scrub in the Olancha area, but it is not a wetland plant and has not been collected from alkaline meadows.

What accounts for very different number of species reported in Haller et al. (1997) and CH2M Hill (2002) compared that of the Appendix? Haller et al. (1997) surveyed Owens Lake once in July 1990, and the field work reported in CH2M Hill (2002) was done in June. These are not the optimum times of year for surveying alkaline meadows in the western Great Basin. Many species put on most of their growth and flower in the late summer and fall, and would not be readily detected in June and July surveys. CH2M Hill (2002) was a vegetation study; the transects and plots used in such field work record the dominant and widespread species but tend to miss most of the rare and local taxa.

The wetlands of the Owens Lake bed should not be viewed as depauperate ecosystems in terms of their plant species diversity. Rather, they consist of plant communities that tend to be dominated by a few widespread species, with many taxa either rare throughout the area or locally abundant in a few localities. These less-common species contribute significantly to ecosystem function, however. They may serve as specific hosts for insects, support viable populations of pollinators, provide important food sources for wildlife and birds, and promote ecosystem resilience. Particularly rich wetland areas that I have observed include the delta, the Cartago area, and T30-1.

The flora of marshes tends to be dominated by common, readily-dispersed, widespread species. Alkaline meadows, however, often contain many rare, threatened, or endangered plants. Twenty-nine of the rare and endangered species listed by the California Native Plant Society for Inyo and Mono counties are found in alkaline meadows (CNPS, 2009). Very few rare taxa appear to occur at Owens Lake, however. This may reflect the recent origin of most of these wetlands, particularly adverse soil characteristics, grazing history, or other factors.

The plant species of conservation concern that have been reported for Owens Lake wetlands include *Plagiobothrys parishii* (CNPS List 1B.1), *Sidalcea covilleii* (CNPS List 1B.1), *Cleomella brevipes* (CNPS List 4.2), and *Spartina gracilis* (CNPS List 4.2). *Plagiobothrys parishii* (Parish's popcorn flower) is known from the west shore of Owens Lake near Kaiser Permanente spring. *Sidalcea covillei* (Owens Valley checkerbloom) has been reported from meadows near Olancha. These are the two species of highest conservation priority. CNPS List 4 is often called the "Watch List", plants that are not currently rare or endangered but are sufficiently uncommon that they could become threatened by habitat loss or other causes. *Cleomella brevipes* (short-pedicelled cleomella) is actually fairly common in DAM and MAM communities at Owens Lake. *Spartina gracilis* (alkali cordgrass) is known only from a collection made in October 1931 by R. Hoffman from "Olancha (border of Owens Lake)."

There are several other rare plant species that may occur around TAM communities associated with seeps and springs or in the delta. These are: *Calochortus excavatus* (Inyo County star-tulip, CNPS List 1B.1), *Crepis runcinata* ssp. *hallii* (Hall's meadow hawksbeard, CNPS List 2.1), *Goodmania luteola* (golden goodmania, CNPS List 4.2), *Phacelia inyoensis* (Inyo phacelia, CNPS List 1B.2), and *Thelypodium integrifolium* ssp. *complanatum* (foxtail thelypodium, CNPS List 2.2). It does not seem to me that the habitats around seeps and springs and in the delta have been throughly surveyed at the right times of the year, and these should receive more attention.

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IV. Appendix: Species of Vascular Plants Reported from wetlands at Owens Lake.

A representative specimen is given for each taxon recorded from the Consortium of California Herbaria; specimen citations include the herbarium acronym and the accession number. My collections are given in italics (*SPM 110xx*). Exotic species are indicated with an asterisk (*).

ANTHOPHYTA–DICOTYLEDONS

Aizoaceae	
Sesuvium verrucosum	Observed June 2, 2010
Apiaceae	
Berula erecta	Observed September 5, 2010; common
Cicuta maculata var. *angustata*	Observed Sepember 12, 2010 in T30-1

Sium suave	*SPM 11074*, from delta
Asclepiadaceae	
Asclepias fascicularis	Observed September 5, 2010, near Olancha
Asteraceae	
Chrysothamnus nauseosus	Haller et al. 1992
**Cichorium intybus*	Observed September 5, 2010
**Cirsium vulgare*	Observed September 5, 2010
Conyza canadensis	Observed September 5, 2010
Euthamia occidentalis	Observed September 5, 2010
Grindelia sp.	Observed September 12, 2010; a single individual of this difficult genus found in T30-1
Helianthus annuus	RSA 703226
**Lactuca serriola*	Observed September 5, 2010
Machaeranthera carnosa [*Aster intricatus*]	Haller et al. 1992
Psathyrotes annua	*SPM 11069*; mostly dunes but extending into DAM
Pyrrocoma lanceolata	Haller et al. 1992
Pyrrocoma racemosa var. *sessiliflora*	Observed September 5, 2010
Solidago canadensis ssp. *elongata*	Observed September 5, 2010 at Cartago
**Sonchus* sp.	Observed September 5, 2010
Symphyotrichum eatonii [*Aster eatonii*]	UC 1236207
Symphyotrichum frondosum [*Aster frondosus*] [Very similar to *S. subulatum*]	*SPM 11076*, from T30-1
Symphyotrichum lanceolatum ssp. *hesperium* [*Aster lanceolatus* ssp. *hesperius*]	RSA 658427
Xanthium strumarium	Observed September 5, 2010
Boraginaceae	
Heliotropium curassavicum	Haller et al. 1992
Plagiobothrys parishii	Pers. comm., Russell Kokx; CNPS List 1B.1
Brassicaceae	
Rorippa nasturtium-aquaticum	Observed September 5, 2010, at Cottonwood Marsh
Capparidaceae	
Cleome sparsiflora	CHSC 36064; mostly dunes but extending into DAM
Cleomella brevipes	*SPM 11064*; CNPS List 4.2
Cleomella obtusifolia	UC 1731539
Cleomella parviflora	*SPM 11062*
Chenopodiaceae	
Atriplex confertifolia	Haller et al. 1992
**Atriplex micrantha* (= *A. heterosperma*)	RSA 703248
Atriplex parryi	Haller et al. 1992
Atriplex phyllostegia	Observed June 10, 2010
Atriplex prostrata	RSA 625942
Atriplex truncata	*SPM 11068*, at Cartago
**Bassia hyssopifolia*	RSA 626285
**Chenopodium album*	RSA 625978
**Chenopodium glaucum* [Very similar to *Ch. rubrum*]	RSA 500042
Chenopodium rubrum	Observed September 5, 12, 2010
Endolepis covillei	RSA 312475

Nitrophila occidentalis	Observed June 10, 2010; common
Sarcobatus vermiculatus	Haller et al. 1992
Suaeda calceoliformis	*SPM 11075*
Suaeda moquinii	Haller et al. 1992
Cuscutaceae	
Cuscuta sp.	Observed September 5, 2010, near Olancha
Datiscaceae	
Datisca glomerata	RSA 626555
Euphorbiaceae	
Chamaesyce vallis-mortae	UC 126626
Fabaceae	
Glycyrrhiza lepidota	Observed September 5, 2010 at Cartago
**Lotus corniculatus*	Observed September 5, 2010 at Olancha
Lotus oblongifolius var. *oblongifolius*	UC 1234666
**Melilotus alba*	Observed September 12, 2010 in T30-1
**Trifolium repens*	Observed September 5, 2010 at Olancha
Trifoliuim variegatum	RSA 626546
Trifolium wormskioldii	UCR 18969
Gentianaceae	
Centaurium exaltatum	Haller et al. 1992
Lamiaceae	
Lycopus asper	*SPM 11072*; common in delta
Mentha arvensis	Observed September 12, 2010 in T30-1
Lythraceae	
Lythrum californicum	UC 1191553
Malvaceae	
Sidalcea covillei	Pers. comm. R. Kokx; USFWS 1996; CNPS List 1B.1
Onagraceae	
Camissonia boothii ssp. *desertorum*	*SPM 11067*, barely entering DAM
Epilobium ciliatum ssp. *ciliatum*	POM 271497
Oenothera elata	Observed September 5, 2010 near Olancha
Oleaceae	
Fraxinus velutina	RSA 625923
Plantaginaceae	
**Plantago lanceolata*	Observed September 12, 2010 at Olancha
**Plantago major*	UCR 24219
Polygonaceae	
**Polygonum aviculare* ssp. *aviculare*	RSA 625924
Polygonum lapathifolium var. *lapathifolium*	RSA 626481
**Polygonum persicaria*	RSA 626482
Polygonum punctatum	Observed September 5, 2010 at Cartago

**Rumex crispus*	Observed September 12, 2010 in T30-1
Rumex salicifolius	RSA 625930
Ranunculaceae	
Ranunculus cymbalaria var. *saximontanus*	POM 269839
Rosaceae	
Rosa woodsii	Observed September 5, 2010 at Cartago
Salicaceae	
Populus fremontii	RSA 430506
Salix exigua	Observed June 10, 2010
Salix gooddingii	Haller et al. 1992; common on delta
Salix laevigata	RSA 625931
Salix lasiolepis?	Saplings observed September 12, 2010 in T30-1 may be this species
Saururaceae	
Anemopsis californica	Haller et al. 1992
Scrophulariaceae	
Castilleja miniata	RSA 5000044
Castilleja minor ssp. *minor*	UC 1234668
Cordylanthus maritimus ssp. *canescens*	Haller et al. 1992
Mimulus guttatus	Observed June 10, 2010
**Veronica anagalis-aquatica*	RSA 500043
Solanaceae	
Solanum americanum	Observed September 5, 2010 near Olancha
Tamaricaceae	
**Tamarix ramosissima*	*SPM 11070*
Urticaceae	
Urtica dioica	Observed September 5, 2010 near Olancha

ANTHOPHYTA–MONOCOTYLEDONS

Cyperaceae	
Amphiscirpus nevadensis [*Scirpus nevadensis*]	Haller et al. 1992
Bulboschoenus maritimus [*Scirpus maritimus*]	RSA 703198; observed at Swede's Pasture
Carex nebrascensis	RSA 625981
Carex praegracilis	Observed June 2, 2010
Carex pellita	RSA 626188
Carex simulata	RSA 625938
Cyperus laevigatus	UC 1100676
Eleocharis palustris	Haller et al. 1992
Eleocharis parishii	RSA 625926
Eleocharis rostellata	Haller et al. 1992
Schoenoplectus acutus var. *occidentalis* [*Scirpus acutis* var.*o ccidentalis*]	*SPM 11073*, from delta
Schoenoplectus americanus [*Scirpus americanus*]	Haller et al. 1992
Schoenoplectus pungens [*Scirpus pungens*]	Haller et al. 1992
Scirpus microcarpus	RSA 625922

Juncaceae	
Juncus arcticus var. balticus [*J. balticus*]	Observed September 5, 2010; common
Juncus arcticus var. mexicanus [*J. mexicanus*]	Observed September 5, 2010; common
Juncus torreyi	Observed September 12, 2010, in T30-1 and T36-1
Juncaginaceae	
Triglochin concinna var. *debilis*	Haller et al. 1992; *SPM 11061*
Lemnaceae	
Lemna minima	Observed September 5, 2010
Orchidaceae	
Epipactis gigantea	SD 46498
Poaceae	
**Bromus tectorum*	RSA 625929
**Cynodon dactylon*	Observed September 5, 2010
Distichlis spicata	Haller et al. 1992
**Echinochloa crus-galli*	Observed September 5, 2010
Elymus elymoides	Observed September 5, 2010
Festuca arundinacea	RSA 625918
Leptochloa uninervia	Observed September 5, 2010
Leymus triticoides	Observed September 5, 2010
Muhlenbergia asperifolia	UC 121805
Phragmites australis	Observed September 12, 2010; common on delta
**Poa annua*	RSA 625985
Poa fendleriana	RSA 500041
**Poa pratensis*	RSA 500040
Poa secunda ssp. *juncifolia* (= *P. nevadensis*)	*SPM 11066*, Swede's Pasture
**Polypogon monspeliensis*	Observed June 2, 2010
Spartina gracilis	SBBG 72613; CNPS List 4.2
Sporobolus airoides	Observed
Potamogetonaceae	
Potamogeton crispus	RSA 626286
Ruppiaceae	
Ruppia cirrhosa	RSA 212062
Typhaceae	
Typha domingensis	Observed September 5, 2010; common
Zannichelliaceae	
Zannichellia palustris	Observed June 2, 2010

APPENDIX E WATER DEMAND ANALYSIS

OWENS LAKE
SCIENCE, TECHNOLOGY & REGULATORY PROJECT TEAM

OWENS LAKE MASTER PLAN WATER DEMAND ANALYSIS

PREPARED FOR: Owens Lake Master Plan Planning Committee

PREPARED BY: John Dickey, PlanTierra

DATE: December 2011

In support of the Owens Lake Master Planning process, a water demand analysis was undertaken to examine future levels of water demand under a range of dust control and habitat management scenarios. The demand analysis demonstrated that water conservation on the order of 50 percent relative to current levels of demand (about 95,000 AFY) is technically feasible, without compromising other Master Plan goals, such as the maintenance of habitat value.

Several assumptions incorporated into this analysis included the following:

1. Existing BACM were generally assumed to be employed, with the exception of some versions of current BACM in which conditions would be optimized to provide maximum habitat value. Widespread use of brine-based Shallow Flood (which conserves water) was not assumed.
2. Future dust control scenarios were divided into two groups: one assumed implementation of a Master Plan, the other assumed no Master Plan.
3. Water demand for controlling the existing dust control area, as well as other areas of the playa, was evaluated.
4. Habitat value for existing (baseline) conditions, and projected future conditions, were estimated based on the Owens Lake Habitat Suitability Model for target guilds.

The results illustrated the following:

- With a Master Plan, when habitat is conserved, maximum water conservation is about 40 percent for the existing dust control area.
- In the absence of a Master Plan, maximum water conservation is over 70 percent for the existing dust control area, but could be associated with significant loss of some types of habitat.

The potential for water conservation relative to these results, with or without a Master Plan, would be substantially increased in the event of the following:

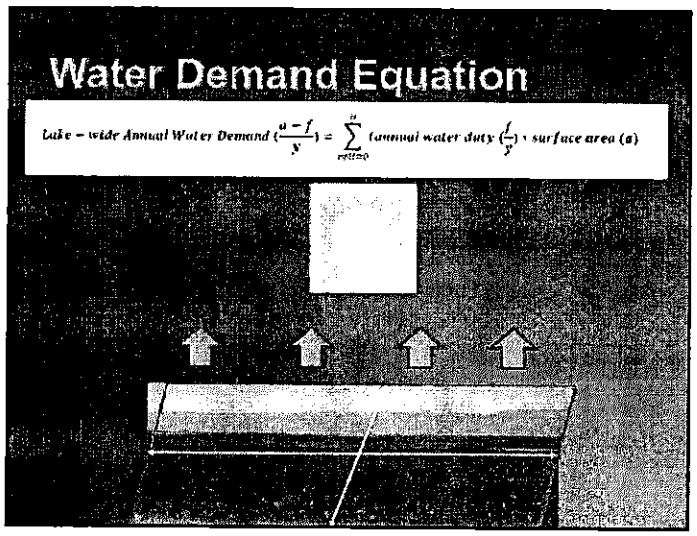
- Approval and implementation of water-conserving BACM

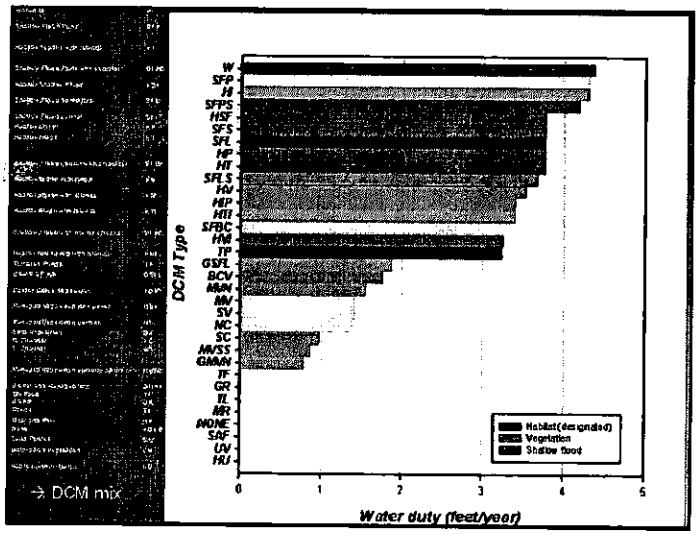
- Management to increase habitat value within dust control areas (levels significantly higher than those currently observed) over substantial areas
- Management to maintain habitat value (levels similar to those currently observed) in a water-efficient manner
- Substantial increase in the use of brine-based Shallow Flood

All the conditions described in the preceding points are envisioned under the Master Plan. Thus, water conservation estimates in this analysis were lower than would be achieved under a successful Master Plan.

Based on the water demand analysis, and considering the Master Plan goals to develop and implement new, water-efficient, or waterless BACM (e.g., Shallow Flood with Brine) and to promote increased habitat value where possible, a Master Plan water conservation target of 50 percent relative to current levels of water demand is reasonable.

The following slides illustrate points made in the discussion above.


Water Demand Equation
Lake – wide Annual Water Demand $(\frac{a-f}{y}) = \sum_{habitat}^{n}$ (annual water duty $(\frac{f}{y})$ × surface area (a)


DCM Type
W
SFP
H
SFPS
HSF
SFS
SFL
HP
HT
SFLS
HU
HIP
HTI
SFBC
HM
TP
GSVL
BCV
MAN
MV
SV
MC
SC
MVSS
GMAN
TF
GR
TL
MR
MOME
SAF
UV
HU
Habitat(designated)
Vegetation
Shallow flood
0
1
2
3
4
5
Water duty (feet/year)
→ DCM mix

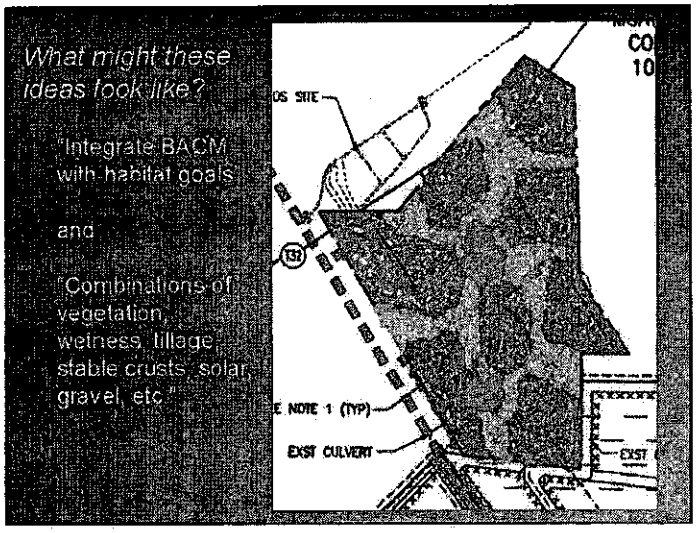
Assumptions

- Current regulatory conditions with specified exceptions
  - Water conservation beyond transitions of SF to GR and MV depends on scientific & regulatory process and results
- Implement all feasible water conservation based on regulatory and investment assumptions in each scenario

Water Conservation Opportunities

- Existing BACM[a]
  - Betterments
  - Flooding replacement with managed vegetation & gravel
- New BACM (beyond current analysis)
  - Integrate BACM with habitat goals
  - Combinations of vegetation, wetness, tillage, stable crusts, solar, gravel, etc.
  - Till-flood-brine stabilization

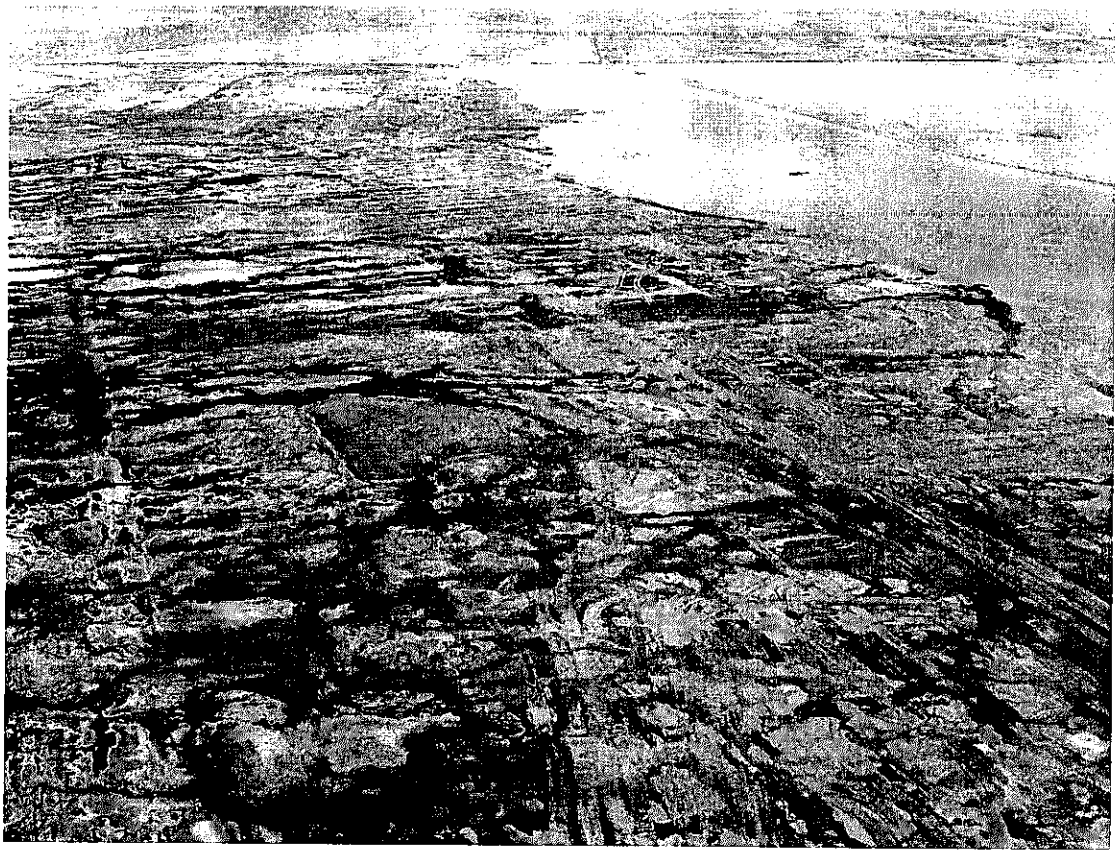
BACM = best available control measures = dust control methods approved by District


What might these ideas look like?
"Integrate BACM with habitat goals
and
"Combinations of vegetation, wetness, tillage, stable crusts, solar, gravel, etc."
OS SITE
NOTE 1 (TYP)
EXST CULVERT
EXST

APPENDIX F HABITAT SUITABILITY MODELS

Habitat Suitability Models for

Species Guilds that Occur on Owens Lake



December 1, 2011

OWENS LAKE

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1.0 INTRODUCTION

Since 2001, the Los Angeles Department of Water and Power (LADWP) has implemented Dust Control Measures (DCMs) to manage the emissions of dust from the Owens Lakebed. DCMs include shallow flooding of emissive areas with water, which can be accomplished with shallow ponds or sheet flow from various low-flow outlets; managed vegetation where native plant species are grown on emissive playa; or gravel. The design and purpose of these measures was dust control, but they often created wildlife habitat where little previously existed on the lakebed playa. Currently, many species of shorebirds and waterfowl, and meadow species, including plants, mammals, and herpetofauna, now utilize areas of DCMs. In the future, LADWP may be required to control dust over more areas of Owens Lake. In order to control dust in the future, DCMs that conserve water will need to be developed. The Owens Lake Master Plan (Master Plan) was initiated to provide a comprehensive tool to continue to manage dust control while maintaining habitat value and conserving water. LADWP will manage biological habitat values through the Master Plan process. Part of the Master Plan is the identification of baseline habitat values through a Habitat Suitability Model (HSM).

The objectives of this modeling effort were, as follows:

- To create and validate a habitat suitability model based on repeatable measures of environmental variables that document the baseline value of habitat for species occurring at Owens Lake.
- To create a habitat suitability model that can be used to predict the effect on the habitat value of DCM units by modifications to management activities, as well as the value of non-dust control project areas of the lakebed.
- To create habitat suitability model that can be used to monitor the value of the dust control project and non-dust control project areas to maintain the overall baseline habitat value.

The habitat suitability model is deductive, based on pre-existing information related to wildlife use of Owens Lake habitat. Therefore, a review of existing literature combined with consultation with local experts was critical to development of the model.

Section 2 presents a review of habitat suitability modeling, the process, and its applications.

In Section 3, the specific guilds and habitat parameters are identified and discussed for the development of the habitat suitability models for Owens Lake.

Section 4 presents the modeling approach, which includes data used and analysis undertaken to obtain the measurements for each parameter in the habitat suitability model.

Finally, Section 5 shows the calculated habitat value as measured in habitat value-acres, which is the habitat suitability index as a product of the acreage of each polygon. Validation of the results of the model is also discussed.

2.0 HABITAT SUITABILITY MODELING

Models that predict the distribution of organisms (at the species level or higher taxonomic/ecological guilds) can take many forms, but in the context of mapping the extent of species occurrence there are three fundamental approaches:

a) expert based models, which may be based on an educated opinion from experience in the local system (expert-opinion based) or may be further informed by an understanding of published studies (expert-literature based);

b) empirical based models, which are informed by a correlation of habitat characteristics with the frequency of occurrence of species;

c) population viability models, which reflects a combination of habitat characteristics and variability with demographics of population to forecast population health and extinction risk; or

d) a combination of these approaches.

In practice, a combination of these approaches is often used in conservation efforts, reflecting the need to use the best science available at the time. Often, complete empirical data may not be available and rarely have population viability studies been completed. Further, developing these datasets can be time consuming and costly to collect (Beazley *et al.* 2010). While developing the research programs necessary to complete these studies would improve confidence in the predictions of species occurrence models, in a species conservation framework, they are often not feasible to implement before management decisions need to be made. As a result, when developing models of habitat-species relationships based on a combination of expert-based and statistical-based parameters, documentation of the assumptions and uncertainty in the model parameters is essential to instruct the appropriate application of the model outputs.

Models that are based on the habitat-species relationship are typically constructed as an HSI model. HSI models hypothesize a functional relationship between the quantity of a resource and its suitability value for a species (Schamberger et al. 1982). The most appropriate use of an HSI model is not in establishing a causal relationship between species and habitat, but rather to document a repeatable assessment procedure of habitat that uses a limited set of easily understood parameter indices that can be used in a management context.

2.1 Approaches to Habitat Modeling

Because habitat models used in conservation planning are needed to make timely management decisions, it is often necessary to base part of the model parameterization on expert-based knowledge to bridge gaps in data availability for parameters that are considered critical for modeling species habitat preference. The concept of habitat-species relationship modeling is supported by ecological theories related to habitat selection, niche portioning and limiting factors (Verner et al. 1986, Morrison et al. 1992).

Benefits to expert-based models include local knowledge, which provides guidance for key goals or targets that would otherwise be ignored by integrative knowledge acquired from regional observations (Beazley et al. 2010). Local experts are more likely to understand cultural, political, and economic barriers to conservation planning (Beazley et al. 2010, Dorussen et al. 2005, Hmelo-Silver and Pfeffer 2004) and may be better able to identify 'hotspots of value' (Brown et al. 2004, Raymond and Brown 2006). For example, Doswald et al. (2007) argues in a review of lynx (*Lynx lynx*) habitat

suitability models in the Swiss Alps that expert-based models were developed successfully and that model performance can even be improved by employing experts with local knowledge. In another example, models based on local expert knowledge and literature review are considered good approximations of models based on empirical datasets for black bear (*Urus americanus*), although they are not guaranteed to be as accurate (Clevenger et al. 2002). Therefore, habitat suitability index (HIS) modeling that utilizes a combination of approaches, including expert knowledge, can be successful, but should explicitly state assumptions and limitations, to help guide the proper application of the model.

2.2 Critiques of Habitat Models

While there are documented benefits to HSI models, there are a number of criticisms that must be considered when evaluating the applicability of models to management decisions. It can be difficult to evaluate model performance (Brooks 1997, Roloff and Kernohan 1999) and the validation studies of some HSI modeling have been inconsistent (Morrison et al. 1992, Roloff and Kernohan 1999). For example, the reliability of some HSI models are affected by inadequate population sampling (Cook and Irnvin 1985, Lancia and Adams 1985), sampling in a limited range of habitat conditions (Clark and Lewis 1983), model equations not representative of the actual wildlife-habitat relationships (Bart et al. 1984, Warvick and Cade 1988, Van Horne and Wiens 1991), misinterpretation of results (Cook and Invin 1985, Capen *et al.* 1986), model application to inappropriate spatial scales (Wiens 1986, Roloff and Kernohan 1999), and inadequate consideration of data variability (Bender et al. 1996).

The utility of HIS models themselves, irrespective of the approach (expert, empirical or population viability–based) to modeling habitat-species relationships, have been questioned (Cole and Smith 1983, Van Horne and Wiens 1991). Because observations of species-habitat preference are not necessarily directly related to fitness, HSI models may not identify habitat supporting viable populations (Garshelis 2000). For example, Breininger et al. (1998) found that although an HSI model for Florida scrub-jays (*Aphelocoma coerulescens*) correlated well with demographic performance (reproduction, survival, and density); most of the area was a population sink where mortality exceeded reproduction. In this case, bird competition for the best habitat apparently reduced their awareness of predators, resulting in high mortality. A comparison of animal movement (e.g. monitored using radio telemetry) and the frequency of use of habitat types within their home range to their eventual reproduction and survival has been proposed as a more definitive approach to evaluate habitat suitable for maintaining viable populations (Garshelis 2000). These types of more rigorous examinations of population viability should be incorporated into the long-term adaptive management goals of conservation areas, in combination with the available modeling approaches, in order to assess hypothetical species-habitat relationships.

Caution must also be used when interpreting the long-term applicability of HSI models where interactive effects (e.g. top-down population pressure from predators) and behavioral responses to changes in resource availability (e.g. shifts in prey food availability due to the effects of climate change) may indirectly or directly alter model parameters (Van Horne 1983). Consequently, HSI models, as with all models, should be iteratively improved over time, reflecting new science and shifting management objectives in a changing world. While some authors have emphasized apparent 'fatal flaws' of the HSI modeling approach (Garshelis 2000), it should be recognized that all modeling activities are by nature imperfect and rely upon necessary abstractions of reality. Despite these challenges, the relatively simple conceptual framework of the HSI models ability to create maps as visual aids for communication and discussion between stakeholders, and the flexibility to incorporate expert and empirical knowledge into the model enhance the utility of HSI models.

The criticisms; however, highlight the need to thoughtfully apply models outputs to management decisions, by considering the variability and uncertainty in model parameters. Further, when possible, validation studies can be used to improve confidence in model results and provide valuable feedback for future model refinement.

2.3 Process of Habitat Modeling

Habitat modeling is a process that develops in stages, centered on the development, evaluation and application of a hypothesized habitat-species relationship, which is explicitly stated in both verbal and mathematical forms.

2.3.1 Model Development

The development of a model can be viewed as a process with three main steps (EPA 2009):

a) Specify the problem, or set of issues, the model is intended to address and develop the conceptual model. Often, it is best to state the problem in clear prose, defining the meaning of key words.

b) Evaluate or develop the model, typically expressed in mathematical terms.

c) Parameterize the model to develop a tool that can be applied to address the stated problem.

The scope (spatial, temporal and process detail) of models that can be used range from very simple to very complex, depending on the problem and data availability. When different approaches may be appropriate for solving a problem, the parsimonious solution is preferred, while maintaining the scope and rigor appropriate for the intended use and confidence needed in the results (EPA 2009).

HSI models relate current species' distribution to current environments and there are a variety of approaches to HSI models based on the underlying hypothesis of species-habitat relationships and assumptions made in statistical models (Thuiller and Munkemuller2010). The types of parameters that can be used to predict habitat suitability are related to probability of occurrence, population density, or population viability. These factors may also be mixed (e.g. see Rittenhouse *et al.* 2007).

Expert-based approaches based in biological expertise can provide a foundation for building models of species occurrence and are most accepted when validated. Expert-based models often form the basis of an iterative multilevel framework, as additional data and capabilities allow, a species occurrence model can be improved with empirical and population viability models that predict habitat associated with the occurrence of a species (Reed et al. 2006).

Environmental parameters for bird species commonly include the following: climate (e.g. temperature), landscape structure (e.g. connectivity indices), resources (e.g. insect availability), and biotic information (e.g. co-occurring competitors). Environmental parameters may be limiting factors, disturbances, or resources (Thuiller and Munkemuller 2010).

Parameters are assigned suitability index values, reflecting the hypothesized relationships between the habitat parameter and species distribution. The value of each of these suitability indices range from 0.0 (low or non-suitable habitat) to 1.0 (highly suitable habitat). A composite HSI value is formed by combining multiple suitability indices from each parameter in an HSI equation. Geometric mean is often used when all habitat characteristics in the model are necessary for habitat suitability:

$HSI = (V_1 * V_2 * V_3 * \ldots V_n *)^{1/n}$, where V represents an n critical parameter. For example, if any of the HSI values are zero then the HSI index is zero. However, when habitat characteristics are substitutable, then an arithmetic mean may be used. The HSI equation can be further modified to reflect the individual role of a parameter in determining habitat suitability (Shifley et al. 2009).

The sensitivity of the resulting HSI model to any one parameter index value will decrease as additional variables are added to the model due to the mathematics of a geometric mean model. Consequently, the model may not accurately reflect habitat use or response of the population to environmental parameters. As such, HSI models should be interpreted as hypothetical species-habitat relationships rather than predictors of actual species response to conditions (Morrison et al. 2006).

To evaluate the impact of individual parameters on model performance, a sensitivity analysis is commonly performed (Rykiel 1996). Sensitivity analysis helps the user of the model understand how much confidence to place in the results by systematically comparing varying model parameters to determine the models response to small changes (Dijak and Rittenhouse 2009). Sensitivity analysis can be an important part of model evaluation, but is should be remembered that this is not the same thing as validation (Johnson 2001).

2.3.2 Model Evaluation

Model evaluation is the process for generating information over the entire life cycle of the project. In an adaptive management context, over the life span of active management, model evaluation helps determine whether a model and its analytical results are of sufficient quality to serve as the basis for a decision. The quality of a model is an attribute that is only meaningful within the context of the specific application of the model (EPA 2009).

Model evaluation provides information to help address the following questions (EPA 2009):

a) How have the principles of sound science been addressed during model development?

b) How is the choice of model supported by the quantity and quality of available data?

c) How closely does the model approximate the real system of interest?

d) How well does the model perform the specified task while meeting the objectives set by quality assurance guidelines set by the project?

Models can both quantify what is known about a system and provide a framework for identifying uncertainty in the system. It is useful to quantify the HSI model accuracy by summarizing the frequency of correct observations using an independent data set (Shifley et al. 2009).

Validation of HSI models is important to increase confidence in the result and quantify the accuracy or error of the model; however, the ability to rigorously validate the model may be limited by the lack of complete information about an organism (Van Horne 1983). An evaluation of HSI models in 1999 revealed that the weakest component of validation was inadequate consideration of input data variability and how this variability affects final HSI output interpretation (Roloff and Kernohan 1999). Because subjective interpretations of wildlife-habitat relationships included in model development may cause the model to perform poorly (Bart et al. 1984, Cole and Smith 1983, Ray and Burgman 2006) and they may not be able to be fully evaluated with a validation study, statements of uncertainty and variability with respect to parameters indices are very important.

Limitations on the applicability of the geographical extent of the model and the tacit assumptions made in parameterizing a model should be explicitly stated and recorded in the documentation of the process. These limitations and assumptions are based in part on the experience of local experts and available published information on the target organisms and their habitat requirements. Regan *et al.* (2002) identifies two main categories of uncertainty, which can be used as a framework for discussing parameter indices:

a) Linguistic – vagueness, ambiguity and context dependence of the natural and scientific language used in developing, describing and applying models; and

b) Epistemic – uncertainty from a determinate fact.

2.3.3 Model Application

The application of a model is strengthened when the science and rationale underlying the model is transparent. Therefore, it is suggested to comprehensively document all aspect of the modeling process and to emphasize communication between modelers, analysts and decision makers (EPA 2009).

HSI models are used for evaluation of alternative management strategies in the development of resource management plans, to identify priority areas for management activities, and as estimates of population viability (Larson et al. 2004). Management decisions at any given time are made using the best available science and data; however, an adaptive management approach can allow for new management prescriptions when better information becomes available.

Geographic Information System (GIS) based applications of HSI models can serve as a powerful tool in support of conservation planning (Gontier 2006). Maps allow for technical experts and non-technical stakeholders to visualize and review the results of HSI modeling, which supports discussion and engagement in selecting conservation planning areas.

3.0 OWENS LAKE HABITAT SUITABILITY MODELS

Six species guilds were identified that are important on the Owens Lake: diving waterbirds, breeding waterfowl, migrating waterfowl, breeding shorebirds, migrating shorebirds and meadow. Guilds are made up of species with similar habitat requirements and therefore, habitat use at Owens Lake. A HSM was developed for each guild based on multiple parameters believed to be the most important to describe habitat for each guild. The model output is a single HSM value for each guild in each area assessed. The HSM value can range from 0.0 (low or non-suitable habitat) to 1.0 (highly suitable habitat).

The HSM model is evaluated by combining individual Suitability Index Values (SIVs) for each parameter. SIVs are assigned to measurements in each parameter in the model based on what measurements are preferred by each guild. The SIVs range from 0 to 1, like the HSM value, which indicate the suitability of each component parameter. For example, in the shorebird habitat model, shorebirds prefer shallow water for the open water parameter therefore the SIV assigned to this parameter when shallow water is measured is 1. Each parameter's SIVs are combined mathematically to obtain the HSM value.

In this section for each Owens Lake guild there is first a description of the guild, then a brief summary of foraging and nesting habitat use (where applicable), diet, and seasonal use of the Owens Lake. Next the specific model parameters and method of calculation for each guild are discussed.

3.1 Model Applicability

These models were developed specifically for use on habitats existing within or around the 3600 feet contour surrounding the Owens Lake in southern Inyo County. These models were developed to assess year-round habitat value on Owens Lake. The majority of the data used for the models is designed to be measured or acquired during the peak breeding or growing season (May-July). It is acknowledged that certain guilds have much higher use of the area during certain times of the year (migration) and that some variables potentially change throughout the year.

3.2 Diving Waterbird Guild

3.2.1 Guild Description

The diving waterbird guild consists of waterfowl that may dive when foraging, the most abundant being the Ruddy Duck, and the taxonomically unrelated Eared Grebe. Other diving ducks include Bufflehead, Redhead, and Lesser Scaup among others. These species are known to spend either a considerable amount of time in open water habitats or use them almost exclusively. These species exhibit significant overlap with regard to their use of specific dust control cells. Aquatic invertebrates comprise the bulk of the diets for these species. They also have similar seasonal patterns of use, in that use is highest during migration and notably less or absent for some species during winter and summer.

Ruddy Ducks forage primarily by diving and consuming benthic invertebrates, primarily midge larvae (Family Chironomidae), but also amphipods (Order Amphipoda) and snails (Order Gastropoda) (Tome 1989). In saline ponds and lakes, Ruddy Duck is also known to consume brine fly larvae. Only small amounts of aquatic vegetation and seeds are consumed. Invertebrate prey that are consumed by Ruddy Duck are typically located in the bottom substrate, or on submerged vegetation.

Ruddy Duck may regularly dive for food in water 2 to 10 feet in depth but they have been found to occasionally feed on the surface or simply immerse their heads (Belrose 1980).

In migration and during winter Ruddy Ducks typically feed in open water areas, often in association with submergent vegetation (Brua 2002). Ruddy Ducks were found in increased density in deeper wetlands but there was no correlation to area of wetland (Colwell and Taft 2000). Additionally, Ruddy Ducks are more prone to feed in small bodies of water than other diving ducks and have been found to feed in ponds excavated for highway fill (Belrose 1980). This species winters throughout the western United States, with notable concentrations of Ruddy Duck occurring in the San Francisco Bay and Salton Sea.

Other diving ducks are generally uncommon and consist of less than 1% in total abundance of all other waterfowl species (LADWP 2010). Many diving ducks including sea ducks (e.g. Common Merganser) generally prey on fish (Belrose 1980) which do not occur in shallow flood. The diving ducks that do occur on Owens Lake (e.g. Lesser Scaup, Bufflehead, and Redhead) occur in small numbers and feed in open water often on planktonic invertebrates.

Eared Grebes forage by diving to feed on bottom-dwelling invertebrates, or glean prey from submerged rocks or vegetation. At saline lakes such as Great Salt Lake and Mono Lake, this species feeds on free-swimming brine shrimp within the water column. However, Jehl (1988) found in Mono Lake that surface feeding predominated. Additionally, surface feeding was used exclusively in summer and fall: when food in the upper layer of the lake was abundant, and in winter and spring: when food scarcity and the lakes low transparency made diving inefficient. During migration, Eared Grebes prefer saline lakes and ponds, including salt ponds with superabundant invertebrate production. In North America, Eared Grebes winter primarily in the Gulf of California, north to San Diego area. Few are reported to winter in inland lakes (Cullen et al. 1999).

Other grebe species are rare and encountered infrequently (LADWP 2010). Pied-billed Grebes (*Podilymbus podiceps*) generally prefer areas with some emergent vegetation cover and the *Aechmorphorus* grebes are piscivorous. Therefore DCMs do not offer suitable food resources for *Aechmorphorus* grebes while Pied-billed Grebes are only expected to occur singly or in very small numbers due to their non-social behavior.

While water depth is important to foraging waterbirds, pond size was found not to be significantly related to abundance of Eared Grebes or diving ducks in San Francisco Bay salt ponds (Warnock *et al.* 2002). Pond size was only important for fish eating birds (Warnock et al. 2002), which only occur rarely at Owens Lake due to lack of fish to prey upon. In a study of boreal lakes in Sweden and Finland, Elmberg et al. (1994) found diving duck species richness was correlated with lake size but that relationship disappeared when lake size was statistically held constant to account for other habitat variables. The authors hypothesized that both habitat factors and lake size contributed to species richness but that lake size only mattered to diving ducks which depended heavily on water for brood rearing compared to dabbling ducks (Elmberg et al. 1994). No diving ducks have been seen nesting on Owens lake and are not expected to nest on Owens Lake given current conditions.

3.2.2 Diving Waterbird Guild Model Parameters

Habitat value for diving waterbird species was found to be best described by three parameters: open water depth, salinity (which influences the productivity of aquatic invertebrates), and the seasonal availability of water.

Water Depth

The minimum water depth for members of the diving waterbird guild can be assumed to be that which is deep enough for the species to swim in. The maximum depth recorded in any one cell in the dust control project area is approximately 5 feet (~150 centimeters). In managed wetlands in the San Joaquin Valley of California, appropriate depths for diving waterbirds are presumed to be greater than 25 cm (Taft et. al. 2002). Taft et al. (2002) also found that diving waterbirds persisted in areas shallower than 25 cm, but that species richness of diving waterbirds declined when average wetland depth was below 15 cm. Ruddy Duck were found to forage in shallow areas (50-100 cm) in wetland systems in Manitoba, Canada (Torrence and Butler 2006). Eared Grebes and other diving ducks typically use salt ponds in the San Francisco bay with depths less than 2 meters (Warnock et al. 2002). The maximum diving depth for Ruddy Duck and Eared Grebe is not available. Water depth likely influences prey availability and food items being consumed – benthic versus planktonic invertebrates. As referenced in Torrence and Butler (2006), invertebrate abundance and biomass is usually higher in shallower depth profiles.

Based on diving waterbird abundance data from Owens Lake in 2010, only ponds that were greater than 40 acres were used by this guild. Therefore, ponds that are smaller than 40 acres were not evaluated and received a value of 0. This guild is different from the rest of the Owens Lake species guilds in that individuals only use ponded portions of each management area. Therefore, only the ponded portion of each area is evaluated for habitat suitability, unlike all other guilds.

For this model, water depths above 25 cm were given the highest rankings, whereas depths greater than 0 cm and less than 25 cm were considered marginally suitable. The 25-40 cm depth profile was ranked slightly higher than > 40 cm depths based on the assumption that the shallower depth may be more productive and the additional energy expended by waterbirds when diving deeper than 40 cm.

Salinity

Ruddy ducks and Eared Grebes have some degree of salt tolerance, and are known to forage extensively in saline systems outside the breeding season. Other diving ducks may prefer less saline areas. Conditions favoring high aquatic invertebrate production will create optimal foraging habitat.

Salinity gradients are the most important variable in structuring invertebrate communities on Owens Lake (Herbst 1997). Invertebrate diversity is highest in freshwater areas while maximum productivity and diversity of invertebrates occurs in areas of moderate salinity.

Herbst (1997, 2001a and 2001b) conducted an analysis of invertebrate communities at perennial water outflow sources and shallow flooded habitats at Owens lake. Salinity of aquatic habitats is measured and reported as electrical conductivity (EC) in units including milliSiemens (mS) per centimeter (mS/cm), or Total Dissolved Solids (TDS) as grams/Liter (g/L). Specific Conductivity (EC25) represents EC values normalized to 25°C. Conversions, from TDS to EC25 are provided below in parenthetical notation after TDS. These are based on CH2MHILL calibrations developed for EC25 for Owens Lake water samples, which are only accurate for specific conductivity readings up to 140 mS/cm.

The most aquatic invertebrate taxa were found in habitats with salinity below 5 mS/cm. Species diversity of invertebrates declines with increasing salinity but was sustained at high levels up to 20 mS/cm (Herbst 2001b).

This maximum productivity of aquatic invertebrates occurs when the specific conductivity (EC25) is 15-20 mS/cm, based on sampling various temporary and permanent water sources on Owens lakebed (Herbst 2001b). Studies of experimental microcosms and sampling of early shallow flooding, artesian wells and seeps and springs around Owens Lake found that salinities in excess of this, to about 50-75 mS/cm, may also promote productive conditions but involve a change in the dominant species of brinefly from *Ephydra auripes* to *E. hians* (Herbst 2001b).

Experimental microcosm studies showed that sustained surface water habitat in the order of a few months duration is necessary for more productive and diverse communities to develop (Herbst 2001a). Even for the most salt tolerant insect, *Ephydra hians*, salinity is toxic above 150 g/L (123 mS/cm).

Salinity categories used for modeling are based on Herbst (1997) invertebrate community habitat distribution with the addition of a saline-to-hypersaline range (70-100 mS/cm) where the community is similar to the saline classification, except for the switch to a different dominant brinefly species, and the reduced productivity of the community members due to salt stress.

Suitability index values (SIV's) are assigned based diving waterbird guild abundance and salinity measurements performed during spring 2009 in various DCM cells, along with analysis of invertebrate communities performed by Herbst. Most of the DCM cells with the highest abundance of diving waterbird guild members (>100 individuals) in April 2009 were in the productive saline range (15-50 mS/cm). These cells were T2-1, T30-3, T36-2, T4-4, and T30-2 which was just in the productive saline range (16.5 mS/cm). There was one cell with 250 Ruddy Duck that was in the saline-to-hypersaline range (T29-3). There was one cell with high diving waterbird abundance (T29-2) that was in the saline range. Other diving ducks, such as Lesser Scaup and Bufflehead, though relatively low in abundance are often found in fresh and brackish areas with other waterfowl (dabbling ducks).

For this model, the productive saline range was given the highest ranking. Saline and brackish water were ranked slightly lower and saline-to-hypersaline cells along with freshwater were ranked lower yet. Hypersaline cells were considered unsuitable.

Water Availability

This parameter was identified in order to account for seasonal variability in water application and pond persistence during the non-dust season. The SIV for each season was weighted based on proportion of use by this guild throughout the year. Migration periods of spring and fall receive the highest value since that is when the majority of Diving Waterbird use occurs on Owens Lake. Seasons as defined for waterbirds that use Owens Lake are in the table below.

Season	Dates	Notes
Spring	February 15- May 14	Spring migration period, some waterbirds initiate breeding.
Summer	May 15- June 30	Breeding and non-breeding residents occur
Fall	July 1- November 14	Fall migration period, some brooding may continue
Winter	November 15- February 14	Wintering period

3.2.3 Diving Waterbird HSM Calculation

The geometric mean is used to combine the diving waterbird SIV's since each one of the variables is necessary in order for the habitat to be suitable for diving waterbirds. The geometric mean of salinity and seasonal water availability is scaled by the SIV of water depth. Practically, this means that in order to get the full habitat value of available water with suitable salinity it must be the appropriate depth, which is hypothesized to be the most important variable.

Table 1. Owens Lake Diving Waterbird Guild Habitat Suitability Model (HSM).

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth in ponds greater than 40 acres	0cm (no water)	0 * proportion of pond
	0<x<10cm	0.05 * proportion of pond
	10≤x<25cm	0.1 * proportion of pond
	25≤x<40 cm	1 * proportion of pond
	≥40 cm	0.8 * proportion of pond
		[Sum total]
Salinity	Fresh (up to 5mS/cm)	0.4
	Brackish (5 - 15mS/cm)	0.8
Average for polygon	Productive Saline (15-50mS/cm)	1
	Saline (50 - 70mS/cm)	0.6
	Saline to Hypersaline (70 - 100mS/cm)	0.4
	Hypersaline (>100mS/cm)	0
Seasonal Water Availability	Spring	0.4
	Summer	0.05
Each applicable season	Fall	0.5
	Winter	0.05
		[Sum total]

Diving Waterbird HSM = (Water Depth SIV)(Salinity SIV*Seasonal Water SIV)$^{1/2}$*

3.3 Breeding Waterfowl Guild

3.3.1 Guild Description

Waterfowl includes all members of the Family Anatidae, otherwise referred to as dabbling ducks. For habitat suitability modeling the breeding waterfowl guild includes all species of dabbling ducks which have been known to breed on Owens Lake including Mallard, Gadwall and potentially Green-winged Teal, Cinnamon Teal and Northern Pintail. Diving ducks are not considered part of this guild, and instead are included in the diving waterbird guild.

Although some species will forage occasionally in meadow habitats, waterfowl are generally found in or near water. Wetted habitats are used during feeding, loafing and for escape from potential predators. One of the main predictors of waterfowl habitat use for foraging is water depth (Colwell and Dodd 1995, Isola et al 2000).

Breeding waterfowl typically use lower salinity habitats. Food intake in this guild varies from reproductive portions of wetlands plants to aquatic invertebrates. In addition, the composition of the diet changes with season for some species, as many species increase their consumption of animal matter during breeding, but consume mostly plant-based foods the remainder of the year.

Habitats with different salinity support different food resources but the ability to exploit the various food resources found in these different habitats varies by species. Freshwater areas typically have a greater diversity of aquatic invertebrates than brackish or saline habitats. Brackish and saline habitats support a less diverse but more productive aquatic invertebrate community, typically brine fly and brine shrimp. At Owens Lake, waterfowl diversity has been highest in cells with fresh water (LADWP 2010). Adjacent wetland vegetation, more common in freshwater areas, provides a source of seeds and vegetative material, which can comprise the bulk of the dietary needs for many species. Wetland vegetation in turn provides organic material to support a more diverse invertebrate community.

Vegetated areas are used by waterfowl primarily for nesting and cover. The lack of vegetation in most dust control cells limits the potential breeding habitat for waterfowl. Waterfowl breeding preferences can be divided into "upland" nesting species, and "over-water" nesting species. Upland nesting species generally nest in meadow or grass-dominated habitats. These grass-dominated sites may be either upland or wetland as classified under federal guidelines. Upland nesting species may place their nests under shrubs, as long as an herbaceous layer is present below the shrub for nest concealment. Newly-hatched ducklings require access to fresh water during the first week of life, however the young are quite mobile, and the female may nest far from a fresh water source. Upland nesting species such as Mallard and Gadwall typically nest within 150 meters of water (Leschack et al 1997, Drilling et al 2002), while for other species such as Cinnamon Teal, close proximity to water is an important factor (Gammonley 1996). Vegetation around waterfowl nest sites is typically described as tall and dense. For Gadwall and Mallard, vegetation height around nests is typically >30 cm and <60 cm and dense (>25% canopy cover) (Leschack et al 1997, Drilling et al 2002). Several species are also known to use islands for nesting, placing their nest under a low shrub or in tall grasses (Lokemoen 1993).

While water depth is important to foraging waterbirds, pond size was found not to be significantly related to abundance dabbling ducks in San Francisco Bay salt ponds (Warnock et al. 2002). Dabbling ducks species richness has been found to be highest in shallow and topographically variable wetlands. The amount of area by itself did not influence the number of species observed in wetlands (Colwell and Taft 2000).

3.3.2 Breeding Waterfowl Guild Model Parameters

Habitat value for breeding waterfowl is best described by six parameters: water depth, salinity, seasonal water availability, proportion of islands, vegetated extent, and vegetation structure.

Water Depth

Water depth was the most important predictor of habitat use for species of waterfowl and shorebirds over various measures of vegetation and proportion of water in managed wetlands in the San Joaquin valley (Isola et al. 2000). Waterfowl species use water depths in an average range of 13 cm for small species such as Green-winged Teal, up to 30 cm for larger waterfowl such as Northern Shoveler and Gadwall (Isola et al. 2000). Waterfowl are also more flexible in their use of various water depths (Isola et al. 2000) than other Owens Lake guilds, such as shorebirds, due to larger bodies and long necks. For the model, high values were assigned to water depths up to 30 cm. Water depths of 13-30 cm were ranked slightly higher than depths below 13 cm reflective of the greater proportional use of Owens Lake by larger breeding waterfowl species such as Gadwall and Mallard.

Salinity

Water salinities for waterfowl are best maintained in the fresh to brackish range. Fresh water areas have supported the most waterfowl species, likely due to the diversity of food resources available. The freshwater ponds at Owens Lake also tend to support more wetland vegetation, which also contributes to the attractiveness for breeding waterfowl.

See previous discussion in the salinity section of diving waterbird guild for details regarding salinity and invertebrate communities. A summary of that discussion is provided below:

Summary

- Most aquatic invertebrate taxa were found in habitats below 5 mS/cm
- Maximum productivity of aquatic invertebrates occurs when the specific conductivity (EC25) is 15-20 mS/cm
- Productivity is maintained at electroconductivities up to about 50-75 mS/cm
- Salinity is toxic above 150 g/L (123 mS/cm) for the most salt tolerant insect (*Ephydra hians*).

SIV's are assigned based on waterfowl abundance in areas with known salinity in various DCM cells, performed during spring 2009. Input from field observations during counts throughout the year (particularly breeding season) were incorporated to account for seasonal variability to the extent feasible.

Waterfowl abundance by cell was negatively correlated with water salinity during April 2009. In other words, the highest numbers of waterfowl were found in cells with the lowest salinity (LADWP 2010). Waterfowl species richness was also negatively correlated to salinity with more species observed in lower salinities (LADWP 2010). The cell with the highest abundance in April 2009 was the freshest salinity cell T30-1, which also has the highest vegetative cover of any shallow flood cell. During the breeding bird survey in 2010, the freshwater cells of T36-1, 29-1, and T30-1 (based on water sampling in October 2010) consistently had the highest number of Mallard and Gadwall observed. Brackish cells T36-2E and T30-2 also had high use, particularly of Gadwall but also Mallard, during the breeding season. Unlike the freshwater cells these units have very little vegetation.

Water Availability

In order to account for seasonal variability in water application and pond persistence during the non-dust season the water availability variable was identified. The SIV for each season is weighted based on proportion of use by this guild in each season. The breeding and brooding period of spring and summer receives the highest value.

SEASON	DATES	NOTES
Spring	February 15 – May 14	Spring migration period, some waterbirds initiate breeding
Summer	May 15 – June 30	Breeding and non-breeding residents occur
Fall	July 1 – November 14	Fall migration period, some brooding may continue
Winter	November 15 – February 14	Wintering period

Drydown in late spring is needed where feasible to facilitate germination of wetland species and to retard cattail growth to maintain open water. Open water is most valuable to waterfowl and shorebirds when these areas are encroached by cattails they become much less desirable to these guilds of management concern. Further, any marsh maintained in the same condition over many years will likely show a decline in productivity (Kadlec and Smith 1989). While it is most important for breeding waterfowl to have water available in summer, some dry down is essential to maintaining open water and productivity.

Islands

Additional islands will be incorporated into dust control cells where possible to enhance microhabitat availability for waterfowl. Dikes and islands are important particularly to roosting waterfowl and shorebirds in San Francisco Bay Salt ponds (Warnock et al. 2002). Waterfowl are frequently seen loafing and sleeping on the few islands that currently exist in the project area. Since several waterfowl species, including species with the potential to nest at Owens Lake, use islands for nesting, these islands have the potential to create additional nesting opportunities for waterfowl as well. The degree to which waterfowl may use the islands for nesting is uncertain. Islands far from shore (>130 meters) in large saline lakes, or in open freshwater wetlands create the safest nesting opportunities (Lokemoen 1993). Due to the shallow nature of the ponds at Owens Lake, and the configuration of roads and dikes through the system, creating islands far from shore or surrounded by deep water is not feasible in all locales. Strategic placement of islands within cells may improve the attractiveness for nesting. Increasing the number of islands may also provide some protection to nesting or loafing birds as this will serve to increase predators search effort.

Vegetated Extent

Increasing the amount of wetland and herbaceous-dominated vegetation on Owens Lake will function to increase nesting opportunities, increase available cover and protection, and directly and indirectly increase food supply. Vegetative cover can also reduce the impacts of human disturbance as well as provide a more favorable microclimate for waterfowl (Kadlec and Smith 1989). The highest overall waterfowl species richness and abundance have been found when a 50:50 vegetation cover to open water ratios is maintained in manipulated wetlands (Smith et al. 2004). The proportion of open water to wetland vegetation is included in the model by determining the proportion of vegetation in a cell. Lower cover proportions (relative to the 50:50 ratio) receive a lower SIV, conversely cover values above 60% receive a slightly lower SIV.

Vegetation Structure

Although the relationship between the vertical height diversity of vegetation and waterfowl use is not well-described, the model assumption will be that herbaceous dominated sites will be preferred over shrub-dominated sites, and that increased structural diversity will result in an increase in available microhabitats, and potential foraging or nesting habitats. While there is a large body of literature on tamarisk (*Tamarix* spp.) presence and cover and its relationships with song bird use, there exists little on the effects on waterfowl. Low amounts of tamarisk can be tolerable and potentially beneficial to some riparian bird species but large amounts of tamarisk can negatively affect bird use (Hultine et al. 2010). Since tamarisk provides limited nesting cover for waterfowl and displaces wetland plant species, large amounts of tamarisk can adversely modify waterfowl foraging and breeding habitat. Therefore when large monocultures of tamarisk exist in an area it degrades the value of habitat for waterfowl. The breeding waterfowl HSM characterizes this by subtracting 0.3 from the vegetation structure suitability value if this condition exists.

3.3.3 Breeding Waterfowl Guild HSM Calculation

The most important parameters used for calculating breeding waterfowl habitat suitability are water depth and salinity. The geometric mean is used since both of these parameters are needed. Islands, seasonal water availability, vegetated extent and vegetation structure are also equally weighted together using the geometric mean.

Table 2. Owens Lake Breeding Waterfowl Guild Habitat Suitability Model (HSM)

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth	0cm (no water) 0<x<13cm (up to 80% of polygon) 13≤x<30cm (up to 80% of polygon) ≥30cm	0 * proportion of polygon 0.8 * proportion of polygon 1 * proportion of polygon 0.01 * proportion of polygon [Sum total * 1.25]
Salinity Average for polygon	Fresh (up to 5mS/cm) Brackish (5 - 15mS/cm) Productive Saline (15-50mS/cm) Saline (50 - 70mS/cm) Saline to Hypersaline (70 - 100mS/cm) Hypersaline (>100mS/cm)	1 0.8 0.4 0.1 0 0
Seasonal Water Availability Each applicable season	Spring Summer Fall Winter	0.35 0.4 0.25 0 [Sum total]
Partially Vegetated Islands Proportion of acreage of land surrounded by water to total acreage	<4% Islands For each additional percentage of islands add 0.1 to a maximum of 1 where; ≥10% Islands	0.3 1
Vegetated extent Percentage of grass dominated vegetation over entire polygon	≥60 % Cover 40≤x<60% Cover 25≤x<40% Cover 5≤x<25% Cover 0≤x5% Cover	0.4 1 0.8 0.2 0
Vegetation Structure Structure based on dominant community	High herbaceous structural diversity Additional herbaceous layer common above saltgrass Isolated areas of additional herbaceous structure above saltgrass Low growing, usually saltgrass dominant Shrub dominant No vegetation	1 0.8 0.5 0.2 0.1 0
	Tamarisk presence	-0.3

Breeding Waterfowl HSM= (Water Depth SIV*Salinity SIV)$^{1/2}$ * (Vegetated Extent SIV*Vegetation Structure SIV*Island SIV*Seasonal Water SIV)$^{1/5}$

3.4 Migrating Waterfowl Guild

3.4.1 Guild Description

The migrating waterfowl guild includes all members of the Family Anatidae, which includes all species of swan, goose, dabbling duck, with the exception of diving ducks and mergansers which are placed in the diving waterbird guild. Migrating waterfowl use of Owens Lake includes seasonal migrants and winter residents.

Food intake in this guild is diverse and varies from primarily vegetative parts of wetland plants (swans and geese), to aquatic invertebrates (dabblers and diving ducks), and reproductive portions of wetlands plants (dabbling and diving ducks). In addition, the composition of the diet changes with season for some species, as many species increase consumption of animal matter during breeding, but consume mostly plant-based foods the remainder of the year.

Although some species will forage occasionally in meadow habitats, waterfowl are generally found in or near water. Wetted habitats are used during feeding, loafing and for escape from potential predators. One of the main predictors of waterfowl habitat use for foraging is water depth (Colwell and Dodd 1995, Isola et al 2000).

Waterfowl use fresh, brackish and saline habitats, but the ability to exploit the various food resources found in these different habitats varies by species. Saline and freshwater habitats support different food resources. Fresh water systems will typically have a greater diversity of aquatic invertebrates than brackish or saline habitats. Brackish and saline habitats typically support a less diverse but more productive aquatic invertebrate community. Adjacent wetland vegetation will provide a source of seeds and vegetative material, which provides the bulk of the dietary needs for many species. Wetland vegetation in turn provides organic material to support a more diverse invertebrate community.

At Owens Lake and other saline lake systems, brackish and saline water typically provide habitat for brine fly and brine shrimp, and the densities of these prey items can be high. Brine fly larvae and pupae are relatively large prey items, and can be effectively captured by all waterfowl species. Prey items such as brine shrimp are much smaller, and not all waterfowl can effectively filter brine shrimp from the water column. One species, Northern Shoveler, is especially adapted to straining small invertebrates from the water column. This species is the dominant fall migrant waterfowl species at Mono Lake and in the Owens Lake dust control project area, where available food resources are predominantly brine flies and brine shrimp (in some ponds) (LADWP 2010). At Owens Lake, waterfowl diversity is highest in cells with fresh water which provides a more diverse food base. In fall, high waterfowl numbers, dominated by Northern Shoveler, have been observed in brackish to saline cells, whose salinity may favor prey resources this species can effectively exploit.

While water depth is important to foraging waterbirds, pond size was found not to be significantly related to abundance of dabbling ducks or diving ducks in San Francisco Bay salt ponds (Warnock et al. 2002). The amount of area by itself did not influence the number of species observed in wetlands (Colwell and Taft 2000). Additionally in a study of boreal lakes in Sweden and Finland, Elmberg et al. (1994) found that dabbling ducks species richness was not correlated with lake size. Instead, measures of habitat and prey were important predictors of species richness.

3.4.2 Migrating Waterfowl Guild Model Parameters

Habitat value for waterfowl is best described by four parameters: water depth, salinity, seasonal water availability, and proportion of islands.

Water Depth

Water depth was the most important predictor of habitat use for species of waterfowl and shorebirds over various measures of vegetation and proportion of water in managed wetlands in the San Joaquin valley (Isola et al. 2000). Waterfowl species use water depths in an average range of 13 cm for small species such as Green-winged Teal, up to 30 cm for larger waterfowl such as Northern Shoveler and Gadwall (Isola et al. 2000). Waterfowl are also more flexible in their use of various water depths (Isola et al. 2000) than other Owens Lake guilds, such as shorebirds, due to larger bodies and long necks. For the model, high values were assigned to water depths up to 30 cm. Water depths of 13-30 cm were ranked slightly higher than depths above 30 cm reflective of the greater proportional use of Owens Lake by larger waterfowl species such as Northern Shoveler, Gadwall, and Mallard.

Salinity

Water salinities for migrating waterfowl are best maintained in the brackish to productive saline range. Freshwater areas have supported the most waterfowl species, likely due to the diversity of food resources available. The freshwater ponds at Owens Lake also tend to support more wetland vegetation, which also contributes to the attractiveness for waterfowl. Brackish to saline areas generally have the most individuals during migration and generally attract flocks of Northern Shoveler and other species, especially in the fall.

See previous discussion in the salinity section of diving waterbird guild for details regarding salinity and invertebrate communities. A summary of that discussion is provided below:

Summary

- Most aquatic invertebrate taxa were found in habitats below 5 mS/cm
- Maximum productivity of aquatic invertebrates occurs when the specific conductivity (EC25) is 15-20 mS/cm
- Productivity is maintained at electroconductivities up to about 50-75 mS/cm
- Salinity is toxic above 150 g/L (123 mS/cm) for the most salt tolerant insect (*Ephydra hians*).

SIV's are assigned based on waterfowl abundance in areas with known salinity in various DCM cells, performed during spring 2009. Input from field observations during counts throughout the year were incorporated to account for seasonal variability to the extent feasible.

Waterfowl abundance by cell was negatively correlated with water salinity during April 2009. In other words, the highest numbers of waterfowl were found in cells with the lowest salinity (LADWP 2010). Waterfowl species richness was also negatively correlated to salinity with more species observed in lower salinities (LADWP 2010). The cell with the highest abundance in April 2009 was the freshest salinity cell T30-1, which also has the highest vegetative cover of any shallow flood cell. Other cells with high numbers of waterfowl, excluding diving ducks, were freshwater cell T29-1, brackish cells T36-1 (8.6 mS/cm), productive saline T30-2 (16.5 mS/cm), and saline cells T2-1 and T29-2. The cell T2-1, while in the saline range, measured salinity at 28.9 mS/cm, just in the saline category.

Additionally, during fall, many Northern Shoveler use Owens Lake. Over 50% of the waterfowl observed in fall are Northern Shoveler and are typically found in more saline cells (LADWP 2010). The productive saline cells T13-1, T18N, T18S, and T30-2 often are used by large numbers of Northern Shoveler.

This gives the productive-saline and brackish salinity range the highest SIV, with freshwater slightly lower. With additional salinity the SIV quickly tapers to 0 at hypersaline (>100mS/cm).

Water Availability

In order to account for seasonal variability in water application and pond persistence during the non-dust season water availability was identified. The SIV for each season is weighted based on proportion of use by this guild throughout the year. Migration periods of spring and fall receive the highest value since that is when the highest numbers of waterfowl are encountered on Owens Lake.

SEASON	DATES	NOTES
Spring	February 15 – May 14	Spring migration period, some waterbirds initiate breeding
Summer	May 15 – June 30	Breeding and non-breeding residents occur
Fall	July 1 – November 14	Fall migration period, some brooding may continue
Winter	November 15 – February 14	Wintering period

Islands

Additional islands will be incorporated into dust control cells where possible to enhance microhabitat availability for waterfowl. Dikes and islands are important particularly to roosting waterfowl and shorebirds in San Francisco Bay Salt ponds (Warnock et al. 2002). Waterfowl are frequently seen loafing and sleeping on the few islands that currently exist in the project area. Due to the shallow nature of the ponds on Owens Lakebed, and the configuration of roads and dikes through the system, creating islands far from shore or surrounded by deep water is not feasible in all locales. Increasing the number of islands may also provide some protection to nesting or loafing birds as this will serve to increase predator search effort.

3.4.3 Migrating Waterfowl Guild HSM Calculation

Since water depth has been found to be the most important predictor of habitat use for waterfowl therefore water depth is the most dominant SIV parameter. Analogous to the diving waterbird guild habitat model, water depth is used to scale the geometric mean of the other parameters (salinity, island and seasonal water availability).

Table 3. Owens Lake Migrating Waterfowl Guild Habitat Suitability Model (HSM)

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth	0cm (no water) 0<x<13cm (up to 80% of polygon) 13≤x<30cm (up to 80% of polygon) ≥30cm	0 * proportion of polygon 0.8 * proportion of polygon 1 * proportion of polygon 0.01 * proportion of polygon [Sum total * 1.25]
Salinity Average for polygon	Fresh (up to 5mS/cm) Brackish (5 - 15mS/cm) Productive Saline (15-50mS/cm) Saline (50 - 70mS/cm) Saline to Hypersaline (70 - 100mS/cm) Hypersaline (>100mS/cm)	0.8 1 1 0.5 0.1 0
Seasonal Water Availability Each applicable season	Spring Summer Fall Winter	0.3 0.05 0.6 0.05 [Sum total]
Partially Vegetated Islands Proportion of acreage of land surrounded by water to overall acreage	<4% Islands For each additional percentage of islands add 0.1 to a maximum of 1 where; ≥10% Islands	0.3 1

Migrating Waterfowl HSM= Water Depth SIV(Island SIV*Salinity SIV*Seasonal Water SIV)$^{1/3}$*

3.5 Breeding Shorebird Guild

3.5.1 Guild Description

The breeding shorebird guild includes all members of the Order Charadriiformes, which may breed on Owens Lake. This includes Snowy Plover, Black-necked Stilt, American Avocet, Killdeer, and potentially Long-billed Curlew. Shorebirds are most abundant on Owens Lake during spring and fall migration but they are also the most abundant guild that nests on Owens Lake. The breeding shorebird guild was designed to describe habitat that the breeding shorebird species need for foraging and reproduction.

Aquatic and terrestrial invertebrates comprise the bulk of food items taken by shorebirds, although some of the larger shorebirds such as Long-billed Curlew also consume mollusks, crustaceans, and small vertebrate species. Aquatic invertebrates consumed by shorebirds may occur in sediments, in the water column, or on the water surface. Many species feed in water or in wet mud or sand; however some species, notably Snowy Plover, also feed on dry flats.

Shorebirds typically use brackish and saline habitats during breeding and in migration. Migrating birds will seek areas of high prey density, while nesting birds are restricted by the availability of appropriate nesting microhabitats in proximity to suitable foraging sites.

Inland nesting Snowy Plover breed throughout the west in barren to sparsely vegetated areas at reservoirs and ponds, alkaline lakes, and salt evaporation ponds in the vicinity of temporary or permanent water which provides conditions suitable to support the production of invertebrate food sources. Additionally Snowy Plover prefer some topographic or substrate color variability to obscure nest sites (District 1998).

American Avocet prefer open areas that are barren or sparsely-vegetated to nest. Like American Avocet, Black-necked Stilt can be found in open to sparsely-vegetated areas. As compared to avocets, Black-necked Stilt may show a preference for lower salinity and higher cover of vegetation such as flooded meadow or pastureland. These shorebirds tend to nest in small numbers in or adjacent to American Avocet colonies. The Long-billed Curlew, a potential breeding species, prefers to nest in meadow areas and will forage in meadow or mudflats habitats.

3.5.2 Breeding Shorebird Guild Model Parameters

Habitat value for shorebirds is best described by six parameters: water depth, salinity, seasonal water availability, islands, vegetated extent, the proportion of dry area in a cell or polygon, and the microtopographic relief of dry area within a polygon.

Water Depth

Shorebirds do not feed in water depths greater than 10-15 cm (excepting phalaropes) and most (particularly smaller shorebirds) feed at water depths less than 4 cm (Isola et al. 2000). In another study, American Avocet were found to feed on mudflats, wade in water generally less than 20 cm deep, or swim in water up to 25 cm deep (Robinson et al. 1997).

Long and Ralph (2001) found that near Humboldt Bay, California, the most important habitat characteristic for shorebirds was presence of standing water and short vegetation. While no specific measurements were given, mudflats were commonly used by most species.

Salinity

See previous discussion on salinity in the diving waterbird guild, summarized below.

- Most aquatic invertebrate taxa were found in habitats below 5 mS/cm
- Maximum productivity of aquatic invertebrates occurs when the specific conductivity (EC25) is 15-20 mS/cm
- Productivity is maintained at electroconductivities to about 50-75 mS/cm
- Salinity is toxic above 150 g/L (123 mS/cm) for the most salt tolerant insect (*Ephydra hians*).

SIV's are assigned based on shorebird abundance and salinity measurements performed during spring 2009 of various DCM cells. Input from field observations during counts throughout the year (particularly breeding season of Snowy Plover) were incorporated to account for seasonal variability to the extent feasible.

Most shorebirds counted during April 2009 were in saline sheet flow cells also due in part to the large quantity of shallow water foraging area compared to ponds with deeper water. There appears to be a pronounced peak in shorebird abundance during 2009 at salinities between 56 and 75 mS/cm.

Areas where Snowy Plover were most abundant during the 2010 plover survey were areas that were saline or productive saline. These areas include T17-1, T13-1, T21, and T27N. Different areas, particularly areas with tillage, had abundant American Avocet nesting but were also in the productive saline to saline range.

Therefore, the productive saline and saline range received the highest SIV followed by brackish. The category of saline-to-hypersaline received a relatively low SIV due to low use. Freshwater also received a relatively low SIV. Hypersaline cells, while not having a forage base, may still provide suitable nesting areas in proximity to fresher areas for foraging, therefore this category still had some value unlike for other guilds.

Seasonal Water Availability

This parameter was identified in order to account for seasonal variability in water application and pond persistence. Each season water is available during the breeding period (spring and summer) is equally weighted. Water availability for each season is totaled to obtain the water availability SIV.

SEASON	DATES	NOTES
Spring	February 15 – May 14	Spring migration period, some waterbirds initiate breeding
Summer	May 15 – June 30	Breeding and non-breeding residents occur
Fall	July 1 – November 14	Fall migration period, some brooding may continue
Winter	November 15 – February 14	Wintering period

Islands

Shorebirds use islands for nesting, loafing, and sleeping. The additional shoreline created by the island provides additional foraging opportunities as well. In the San Francisco Bay estuary, 31% of Black-necked Stilt and almost 40% of American Avocet observations were of birds using islands in salt ponds (Rintoul et al 2003). The construction of islands surrounded by water has been found to be beneficial for nesting shorebirds (Engilis and Reid 1996). Some species such as American Avocet, favor islands for nesting (Lokemoen 1993). This has also been observed at Owens Lake. The size, shape, distance from shore, distance to adjacent islands, depth of surrounding water, and amount of vegetation are all factors that could influence the use of islands by shorebirds. Little information is available regarding the design of constructed islands, although Lokemoen (1993) suggests that for nesting waterfowl species, islands should be at least 130 meters from shore, and 91 meters apart for protection from predators and to reduce territorial strife from adjacent nesting pairs.

The specific design of constructed islands on the Owens Lake has not been determined. Due to the shallow nature of the ponds at Owens Lake, and the configuration of roads and dikes through the system, creating islands far from shore or surrounded by deep water is not feasible in all locales. Strategic placement of islands within cells may improve the attractiveness for nesting. The additions of islands to some shallow flood cells in the dust control project area will increase the diversity of habitats available for shorebirds. Increasing the number of islands may also provide some protection to nesting or loafing birds as this will serve to increase a predator's search effort. The model assumption is that the suitability value of an area will increase with additional island acreage up to 10%.

Dry Area

Snowy Plover, American Avocet and Black-necked Stilt need dry areas in order to successfully nest. There have been reported failures of Snowy Plover nests because wind blew water into the area surrounding a nest saturating the soil and causing abandonment (Ruhlen and Page 2002).

The majority of high Snowy Plover use areas often have a relatively low proportion of saturated area compared to other shallow flood areas. Each dust control area (cell) is required to be 75% wet for dust control compliance. The cells that are closer to 75% wet threshold (average over entire polygon) are at the drier end of the scale often have high Snowy Plover use. Water is not equally distributed within a cell, resulting in ponded areas down gradient and saturated and dryer areas higher in elevation. LADWP Watershed Resources staff have noted that the drier parts of the cell often have the highest use by plovers. Shallow flood cells often have sheet flow on the upper portion of a management cell that drains into a tailwater pond. Since the dryer parts of the sheet flow cells have more plover use the hypothesized favored ratio of wet to dry area for Snowy Plover is close to 50:50. As a cell becomes wetter there is less area available to nest. Conversely as the area becomes increasingly drier there is less area available to forage for food and therefore that area becomes less valuable.

On Owens Lake, the furthest documented nest from a water source was located approximately one mile from water (Ruhlen and Page 2001). In 2002, after initiation of shallow flooding as a dust control measure, nest distances to water averaged almost 1,395 feet for nests in natural areas, and approximately 26 feet on average in artificially flooded areas (Ruhlen, Page, and Stenzel 2006). Snowy Plover habitat has also been defined as playa within 0.5 miles of water (District 1998, 2008).

The highest SIV for this parameter is 30-60% dry area. The SIV will decrease as polygons become more flooded with the complete flooding receiving the lowest value of 0.1 and conversely, to 0 for

areas with 100% dry area (no water) and greater than 0.5 miles from water. There were no polygons that were greater than 0.5 mile from water therefore no polygon received a value of 0.

Microtopographic Relief

The majority of Snowy Plover nests found by Henderson and Page in a survey of inland nesting Snowy Plover (1979 from District 1998) were well concealed because of placement of nest in close proximity to topographic features. The microtopographic break used by Henderson and Page (1979 from District 1998) was 5 cm within 1 m of the nest. Fewer nests were found in lower microtopographic relief areas. Since availability of habitat was not measured in the survey locations at these inland lakes it is impossible to measure if Snowy Plover are nesting in high-relief microtopography in greater proportion than availability. Presumably these alkali lakes are proportionately flat; therefore the category of greater than 5 cm relief within 1 m of the nest is quite rare. Few areas of barren playa on Owens Lake average greater than 5 cm of relief over a 2 m range, based on Lidar data used for the index calculation (Watershed Sciences 2010). The areas that do have an average microtopographic relief above 5 cm have proportionately high Snowy Plover use (e. g., T13-1, Tubman Springs and Trucksticker Spring [North Tubman Spring]). These are generally areas where the salt crust tends to be both thick as well as heaves and cracks, producing a very irregular playa surface.

Additionally, Snowy Plover nesting is often on an elevated area such as a low mound or ridge of playa (Henderson and Page 1979 *from* District 1998).

In early 2010, tillage of playa was performed in Phase 7 areas. Tillage roughens the soil surface to reduce fetch for dust control. This produces a series of furrows and mounds. In spring of 2010, these areas were flooded which resulted in many areas where there was saturated soil or standing water in furrows leaving the mounds above water. During the 2010, Snowy Plover annual survey in May, the majority of American Avocet nesting observed at Owens Lake occurred in these tillage areas. These areas measure above 20 cm average topographic relief over a 2 m area.

Vegetated Extent

Most migrant shorebirds wintering in managed wetlands in the San Joaquin Valley preferred foraging in open wetlands with less than 5% emergent cover.

Snowy Plover will nest in non- to lightly vegetated flats on alkali lakes. Of nests observed on lake flats, 27% were within 1 m of some vegetation and 51% had some vegetation within a 10 meter radius of the nest (Henderson and Page 1979 in District 1998).

American Avocet around Owens Lake have been observed to nest both on barren playa, in clumps of vegetation adjacent to seeps and springs, and in small clumps of saltgrass present in some shallow flood cells. Black-necked Stilt appear to be the most vegetation-tolerant of the common breeding shorebirds on Owens Lake, nesting in higher cover saltgrass areas.

3.5.3 Breeding Shorebird Guild HSM Value Calculation

The most important parameters used for calculating breeding shorebird habitat suitability are water depth and dry area. The remaining five variables are equally weighted and multiplied by the geometric mean the SIV's of water depth and dry area.

Table 4. Owens Lake Breeding Shorebird Guild Habitat Suitability Index Model (HSM)

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth	0 cm (no water) 0<x<10cm (up to 50% of polygon) 10≤x<25cm (up to 50% of polygon) ≥25cm	0.01 * proportion of polygon 1 * proportion of polygon 0.4 * proportion of polygon 0.05 * proportion of polygon [Sum total * 2]
Salinity Average for polygon	Fresh (up to 5mS/cm) Brackish (5 - 15mS/cm) Productive Saline (15-50mS/cm) Saline (50 - 70mS/cm) Saline to Hypersaline (70 - 100mS/cm) Hypersaline (>100mS/cm)	0.1 0.5 1 1 0.6 0.2
Seasonal Water Availability Each applicable season	Spring Summer Fall Winter	0.5 0.5 0 0 [Sum total]
Islands Proportion of acreage of land surrounded by water to overall acreage	<4% Islands For each additional percentage of islands add 0.1 to a maximum of 1 where; ≥10% Islands	0.3 1
Dry Area Percentage of dry area	0%≤x<10% 10%≤x<20% 20%≤x<30% 30%≤x<60% 60%≤x<80% 80%≤x<100% 100% (but standing water within ~0.5 mile) No water within 0.5 mile	0.1 0.3 0.6 1 0.7 0.4 0.1 0
Microtopographic Relief (of dry areas) Average difference between local maximum and local minimum	0≤x<2cm 2≤x<5cm 5≤x<20cm ≥20cm (tillage)	0.2 0.7 1 0.7
Vegetated extent (Percentage of vegetation over entire area)	≥50 % Cover 25≤x<50% Cover 10≤x<25% Cover 0≤x<10% Cover	0.3 0.4 0.6 1

*Breeding Shorebird HSM= (Dry Area SIV*Water Depth SIV)$^{1/2}$ *(Relief SIV*Vegetated extent SIV*Salinity SIV*Seasonal Water SIV*Islands SIV)$^{1/5}$*

3.6 Migrating Shorebird Guild

3.6.1 Guild Description

The shorebird guild includes all members of the Order Charadriiformes excluding the family Laridae (gulls) which includes plovers, stilts and avocets, phalaropes, and all sandpipers (Family Scolopacidae). Since shorebirds are most abundant on Owens Lake during spring and fall migration but have different resources needs as compared to breeding shorebirds, the migrating shorebird guild was designed. This includes some of the same species of shorebirds that will breed on Owens Lake but these individuals may be migrating towards different breeding or wintering locations during spring and fall, respectively. As many as 35 shorebird species have been seen on Owens Lake during migration.

Aquatic and terrestrial invertebrates comprise the bulk of food items taken by shorebirds, although some of the larger shorebirds such as Whimbrel and Long-billed Curlew also consume mollusks, crustaceans, and small vertebrate species. Aquatic invertebrates consumed by shorebirds may occur in sediments, in the water column, or on the water surface. Many species feed in water or in wet mud or sand; however some species, notably Snowy Plover, also feed on dry flats. Most migrant and overwintering shorebirds prefer open, shallow, flooded habitats that provide muddy substrates or shallow water for foraging.

Shorebirds often use brackish and saline habitats during migration. Migrating birds will generally seek areas of high prey density which is often in the moderate salinity range.

The most abundant species at Owens Lake include Western and Least Sandpipers, and Wilson's and Red-necked Phalaropes. Western and Least sandpipers are the most abundant Calidrid sandpipers present in migration, with numbers generally highest in fall. Most Western Sandpipers leave Owens Lake during the winter, while a few hundred to a few thousand Least Sandpipers have remained at Owens Lake through winter. Phalaropes are also quite abundant in migration, with numbers highest in fall. Phalaropes do not remain at Owens Lake during the winter. Least and Western Sandpipers feed on benthic and terrestrial invertebrates, and obtain prey by pecking or probing in mudflats or very shallow water. Least Sandpipers generally take the most abundant prey of the appropriate size. Prey density has explained 53% of the variability in microhabitat use by this species, with Least Sandpipers often occurring in mudflat patches with the highest prey density (Nebel and Cooper 2008).

The Wilson's Phalarope is the most terrestrial of the three phalarope species, but may also be found swimming or feeding over deeper waters. Wilson's Phalaropes feed by probing or picking prey off of muddy surfaces, or pecking prey from the water surfaces or from just below. Wilson's Phalaropes feed on aquatic and terrestrial invertebrates. At Mono Lake, brine shrimp and brine flies form a large proportion of the diet.

The Red-necked Phalarope is a shorebird species that is characterized by its use of open water habitats (Rubega et al 2000). This species feeds primarily on small aquatic invertebrates and adult flying life stages of aquatic insects. At saline lakes during fall migration, diet consists primarily of brine flies, consuming all life stages. Red-necked Phalarope feed primarily in water, capturing prey at or just below the surface of the water. During migration, this species uses water bodies of all sizes, and is particularly numerous on salt lakes where the diet overwhelmingly consists of brine flies.

3.6.2 Migrating Shorebird Guild Model Parameters

Habitat value for migrating shorebirds is best described by five parameters: water depth, salinity, seasonal water availability, islands, and the vegetated extent within a management polygon. Water depth salinity, proportion of islands and vegetated extent each have similar suitability values (SIV's) compared to the breeding shorebirds. The major difference between breeding and migrating shorebirds is the timing of water availability and the need for nesting habitat (microtopography and dry area).

Water Depth

Shorebirds do not feed in water depths greater than 10-15 cm and most (particularly smaller shorebirds) feed at water depths less than 4 cm (Isola et al. 2000). In another study, the larger American Avocet were found to feed on mudflats, wade in water generally less than 20 cm deep, or swim in water up to 25 cm deep (Robinson et al. 1997). The most abundant shorebirds that use Owens Lake are generally quite small. The abundant Least Sandpiper is the smallest shorebird at 6 inches in length with relatively short legs and a short bill. Therefore, it must forage in very shallow water and is often seen foraging on mudflats.

Long and Ralph (2001) found that near Humboldt Bay, California, the most important habitat characteristic for shorebirds was presence of standing water and short vegetation. While no specific measurements were given, mudflats were commonly used by most species.

Cycles of rainfall and evaporation may provide temporary refuge for invertebrates but if water levels remain constant shorebirds may deplete resources (Helmers 1992). Additionally, while it is important for water to remain available, the typical dry down of ponds during summer into fall concentrates invertebrate food sources providing areas of high prey density, which are often used by migrating shorebirds.

Salinity

See previous discussion on salinity in the diving waterbird guild which is summarized below.

- Most aquatic invertebrate taxa were found in habitats below 5 mS/cm
- Maximum productivity of aquatic invertebrates occurs when the specific conductivity (EC25) is 15-20 mS/cm
- Productivity is maintained at electroconductivities to about 50-75 mS/cm
- Salinity is toxic above 150 g/L (123 mS/cm) for the most salt tolerant insect (*Ephydra hians*).

SIV's are assigned based on shorebird abundance and salinity measurements performed during spring 2009 of various DCM cells, along with analysis of invertebrate communities performed by Herbst. Input from field observations during counts throughout the year were incorporated to account for seasonal variability to the extent feasible.

Most shorebirds counted during April 2009 were in saline sheet flow cells also due in part to the large quantity of shallow water foraging area compared to ponds with deeper water. There appears to be a pronounced peak in shorebird abundance during 2009 at salinity between 56 and 75 mS/cm.

Cell T36-2 E (productive saline during sampling) was observed qualitatively to have the highest insect abundance during water quality sampling in April 2009 and also had the highest shorebird abundance (LADWP 2010). T36-2 also has a large proportion of island area that may preferentially attract shorebirds compared to other ponds.

Therefore, the productive saline range received the highest SIV followed by brackish. The category of saline-to-hypersaline received a relatively low SIV due to typically lower invertebrate productivity yet still does see shorebird use. Freshwater also received a relatively low SIV. Hypersaline cells were considered unsuitable.

Seasonal Water Availability

This parameter was identified in order to account for seasonal variability in water application and pond persistence. The season when water is available is weighted based on proportion of use by this guild throughout the year. Migration periods of spring and fall receive the highest value since that is when the highest numbers of shorebirds are encountered on Owens Lake. There are a small percentage of shorebirds that overwinter at Owens Lake.

Season	Dates	Notes
Spring	February 15- May 14	Spring migration period, some waterbirds initiate breeding.
Summer	May 15- June 30	Breeding and non-breeding residents occur
Fall	July 1- November 14	Fall migration period, some brooding may continue
Winter	November 15- February 14	Wintering period

Islands

Shorebirds use islands for nesting, loafing, and sleeping. The additional shoreline created by the island provides additional foraging opportunities as well. In the San Francisco Bay estuary, 31% of Black-necked Stilt and almost 40% of American Avocet observations were of birds using islands in salt ponds (Rintoul et al. 2003). The size, shape, distance from shore, distance to adjacent islands, depth of surrounding water, and amount of vegetation are all factors that could influence the use of islands by shorebirds. Little information is available regarding the design of constructed islands, although Lokemoen (1993) suggests that for nesting waterfowl species, islands should be at least 130 m from shore, and 91 m apart for protection from predators and to reduce territorial strife from adjacent nesting pairs. The specific design of constructed islands on Owens Lake has not been determined. Due to the shallow nature of the ponds at Owens Lake, and the configuration of roads and dikes through the system, creating islands far from shore or surrounded by deep water is not feasible in all locales. The additions of islands to some shallow flood cells in the dust control project area will increase the diversity of habitats available for shorebirds. Increasing the number of islands may also provide some protection to nesting or loafing birds as this will serve to increase a predator's search effort. The model assumption is that the suitability value of an area will increase with additional island acreage up to 10%.

Vegetated Extent

Most migrant shorebirds wintering in managed wetlands in the San Joaquin Valley preferred foraging in open wetlands with less than 5% emergent cover. Least Sandpiper were found in areas that had an average of 10.3% cover of emergent vegetation.

3.6.3 Migrating Shorebird Guild HSM Calculation

Water depth has been found to be the most important predictor of habitat use for shorebirds, therefore, water depth is the most dominant SIV parameter. To receive a high migrating shorebird habitat value the water depth SIV must be highly suitable. The geometric mean is used to combine the other parameters since they are not substitutable.

Table 5. Owens Lake Migrating Shorebird Guild Habitat Suitability Model (HSM)

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Water Depth	0 cm (no water)	0 * proportion of polygon
	0<x<10cm (up to 50% of polygon)	1 * proportion of polygon
	10≤x<25cm (up to 50% of polygon)	0.4 * proportion of polygon
	≥25cm	0.05 * proportion of polygon
		[Sum total * 2]
Salinity Average for polygon	Fresh (up to 5mS/cm)	0.2
	Brackish (5 - 15mS/cm)	0.8
	Productive Saline (15-50mS/cm)	1
	Saline (50 - 70mS/cm)	0.4
	Saline to Hypersaline (70 - 100mS/cm)	0.1
	Hypersaline (>100mS/cm)	0
Seasonal Water Availability Each applicable season	Spring	0.4
	Summer	0.05
	Fall	0.5
	Winter	0.05
		[Sum total]
Islands Proportion of acreage of land surrounded by water to overall acreage	<4% Islands	0.3
	For each additional percentage of islands add 0.1 to a maximum of 1 where;	
	≥10% Islands	1
Vegetated extent (Percentage of vegetation over entire area)	≥50 % Cover	0.3
	25≤x<50% Cover	0.4
	10≤x<25% Cover	0.6
	0≤x<10% Cover	1

Migrating Shorebird HSM = (Water Depth SIV)(Vegetated Extent SIV*Island SIV*Salinity SIV*Seasonal Water SIV)*$^{1/4}$

3.7 Meadow Guild

3.7.1 Guild Description

The meadow guild includes all species associated with herbaceous-dominated communities. During model development, general habitat needs for reptiles, amphibians, mammals and birds that use meadow habitats were considered. Species typically associated with meadow habitats on or adjacent to Owens Lake include reptiles such as Side-blotched Lizard, Gopher Snake; mammals such as Owens Valley Vole, Deer Mouse, Tule Elk; and birds such as Northern Harrier, Savannah Sparrow, and Western Meadowlark. Meadow habitats also support many invertebrate and plant species.

The meadow guild species generally prefer herbaceous dominated vegetation, which range from dense saturated alkali meadow (SAM) to areas of drier grassland types with shrub inclusions and isolated willow species. Meadow habitats are expected to attract typical grassland species, and those requiring additional vertical structure. A general assumption made in developing the meadow guild model was that areas of higher microhabitat diversity and vegetation cover would be suitable to more meadow species than areas of low to moderate cover or reduced microhabitat diversity. Many species would benefit from occasional inclusions of more open areas, particularly some small mammals and reptiles. This is accounted for in the topographic diversity parameter.

While measures of vegetation extent and/or structure are considered parameters in all habitat models, except the diving waterbird guild, plants themselves are not specifically identified as target organisms. Several species of plants have been identified for conservation and management within both natural and managed lakebed meadows (McLaughlin 2010). Therefore, while not specifically included with the targeted wildlife, plants are nonetheless considered for conservation and management.

3.7.2 Meadow Guild Model Parameters

Habitat value for the meadow guild will be evaluated based on vegetation cover, plant species richness, vegetation structural diversity, and the topographic diversity of vegetated areas.

Vegetation Cover

The amount of plant cover is directly related to habitat value of an area for all species in the meadow guild from Tule Elk and Owens Valley Vole to grasshoppers and spiders. Not only does vegetation cover provide essential food and cover to herbivorous species, plant cover plays a role in mediating predator prey interaction and promoting diversity (Ayal et al. 2005).

Except for areas with freshwater application, Owens Lake habitat types are characterized by low cover values. Areas that receive freshwater often have soil salinity that is conducive to higher cover values of salt tolerant species and have hydrophyte species that can obtain higher cover values. The average cover value of these high cover alkali meadow communities was 70% (LADWP 2002). Since the Owens Lake polygons consist of many non-vegetated habitat types, the upper cover category was defined as greater than 50%, which received the highest SIV of 1. There are three additional lower cover categories that have SIV values that decrease at a linear rate until 0% cover receives a SIV of 0.

Vegetation Richness

Species richness is one of the simplest; most widely used, and best understood methods of characterizing a biological community. Species richness is a fundamental measurement of community and regional diversity, and it underlies many ecological models and conservation strategies (Gotelli and Colwell 2001). With increasing species richness there are more ecological interactions between those species which leads to resistance to disturbance (Tilman and Downing 1994). Increasing species richness is also often positively related to productivity (Mittelbach 2001), with increased species comes additional organisms able to exploit resources across many different ecological gradients.

Avian species richness is typically related more to vegetation structure as opposed to vegetation composition (MacArthur and MacArthur 1961, Erdelen 1984). Vegetation species richness may, however, affect the vertical height diversity of vegetation, and thus bird use. Variations in vegetation species richness would also be expected to influence the availability of food resources with more plant species offering more productive and diverse resources.

Higher richness areas may be more likely to have rare species such as *Sidalcea covillei* and *Plagiobothrys parishii.*

Low amounts of tamarisk can be tolerable and potentially beneficial to some riparian bird species but large amounts of tamarisk can negatively affect bird use (Hultine et al. 2010). While 32 different bird species have been noted to breed in tamarisk it could be of lower value than native habitat (Sogge st al. 2008). Tamarisk takes the place of some native wetland species, and while some tamarisk may possibly be beneficial to some wildlife species, large monocultures are not desirable. Therefore the SIV is reduced by 0.3 for polygons with monocultures of tamarisk.

Vegetation species richness categories were defined based on observations of the vegetation communities on Owens Lake. The presence of a few plant species (inland saltgrass is usually dominant) quickly raises the value of an area for the meadow guild since meadow species do not use barren playa. With each additional ten species the SIV is raised to the point where more than 40 species received the maximum value of 1. Only two polygons on the west side of Owens Lake have more than 40 species.

Vegetation Structure

The diversity and density of birds in grassland habitats is generally low as compared to most other habitats. Within grassland and open-country habitats, more open, patchy, and variable habitats will support more bird species (Cody 1985). Grassland birds vary in their specific habitat requirements with regard to vegetation structure. Grassland bird species will readily use small shrubs and trees, although they vary in the amount of shrub cover tolerable. Some species such as Western Meadowlark prefer shorter grass, with limited amounts of shrub cover. Savannah Sparrow is more of a habitat generalist, occurring in a wide range of grassland habitats, and often in fairly lush short to medium height grassland areas. Northern Harrier will use upland and wetland habitats, and will tolerate low shrub cover (<20%) (Sample and Mossman 1997). Areas supporting SAM and taller emergent vegetation will create nesting opportunities for other species such as Marsh Wren, Red-winged Blackbird and Yellow-headed Blackbird. SAM habitats will provide additional nesting and cover opportunities for waterfowl as discussed previously. Additional woody vegetation structure will provide perch sites and additional foraging opportunities for migrant, wintering and breeding passerine birds.

Local scale habitat heterogeneity is positively related to species richness of small mammals (Williams et al 2002). In a study of small mammal populations in Nevada, the most diverse plant community which was comprised of dense herbaceous growth interspersed with forbs and many mesic shrubs supported the greatest number of small mammal species (Ports and Ports 1989). On Owens Lake, rodent species richness is positively correlated with plant species cover and the spatial heterogeneity of vegetation (Matson 1976).

Foliage height diversity is well correlated to increases in bird species richness (MacArthur and MacArthur 1961, Erdelen 1984). Since it would be impractical and time consuming to measure foliage height diversity or foliage density across the Owens Lake, categories were created based on vegetation structural groups that exist on Owens Lake.

Some polygons, particularly those close to the historic shoreline, are shrub dominant. While some wildlife may use shrubs, most of the meadow guild needs resources that grass or other herbaceous species provide. Therefore when shrubs are dominant the SIV is the lowest. The next highest SIV structure category is saltgrass dominant. These areas provide marginal cover and food resources for most species. In these saltgrass dominant areas, Kangaroo rats, white-footed mice and Owens Valley Vole have been noted along with Savannah Sparrow and the occasional foraging Northern Harrier. The majority of vegetated areas on Owens Lake are saltgrass dominant.

With increasing connection to a spring or other freshwater source additional herbaceous structure generally occurs. These more mesic areas provide additional structure for small mammals to use along with Tule Elk and other songbirds and waterbird species. With isolated areas of additional herbaceous structure this raises the SIV by an additional 0.2. When multiple additional herbaceous layers are common (e.g., wiregrass [*Juncus* spp]. and bulrush [*Schoenoplectus* spp.]) this increases the suitability value further to 0.9. This category may also have some shrub structure. This additional structure creates additional perching areas for foraging birds or to serve as singing perches.

Lastly the most valuable areas contain some woody riparian species. This vegetation structure category is relatively rare on Owens Lake due to the lack of fluvial process to establish willows and cottonwood, the highly saline soil and groundwater, and shallow rooting zone. There are some springs adjacent to ephemeral creeks on the west side of Owens Lake that do have spotty but dense native woody riparian species. Due to the high structural diversity of this category, it receives the highest SIV.

Vegetated Topographic Diversity

Topographic diversity of hummocks, rocks, and woody material provides cover for many small animals which is otherwise often lacking on the lakebed.

While vegetation in and of itself may provide cover for some small mammals (e. g., Owens Valley Vole) most small mammals need friable soil to build burrows. With increased topographic diversity there are additional raised areas that are above the saline ground water that would provide areas conducive to burrow placement. Only small mammals such as black-tailed hare, that do not rely on burrows and are mobile enough to move into vegetated shallow flood areas from adjacent uplands to forage and then leave when additional cover is needed, have been noted in the relatively flat shallow flood areas.

Substrate diversity and patchiness has been found to influence rodent community structure and increase diversity (M'Closkey 1976). On Owens Lake, areas with additional topographic diversity with vegetation even in the middle of the lakebed, such as Managed Vegetation have known use by

Botta's Pocket Gopher (*Thomomys bottae*), Deer Mouse (*Peromyscus maniculatus*), and various pocket mice (*Perognathus* spp.).

The general life history requirements for reptiles of sunlight for warmth and food, usually in the form of insects (which are most valuable adjacent to vegetation) is met in some DCA's. The third requirement, cover from temperature extremes and escape from predation, is often insufficient everywhere except for adjacent to the historic shoreline.

The lakebed is topographically flat and quite simple. Spatial heterogeneity is the single most important variable in determining species richness and determining coexisting species (Pianka 1967). Various reptiles have been observed adjacent to shallow flood including Side-blotched Lizard (*Uta stansburiana*), Long-nosed Leopard Lizard (*Gambelia wislizenii*) and Desert Spiny Lizard (*Sceloporus magister*) particularly adjacent to the created wetlands in T30-1, which is located next to upland habitat. Here these species are often seen utilizing rip-rap along culverts and berms to meet their cover requirement (LADWP 2010). Additional burrows in raised areas would allow this cover requirement to be met in the middle of DCA cells, as well.

With additional topographic diversity to provide cover in DCA cells (and reduction of water application) additional wildlife would very likely utilize areas with vegetation. This, in turn, would provide additional trophic levels and resources for other wildlife such as predatory snakes and raptors.

This parameter was assessed using the topographic complexity attribute in California Rapid Assessment Methods for Wetlands (CRAM 2009) which was slightly modified for use on Owens Lake.

The categories in order of increasing topographic diversity and higher suitability values are below.

- Flat (Swales of vegetation that exist with little slope);
- Mostly flat with short, steep slope (historic shoreline);
- Vegetated areas with shallow slope or short feature with steep slope;
- Vegetated areas with multiple breaks in slope and often steeper slopes (e.g., berms, hummocks, and could include influence of various woody material and rocks)

3.7.3 Meadow Guild HSM Calculation

Vegetative cover is the most important parameter for the meadow guild. Without vegetative cover the other parameters are not particularly valuable. The geometric mean of the remaining three meadow guild parameters SIVs is then scaled by vegetative cover SIV to obtain the meadow guild HSM value.

The value of a meadow is assumed to ultimately be determined by the amount of area with vegetative cover and secondarily the parameter with the lowest suitability to support the needs of the guild. With the exception that topographic diversity is parameterized to not be limiting and only add value to the meadow in a given polygon. While measures of vegetation are correlated, particularly vegetation richness and structure on Owens Lake, each are fundamentally different measures of vegetation value to wildlife.

Table 6. Owens Lake Meadow Guild Habitat Suitability Model (HSM)

Parameters	Habitat Value Measurements	Suitability Index Value (SIV)
Vegetation cover	≥50% Cover 25≤x<50% Cover 10≤x<25% Cover 0<x<10% Cover 0% Cover	1 * proportion of polygon 0.8 * proportion of polygon 0.6 * proportion of polygon 0.4 * proportion of polygon 0 * proportion of polygon [Sum total]
Vegetation Richness (Number of species)	>40 species 31-40 species 21-30 species 10-20 species 1-9 species 0 species	1 0.9 0.8 0.6 0.4 0
	Tamarisk presence Other noxious weed presence Species status species presence	Subtract 0.3 Subtract 0.1 Add 0.1 per species
Vegetation Structure Structure based on dominant community	Multiple herbaceous layers and some native woody riparian Additional herbaceous layer common above saltgrass, potentially some shrubs Isolated areas of additional herbaceous structure above saltgrass Low growing, usually saltgrass dominant Shrub dominant No vegetation	1 0.9 0.8 0.6 0.2 0
Vegetated Topographic Diversity	Flat (Swales of vegetation that exist with little slope) Mostly flat with short, steep slope (historic shoreline) Vegetated areas with shallow slope or short feature with steep slope Vegetated areas with multiple breaks in slope and often steeper slopes (e.g., berms, hummocks, and could include influence of various woody material and rocks)	0.7 0.8 0.9 1

Meadow Guild HSM = Cover SIV(Richness SIV*Structure SIV*Topographic Diversity SIV)*$^{1/3}$

4.0 HABITAT SUITABILITY MODEL CALCULATION

The Owens Lake Habitat Suitability Models for each of the guilds were evaluated across all Owens Lake polygons in Figure 1. There are 144 polygons that were delineated below the 3600-foot elevation contour. These polygons encompass management units in dust control and areas outside of dust control were delineated based on soil type and landownership. Seep, springs, and adjacent areas were drawn based on connections to ground water discharge sources. Habitat suitability modeling was performed on all polygons with the exception of the Owens River and Owens River Delta. This section describes the data sources used to obtain the data necessary to calculate the habitat suitability model.

Figure 1. Owens Lake Polygons Inside the 3600 ft Contour Evaluated During the Habitat Suitability Model Calculation

4.1 Habitat Classification

Habitat classification using remote sensing was the quickest and most accurate way to obtain certain variables for habitat modeling across Owens Lake. Variables of open water depth in the 0<x<10cm range, vegetated extent of graminoid (grass-like) species, proportion of islands and proportion of dry area were obtained from the classification described below.

The selection of habitat types identified for the habitat suitability mapping effort was based on the current range of data and information available that characterize all of the present habitats within the 3600 foot elevation contour of Owens Lake. The mapping process was separated into two efforts; areas within the present extent of dust control and areas outside of dust control. For the most part, the two efforts utilize a different classification nomenclature to describe habitat types; however, there was some overlap particularly within algae and dry alkali meadow (DAM). Within dust control, classification types consisted of dry playa, algae, saturated soil, water, and vegetation. The remainder of the Owens Lake, outside of dust control management areas, was distinguished by additional community physiognomy and species composition. This is particularly important adjacent to the historic shoreline where vegetated communities were more common. Species nomenclature was adopted from Hickman (1994).

Within Dust Control

Dry Playa: This habitat type typically consisted of unvegetated lakebed, occasional terraces within saturated soils, and along constructed berms.

Algae: This habitat type occurred primarily within shallow flood cells in transitional areas between shallow water and saturated soils.

Saturated Soil: This habitat type consisted of saturated areas or standing water that was shallow 0<x<10cm.

Water: Standing water. Often contains large expanses of relatively deep (>10cm) ponded water.

Transmontaine Alkali Meadow (TAM): This habitat type occurred in the developed shallow flood cells that had a larger component of fresh water inputs and generally occurred on the up gradient (eastern edges) of the cells. This classification consists mostly of Dry Transmontane Alkali Meadow which is saltgrass (*Distichlis spicata*) dominant, and has developed inside dust control since implementation. Some areas with better draining soils had Wet Alkali Meadow vegetation development, often in close proximity to freshwater bubblers that maintain lower salinity in the rhizosphere. Here American bulrush (*Schoenoplectus americanus*), salt marsh bulrush (*Schoenoplectus maritimus*), and cattail (*Typha* spp.) become dominant.

Additional Areas Outside Dust Control

Dry Playa: This classification type was most common outside of dust control areas and typically consisted of large expanses of dry, barren and unvegetated lakebed.

Upland Scrub: This low shrub vegetation type occurred on high terrace and aeolian land types. The dominant shrubs were greasewood (*Sarcobatus vermiculatus*), bush seepweed (*Sueda moqunii*), Parry's salt bush (*Atriplex parryii*), and shadscale (*Atriplex confertifolia*). The sparse understory occasionally consisted of saltgrass (*Distichlis spicata*).

Tamarisk: This tall shrub vegetation type occurred primarily on the west shore along riparian areas with high to low water tables. A dense to open overstory canopy was dominated by tamarisk (*Tamarix ramosissima*). Occasional low shrubs included rubber rabbitbrush (*Ericameria nauseosa*) and Nevada saltbush (*Atriplex lentiformis torreyi*). Herbaceous vegetation was very sparse.

Transmontane Alkali Meadow (TAM): This herbaceous vegetation type occurred within spring areas often with high water tables. Dominant plants included saltgrass (*Distichlis spicata*), American bulrush (*Schoenoplectus* americanus), Baltic rush (*Juncus balticus*), salt marsh bulrush (*Schoenoplectus maritimus*), and cattail (*Typha* spp.). Adjacent areas farther away from spring sources and farther onto the playa became increasingly saltgrass dominant.

Inclusions of contrasting types are typically common in all map units. Inclusions may include gradual transitions between similar vegetation types or small areas of contrasting type scattered within an area classified as another type.

4.1.1 Classification Process

Two imagery data sets were utilized to perform the habitat mapping on Owens Lake. The primary image was taken from the GeoEye1 satellite/sensor taken on May 5, 2010. The image is 0.5 m (1.64 ft) resolution and had a pan-sharpened color-infrared band combination.

Some areas were outside of the extent of the May 5, 2010 image, therefore imagery that was collected between August 1 and August 7, 2009, using an aircraft equipped with a multi-spectral digital camera was utilized. The imagery had a resolution of one foot in true color as a single 4-band (red, green, blue, near infra-red). These four bands were collected simultaneously with identical look angles.

A spectral classification was performed on all of the subareas followed by a supervised classification using ERDAS Imagine 9.3 to identify habitat types. Following the classification of the subareas, the habitat types delineated utilizing ERDAS Imagine were converted to polygons using ArcMap 9.3. A post-classification clean up was performed to eliminate erroneous pixel inclusion in the classification. After completing the clean-up, similar habitat types were merged together creating a preliminary habitat map.

The following is a step by step process of the specific operations used to create the classified ArcGIS shapefiles.

- Mosaic Separate Geo-Tiff Files into Manageable Subareas
- Use Subset Tool to Create Manageable Subareas to Perform Supervised Classification
- Collect Spectral Signatures for Supervised Classification

- Perform Supervised Classification
- Perform Fuzzy Convolution
- Use ArcMap to Convert Fuzzy File from a Raster to a Vector File
- Once in ArcMap perform Post Classification Clean-up

Ground Truthing Protocol

The objective of the ground truthing effort was to verify the accuracy of the preliminary habitat map. Of particular concern were the algae and TAM vegetation habitat types. These habitat types have similar spectral signatures, making them difficult to distinguish during a supervised classification.

Utilizing the preliminary habitat map, each dust control management area was surveyed by vehicle and when necessary, by foot. Large cells were surveyed from the perimeter with a spotting scope and a pair of binoculars to aid in the observation of polygons located far from view. Information about the extent of classification types, boundaries, and if the habitat was mapped properly was recorded. This information was used to refine both the habitat classification and delineated boundaries.

Additionally, TAM areas outside of dust control on the east side of Owens lakebed were checked for accuracy by comparing with an ArcGIS shapefile of the 1996 wetland vegetation delineation (Jones and Stokes 1996). This comparison showed similar vegetated extent; particularly given the assessments were performed 14 years apart.

The habitat classification results were used to evaluate the variables of open water depth in the $0<x<10$cm range, vegetated extent of grass-like species, proportion of islands and proportion of dry area as discussed in the individual variable sections below.

4.2 Open Water Depth

Water depth classification was performed across all Owens Lake polygons inside the 3600 foot contour (Figure 1). Dust Control Areas (DCAs) operated by the LADWP have the most precise elevation data available in the Project area and therefore the most precise depth classification. DCAs consist of approximately 42% of the Planning area. Using ArcGIS, water depths were classified using digital-elevation-models (DEM's) of shallow flood DCMs and measured water-surface-elevations at a given pond. Additionally, saturated soils that are associated with areas on the lake where there is sheet-flow flooding from bubblers as well as springs and seeps were classified using remote sensing techniques.

Two DEM's of different resolution were used in the analysis due to the lack of a continuous, high-resolution elevation data-set covering the full extent of the lakebed. A 0.5 m DEM, composed of LiDAR derived data, created by Watershed Sciences, Inc. (2010) was available for approximately 36% of the dust control area (Phase 7 and some adjacent areas) which has a vertical accuracy of +/- 1 cm. In areas with no LiDAR coverage or where ponds were flooded at the time of LiDAR collection (thus, making it impossible to detect the bottom of the ponds) required a second DEM. This DEM (2 m pixel size) was constructed by LADWP personnel using kriging interpolation, in ArcGIS, of ground-surveyed elevation points (vertical accuracy +/- 0.7 cm) and grading contours. This analysis was performed on 36% of the dust control area. These 2 m DEMs, have 5 times greater resolution than any publicly available DEM (e.g. U.S.G.S, 10 m); and, therefore, provide a high level of spatial detail.

Using ArcGIS, individual cells were masked from the appropriate DEM. Then, using water-surface elevations (A.M.S.L) measured at all dust-control ponds on or around May 1, 2010, water depths within individual cells were classified into 7 depth-classes, which are: 0 cm (above the water surface), $0<x<10$ cm, $10\leq x<13$ cm, $13\leq x<25$ cm, $25\leq x<30$ cm, $30\leq x<40$ cm and ≥ 40 cm. Additionally, using remote sensing techniques with a 4-band (RGB, NIR), digital aerial-photography from May 2010, the area of saturated soils in both sheet-flow and springs and seeps regions were delineated (see 'Classification' methods for further details.) Following classification, the total area, in acres, for each depth class was tabulated for the individual cells (polygons). Figure 2 compares the true color image used for classification with the water depth categories delineated using the 0.5 m DEM and saturated soil classification.

In some instances where the interpolated surface of the 2 m DEM was poor due to a sparse number of elevation-survey points, the extent of the water depths were hand digitized in ArcGIS. To assist in digitizing, coarse trends in the DEM along with high resolution (1m), color digital-aerial photos were used. In particular, aerial-photo sequences through various times of low water elevation during the non-dust control season revealed low stands in pond elevations (August and September 2009). This allowed the visual detection of varying water depths. Using these visual cues along with elevations from the 2 m DEM, water depths were classified.

Lastly, for original Phase 1 sheet flow areas (approximately 28% of dust control areas) that became operational in 2002, no up-to-date elevation survey data was available. Therefore, pond depth was classified using aerial imagery. Along with the saturated soil classification from ERDAS imagine, deeper areas were digitized using imagery taken at low water coverage time periods, as described above. These Phase 1 DCM areas have relatively small amounts of ponding, as designed, compared to other areas of shallow flooding. Figure 3 compares the image in true color used for classification with the water depth categories delineated using heads-up digitized depths and saturated soil classification for one region. Heads-up digitized ponds amounted to approximately 9% of the total dust control area. All non-dust control areas (58% of the total Planning Area) had water depth classified in the same manner as above. The Owens River and Delta were not analyzed.

The acreage of the various depth classes were then evaluated as a percent of the overall polygon to be used in the HSM model for the appropriate guild.

This water depth classification was also performed in fall 2010 using WorldView-2 imagery captured on November 24, 2010 to observe seasonal variability in water depth in both shallow flooding areas and springs along the lakeshore.

Figure 2. Example of Water Depth Classification Using 0.5m DEM in DCA Cell (Polygon) T17-1

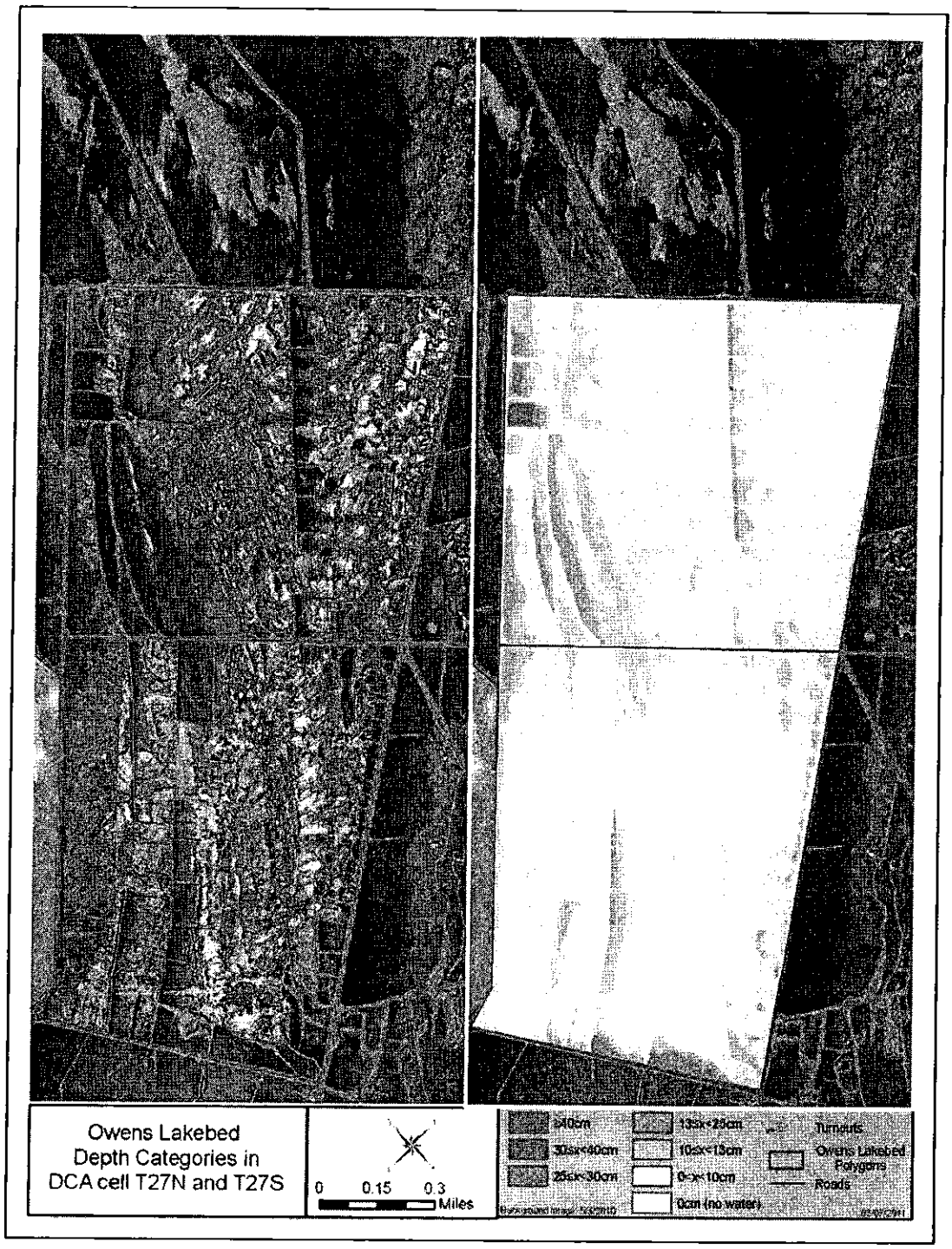

Figure 3. Example of Water Depth Classification in Spring 2010 Using Heads-up Delineation of Ponds in DCA Cell (Polygon) T27N and T27S

4.3 Salinity

Salinity measurements were taken in shallow flood ponds or tail water ponds of sheet flow areas during spring and fall of 2010. A Quanta Water quality monitoring system (HydroLab Corporation, Austin, Texas) was used. This monitoring occurred on May 4-5 and recorded Specific Conductivity (EC25) along with other common field water quality measurements. Specific conductivity takes water conductivity and normalizes the measurement to 25°C. The range of specific conductivity the Quanta can measure is from 0-100 mS/cm. Occasionally DCM cells were missed in sampling. In these rare cases the most similar adjacent DCM cell value was used. Salinity was not measured at any seeps or springs. Some measurements exist but are for the spring or well head locations and therefore are not representative of the entire polygon. Consequently, 30 mS/cm was used for all polygons with seeps or springs, which gives these the highest SIV for shorebirds. In all other playa dominated polygons 80 mS/cm was used except for the brinepool and some adjacent polygon where 100 mS/cm was used due to the increased amount of salts in the soil.

4.4 Seasonal Water Availability

Seasonal water presence was assessed by viewing various images of Owens Lake through the seasons. Each polygon was assigned presence or absence of water through each season. Polygons were assessed by viewing a Quickbird image from January 9, 2009, for winter. All polygons associated with seeps and springs had standing water in winter and all operational shallow flood areas had standing water as well. For spring water presence the May 2010 water depth classification was used. Summer water presence was assessed using the August image of 2009 discussed in Classification above. Phase 7 shallow flood areas were not operational over summer thus, it is unknown how many would retain water through the summer; therefore no water presence over the summer season was the assigned value. Fall assessment was performed using WorldView-2 imagery captured on November 24, 2010. All shallow flood DCA cells had water in fall.

4.5 Islands

Islands were delineated utilizing the dry playa classification that is surrounded by water on all sides. Islands occurred within ponded areas which were almost exclusively in dust control areas. These areas were often found in Phase 7 ponds that were tilled before operation of dust control. Once island areas were delineated the proportion of each polygon was calculated for use in the HSM.

4.6 Vegetated Extent

Wetland vegetation on the east side of Owens Lake was field mapped by J. Paulus in 1995 (Jones and Stokes 1996) and dominated almost exclusively by Transmontane Alkali Meadow (TAM) with very small areas of Cottonwood-Willow Riparian Forest. This delineation was coarser on the west side of Owens Lake because LandSat satellite imagery with 25 m pixels was utilized instead of field mapping.

The data obtained from the east side wetland delineation was used for vegetated extent with some corrections. Data obtained from the 2010 habitat classification was used for the west side seeps and springs as well as within dust control areas. As discussed in Classification section above, all vegetated areas inside dust control were ground-truthed by observing if the classified image matched on the ground vegetated extent. One potential delineation error was noted in the 1996 wetland delineation that could be attributable to an erroneous projection shift in the Tubman springs area which was corrected with the 2010 vegetation classification for the HSM.

The resulting shapefile with wetland delineation on the east side of Owens Lake and the 2010 vegetation classification containing graminoid (grass-like plant) dominated communities for all other areas was then intersected with the Owens Lake Polygons shapefile to obtain the proportion of vegetated extent in each polygon.

4.7 Dry Area

The proportion of dry area was analyzed using a LandSat TM7 image from May 5, 2010, for the dust control project areas. This image was processed to assess compliance with wetness requirements for dust control (75% wetted area). Due to the large pixel size of the LandSat image, most areas outside of DCAs were assessed for proportion of dry area using the classification from higher resolution GeoEye image from May, 3 2010, discussed in Classification above. Additionally fall dry area was also assessed using a WorldView-2 imagery captured on November 24, 2010.

4.8 Microtopographic Relief

The microtopographic relief of dry area on Owens Lake was analyzed using ArcGIS and a high resolution DEM. The DEM utilized is 0.5 meter resolution (vertical accuracy of +/- 1cm), which covers ~ 15,000 ac of the lake and was derived from LiDAR data collected in winter 2010 (Watershed Sciences, 2010). The goal of this analysis was to measure microtopographic relief over a 2 m pixel. The 2 meter pixel size was used because it was as small as possible to measure change with the pixel size of the data set (four measurements in each of the 0.5m pixels) but large enough to capture the microtopographic variation caused by tillage.

Using ArcGIS, two raster datasets were created from the 0.5m DEM: one with the maximum elevation over 2m (four 0.5 m pixels), and the other with the minimum elevation over 2m. This was performed using the aggregate function in ArcGIS. The resulting two raster data sets were then subtracted to get the change in relief in each two meter pixel. Next, individual Owens Lake polygons were masked from the newly constructed raster. Any areas that were covered with water were removed from the microtopographic relief raster. The microtopographic relief was averaged across each polygon to obtain the mean microtopographic value.

In order to account for the change is slope over each pixel that is not related to microtopographic relief the average slope across the DEM was calculated. The slope was approximately 1% which resulted in a change in elevation of 2 cm over 2 m due to slope. Therefore, to correct for the effect of slope 2 cm was subtracted from the average microtopographic value of each polygon.

This analysis was possible in Phase 7 shallow flood areas and some adjacent DCA cells as well as other adjacent polygons not under dust control, although only small portions of these adjacent areas had data available. All other polygons were assigned a microtopographic relief value using the above analysis as a benchmark to compare during a field evaluation of all other polygons from January 31 through February 2, 2011. Example of microtopographic relief over the entire cell is displayed in Figure 4. Dark red areas showing high relief are tilled areas which are surrounded by graded areas for shallow flood.

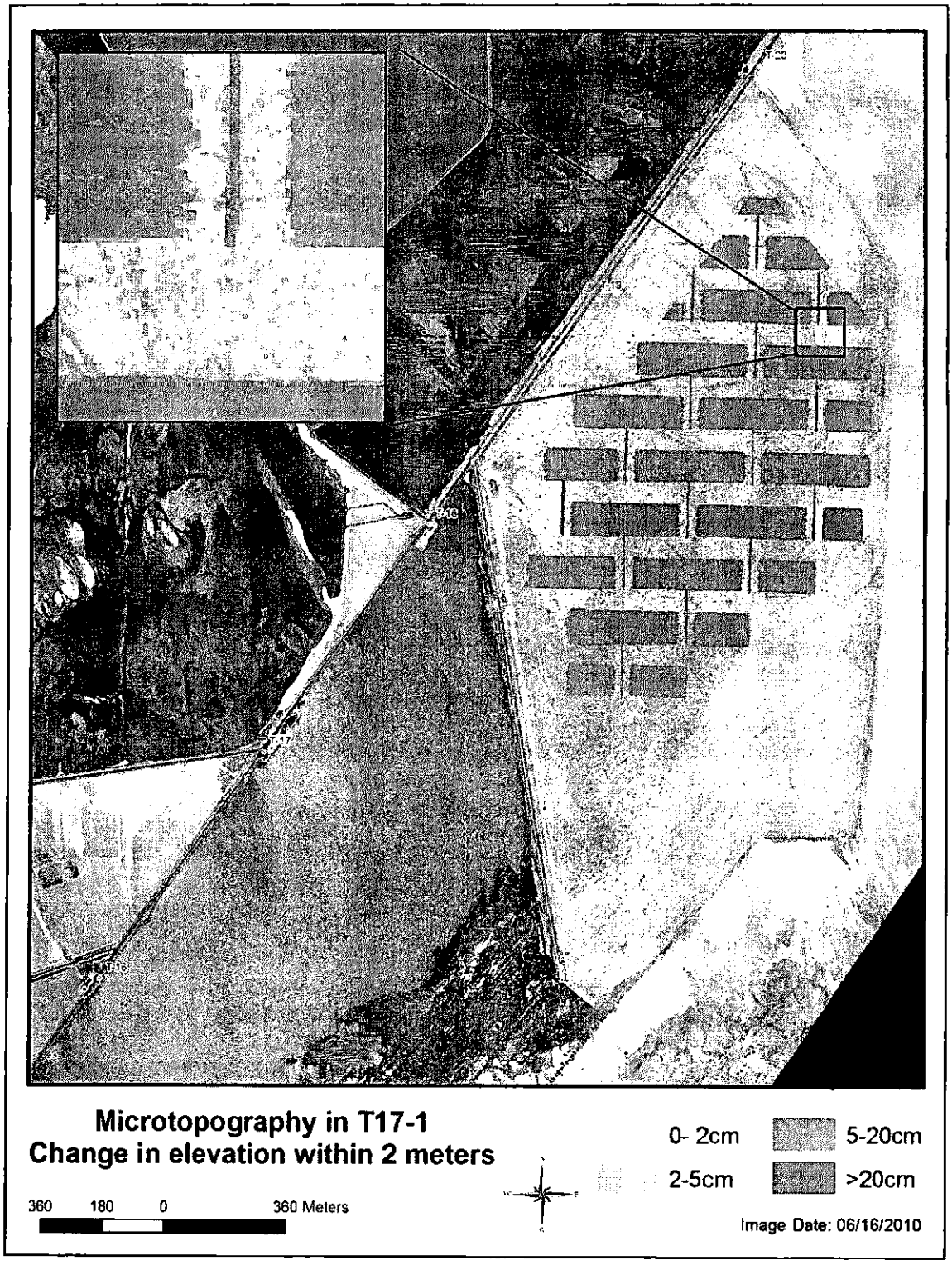

Figure 4. Example of Microtopographic Measurements on Owens Lake

4.9 Vegetation Cover

An estimate of vegetative cover on the Owens playa is one parameter required to generate HSM values as part of the Owens Lake Master Planning process. The approach and methodology are summarized below.

Approach

Vegetative cover (mainly saltgrass) has been measured since 2004 in the Owens Lakebed Managed Vegetation (MV) area by calibrating satellite imagery with ground-truthing observations (ground-based measurements of vegetative cover). Since these estimates are used to determine compliance with dust control requirements, the precision requirements are greater than those necessary for the HSM application. The MV method performs well, with the latest assessment, November 2010 imagery acquisition, having an R2 of 0.93, meaning that 93% of the variation in cover is explained. In an exploratory lake-wide vegetative cover assessment, the same MV-based method, which resulted in R^2 of 0.93, was applied to the entire imagery extent within the historic shoreline. This lake-wide imagery was also acquired in November 2010. This lake-wide vegetative assessment is considered exploratory because the MV-based method and MV ground-truth data are applied to areas outside of MV that contain some different vegetative communities and surface characteristics. The application of the MV-area model, R2 of 0.93, is fully understood to introduce error due to the altered population which is much expanded from MV-site to lake-wide. In support of determining HSM values, the assessed areas included Shallow Flood (SF) areas, playa surface areas, and areas surrounding natural springs. These areas range in vegetation types and also in surface conditions from high-salinity to fresh water, fine to coarse soil, and crusted to bare soil surfaces.

Methods

The vegetative cover measurement process is generally as follows (the detailed methodology may be found in the "Managed Vegetation Operation and Management Plan," NewFields and Earthworks, 2008):

- Ground-truthing measurements are made by analyzing ground-based downward-looking digital photographs (DPFs) and counting visible intersections of a grid overlay with vegetative material visible in the photograph.
- The exact XY location of each calibration target is GPS-surveyed so that the pin-count tallies can be related to specific points on acquired satellite imagery.
- The satellite imagery is ideally acquired concurrently with the ground-truthing DPFs. Satellite imagery sources utilized in this methodology include 4 spectral bands: blue, green, red, and near-infrared. Spatial resolution of this multi-spectral imagery is 2.4 m or finer.
- Various indices relating multi-spectral imagery bands are calculated for each pixel in the satellite imagery. These indices leverage the absorption and reflection of specific spectral ranges as they relate to photosynthetic activity. The result of any of these indices is a continuum of vegetative vigor.
- Results for a (calibration) subset of ground-truthing points are statistically fit to index values at corresponding locations on the image, producing a distinct relationship for each index.
- The accuracy with which indices predict a second (validation) subset of ground-truthing data is then tested statistically. Indices with the best statistical

performance are selected and applied to the entire image, producing a map of percent cover for the area.

Lake-wide vegetative cover for the HSM was developed from WorldView-2 imagery captured on November 24, 2010. All ground-truthing was within the MV area and comprised the same data set used in the November 2010 MV cover compliance assessment.

Through evaluation and visual inspection of vegetation cover values across familiar areas of the lakebed, it was determined that the application of the MV ground-truth correlation caused a positive shift in the percentage of cover estimated outside the MV area. This is likely due to referencing a relative monoculture of saltgrass cover in the MV area to develop the correlation, and then applying the correlation to more diverse vegetative communities lake-wide. In areas with species composition similar to that in the MV site, it was observed that percent cover determination was more nearly correct.

After visual review and several iterations of negative-shift calculations applied to the original output of the lake-wide vegetative assessment, a negative shift value was selected and applied to adjust for the overestimated cover. To lessen the effect of algae on vegetative cover results, areas containing standing water were excluded from the analysis process. The resulting lake-wide vegetation assessment draft was binned into categories of no vegetation, low, medium, high, and highest vegetation. These categories roughly correlate to 0%, $0<x<10\%$, $10\leq x<25\%$, $25\leq x<50\%$, and $\geq 50\%$ cover.

The lake-wide vegetative cover results are intended for evaluation purposes. This being the first application of this method lake-wide, further refinements will be made in future events. Ground-truthing refinement will be expanded into more diverse plant communities during future events, and this will likely improve performance. While these results provide a good indication of cover levels, they may contain substantial errors for specific locations and should thus be applied and interpreted with some caution.

Details regarding the methodology for vegetative cover analysis on the Owens Lakebed can be found in the 2008 NewFields and Earthworks report.

4.10 Vegetation Richness and Vegetation Structure

LADWP field staff visited all Owens Lake polygons within the 3600 ft contour over eleven days in January 10, 2011-February 3, 2011 and again in July 2011. Staff brought hardcopy aerial photos with the polygon boundaries into the field and used a Trimble GPS loaded with the GIS polygon file to verify observer position. Due to time limitation and the large area of the lake, field staff did not walk entire polygons particularly when no vegetation was visible from a distance. Areas were only walked that appeared from the aerial photos to have greater plant diversity.

Where there were seeps and springs and other areas of high plant diversity, staff walked into these areas and identified plants to species. Most annual plants were not present during winter sampling; however, in some cases it was possible to identify annual plants by observing dried vegetation from last growing season. Many perennial plants were dormant without flowers and sometimes with few leaves. During this field visit vegetation structure was also assessed. Additional field visits during summer allowed observed annual species. Isolated areas of MAM or SAM communities and native woody riparian vegetation were noted when found. Tamarisk presence was also noted.

For eleven of the most diverse polygons, local botanist, Steven McLaughlin briefly visited the sites (June 2010 and September 2010) and shared data with LADWP (McLaughlin 2010). LADWP staff visited these polygons and added any additional plants that were seen.

4.11 Vegetated Topographic Diversity

This variable was assessed using topographic complexity attribute in California Rapid Assessment Methods for Wetlands (CRAM 2009) that was slightly modified for Owens Lake. This variable was assessed January 31- February 2, 2011 the same time when the microtopography of dry areas was evaluated. Field maps of each polygon area were brought into the field with the slope displayed along with vegetated extent. Each Owens Lake polygon was visited and assigned one of the categories:

- Flat (swales of vegetation);
- Mostly flat with short steep slope;
- Vegetated areas with shallow slope;
- Vegetated areas with multiple breaks in slope and often steeper slopes (e.g., berms, hummocks, and could include influence of various woody material and rocks).

Areas adjacent to the historic shoreline typically received a value of "2." Larger springs typically received a value of "3" or rarely "4." Most areas received a value of "1" particularly if no vegetation was established, which is common on the lakebed.

5.0 HABITAT MODEL RESULTS AND VALIDATION

Using the aforementioned variables, habitat suitability values for each guild were calculated in each of the 144 Owens Lake polygons. The resulting index values (range 0.0-1.0) were multiplied by the acreage in each polygon to calculate Habitat Value-Acres for each guild (Table 7).

Along with the literature review, these habitat suitability models have undergone substantial review from local experts. Multiple versions of the model have been discussed and comments incorporated. Information from these past iterations has been incorporated into subsequent models in order to better describe habitat suitability. The last version of the habitat suitability model was reviewed by an Independent Scientific Review Panel of experts. Comments from the Review Panel have been incorporated in the current model and can be found in Appendix F.

Validation of the model results were performed using counts of the abundance of individuals from each guild. Data used were from four lake-wide waterbird counts of the DCA in 2010. These surveys involved multiple observers and occurred on March 31 (Spring), May 1 (Spring), and October 22 (Fall), 2010. Additionally breeding waterfowl and shorebirds were counted from May 24-May 28, 2010. These counts represent snapshots of bird use which are variable through the year as well as season. It is important to note that birds may move in response to a variety of highly variable environmental variables that change daily not accounted for in the habitat suitability model such as wind, disturbance, and temperature, among others.

The diving waterbird guild (DWB) consists of Eared Grebe, and all diving ducks. Migrating waterfowl (MWF) include all dabbling ducks (*Anas* sp.) in the family Anatidae. Breeding Waterfowl (BWF) habitat value was validated using all dabbling ducks known to breed on Owens Lake (mainly Gadwall and Mallard) that were counted during a lake-wide survey conducted May 24 to May 28 2010. Migrating Shorebirds (MSB) were all members of the order Charadriiformes excluding the family Laridae (gulls). Breeding shorebird (BSB) habitat value was validated using all shorebird individuals counted that include species that are known to breed on Owens Lake (Snowy Plover, American Avocet and Black-necked Stilt) that were counted during a lake-wide survey conducted May 24 to May 28 2010. The meadow guild does not have a validation dataset. This is due to the diversity of taxa included in this guild that are much more difficult to monitor than birds. For validation, the habitat value-acres of each guild is compared with the numbers of waterbirds in each guild (summed across all surveys) to see how well habitat value-acres predicts abundance. Validation was performed by Peter J. Weisberg, PhD and is summarized below. He has participated in development of other models and ecological understanding to assist management of forest, rangeland, and riparian systems and to forecast future change.

The Spearman's rank correlation statistic was used as a non-parametric measure of association between habitat value and abundance for each guild. Spearman rank correlations may provide an overly optimistic representation of the degree to which habitat suitability models fit bird abundance data. Much of the strength of these correlations may depend on inclusion of units that are obviously lacking in suitable habitat for guilds (i.e. "double zeroes" for abundance and habitat value). Additionally, Poisson or zero-inflated regression models (depending on which fit the data better) were used to fit the observed abundance data as a function of habitat value-acres for each guild. Goodness-of-fit of each model was assessed using pseudo- R^2 values and the modeling efficiency (EF) statistic. The EF statistic has an upper bound of one (perfect fit), a lower bound of negative infinity, and calculates the deviation of the predicted data from the line of perfect fit.

A significant positive relationship was found between diving waterbird (DWB) habitat value (Value-acres) and lake-wide counts of diving waterbirds (r_s = 0.74, p<0.01). Although the r_s is non-parametric, this correlational analysis is limited by inability to model nonlinear relationships, inability to model multivariate relationships, and by the problem of a large number of project units (32 of 74 units monitored) with no diving waterbirds observed in 2010. The presence of a large number of zero values serves to inflate the magnitude of the Spearman rank correlation coefficient. Therefore, to address the problem of a non-normally distributed response variable (abundance) in the form of count data, zero-inflated Poisson regression were applied. The resulting fit, while highly statistically significant (X^2=5181, p<0.01), explained only a moderate proportion of the variance in total DWB abundance (R^2 = 0.313; EF = 0.330). With every 100-unit increase in DWB value-acres, the expected change in bird abundance is increased by a multiplicative factor of approximately 1.20 (95% CI = 1.19 to 1.21). In other words, increasing from 100 to 200 DWB value-acres increases the expected number of diving waterbirds from 356 to 429. From a graphical inspection it appears that DWB value acres under predicts DWB abundance at moderate to high values of observed abundance.

For migrating waterfowl (MWF) Spearman rank correlation shows a significant positive association (r_s= 0.49, p<0.01) between abundance and habitat value-acres. The zero-inflated regression model showed a relatively high goodness-of-fit (R^2 = 0.50; EF = 0.66). This was driven largely from a single data point having an especially high value for both observed abundance and habitat value-acres. With this site removed the model was still statistically significant. With every 100-unit increase in MWF value acres, the expected change in bird abundance is increased by a multiplicative factor of approximately 1.47.

Few sites had substantial breeding waterfowl (BWF) abundance and only 16 of 74 sites had at least one BWF observation. As a result it is difficult to observe trends between BWF value acres and the observed abundance, although it is apparent that most of the sites with non-zero BWF abundance were classified as having a zero value for BWF habitat value-acres. There was a significant positive relationship observed between BWF habitat value (Value-acres) and lake-wide BWF counts (r_s= 0.27, p<0.05). This guild is difficult to validate since it is not possible to count the number of waterfowl sitting on a nest. The counts represent both breeding and non-breeding individuals. Even observations of waterfowl with broods are not the most accurate measure of breeding waterfowl habitat since waterfowl may travel far from where they actually nested with their brood. Not surprisingly the Poisson regression model yielded a non-significant relationship to counts (R^2 = 0.05; EF = a negative value indicating worse than random).

There was a significant positive correlation between breeding shorebird (BSB) abundance and habitat value-acres (r_s= 0.60 p<0.01). The zero-inflated regression model described 22% of the variation in breeding shorebird abundance (R^2 = 0.22; EF = a negative value), with the fit inflated by one site, as was also the case for migratory waterfowl. This single data point had an especially high value for both observed abundance and habitat suitability index. A graphical inspection suggests that the BSB value-acres more adequately predicts BSB abundance at low levels of abundance. With every 100-unit increase in BSB value-acres, the expected change in bird abundance is increased by a multiplicative factor of approximately 1.32.

For migrating shorebirds (MSB) Spearman rank correlation showed a significant positive association (r_s= 0.53, p<0.01) between abundance and habitat value-acres. The water depth variable proved the strongest of the individual SIV indicators. The zero-inflated regression model described 23% of the variation (R^2 = 0.23; EF = a negative value), with one over-predicted site, T18S. As was also the case for migratory waterfowl and breeding shorebirds, this single data point had an especially high value for both observed abundance and habitat suitability index, associated in part with the high acreage (1167 acres) of this management unit. With every 100-unit increase in MSB value-acres, the expected change in bird abundance is increased by a multiplicative factor of approximately 1.32.

These results indicate the HSM positively predicts bird use for each guild based on habitat value calculated from variables in 2010. With additional years of monitoring of both habitat and wildlife use the HSM can be further refined to the extent that the multivariate nature and variability of wildlife use data will allow.

Table 7. Average Habitat Value of Each Owens Lake Species Guilds

Average habitat value of each Owens Lake species guilds in May and November 2010 within Dust Control Project Areas and Non-dust Control Project Areas in the Planning Area. Habitat value-acres for each guild are the product of the habitat suitability value (not shown) and the acreage of the polygon. Guild descriptions are in text.

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
Ash Creek	1203	Non-project	0	55	14	85	25	109
Bartlett Well	178	Non-project	0	11	6	22	10	24
Brinepool	16308	Non-project	0	0	0	193	0	0
Cartago Springs	311	Non-project	0	40	20	59	29	109
Channel Area North	133	Project	0	6	6	19	12	0
Channel Area South	190	Project	0	10	6	22	10	1
Corridor 1	88	Project	0	0	0	2	0	0
Cottonwood Creek	1041	Non-project	0	7	1	67	2	47
Cottonwood Marsh	596	Non-project	0	55	28	104	44	192
Crystal Geyser	374	Non-project	0	20	5	37	9	165
Dead Hawk	81	Non-project	0	3	1	9	2	28
Dirty Socks	176	Non-project	0	17	12	42	23	24
Dirty Socks Yd	10	Non-project	0	0	0	0	0	0
DIVOT	309	Non-project	0	0	1	25	4	0
Duck Ponds	302	Non-project	21	54	69	80	66	37
East Shore 1	238	Non-project	0	5	2	21	3	10
East Shore 2	97	Non-project	0	2	0	7	1	12
East Shore 3	252	Non-project	0	6	2	22	3	33
East Shore 4	594	Non-project	0	4	1	41	3	18
East Shore 5	324	Non-project	0	16	11	43	21	19
East Shore 6	210	Non-project	0	9	3	22	6	26
East Shore 7	489	Non-project	0	46	66	168	128	43
East Shore 8	198	Non-project	0	8	4	24	9	12
East Shore 9	82	Non-project	0	2	1	7	2	14

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
Horse Pasture	51	Non-project	0	4	3	8	5	21
Keeler Spring	83	Non-project	0	5	2	10	4	12
Lizardtail	740	Non-project	0	0	0	33	0	45
Lizardtail 2	395	Non-project	0	0	0	19	0	0
Managed Vegetation	2260	Project	0	75	32	192	60	1131
North Ash Creek	554	Non-project	0	5	0	28	1	16
Northwest Spring	712	Non-project	0	69	33	84	58	132
Phase 8	1290	Project	0	0	0	35	0	0
Playa 1	163	Non-project	0	0	0	4	0	2
Playa 10	140	Non-project	0	0	1	15	3	0
Playa 11	389	Non-project	0	0	0	24	1	0
Playa 12	157	Non-project	0	0	26	15	5	0
Playa 13	912	Non-project	0	0	0	22	0	0
Playa 14	269	Non-project	0	0	0	17	0	1
Playa 15	2245	Non-project	0	0	0	110	0	0
Playa 2	270	Non-project	0	0	0	14	0	26
Playa 3	201	Non-project	0	0	0	13	1	0
Playa 4	2286	Non-project	0	0	1	136	2	0
Playa 5	799	Non-project	0	0	6	81	19	0
Playa 6	418	Non-project	0	0	4	45	11	1
Playa 7	929	Non-project	0	0	0	34	0	0
Playa 8	262	Non-project	0	0	4	34	14	0
Playa 9	152	Non-project	0	0	0	4	0	0
PPG	605	Non-project	0	5	1	44	3	22
Sulfate Well	70	Non-project	0	7	24	47	47	6
Swansea	89	Non-project	0	6	3	12	5	9
Swedes Pasture	512	Non-project	0	68	59	161	107	93
T10-1	448	Project	162	0	135	198	175	0
T10-2N	197	Project	73	0	76	74	122	0
T10-2S	695	Project	336	0	229	184	336	0
T10-3	281	Project	66	0	47	135	86	0

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
T11	432	Project	31	0	64	52	54	0
T1-1	155	Project	24	0	74	38	115	0
T12-1	220	Project	0	0	0	5	0	0
T13-1	745	Project	377	0	216	217	370	3
T13-1 Addition	80	Project	0	0	1	12	3	0
T13-2	390	Project	390	0	130	57	192	0
T13-3	438	Project	124	0	61	70	84	0
T16	1056	Project	906	0	184	202	223	0
T17-1	529	Project	243	0	165	228	246	0
T17-2	598	Project	408	0	96	164	172	0
T18-0	339	Project	128	0	186	70	179	0
T18N	545	Project	476	0	216	152	285	0
T18N Addition	21	Project	0	0	11	4	10	0
T18S	1167	Project	909	0	622	622	844	0
T1A-1	249	Project	0	10	10	37	21	2
T1A-2	708	Project	484	0	174	194	272	1
T1A-3	503	Project	0	0	0	11	0	0
T1A-4	616	Project	0	0	0	7	0	0
T21	317	Project	192	0	104	102	123	1
T2-1	333	Project	180	0	86	104	145	0
T2-1 Addition	187	Project	56	0	90	66	131	0
T2-2	134	Project	43	0	30	33	44	0
T2-3	75	Project	6	0	13	16	23	0
T23-5	199	Project	73	0	44	75	57	1
T23NE	266	Project	17	0	110	63	124	0
T23NW	221	Project	70	0	127	41	110	0
T23SE	474	Project	112	0	112	206	193	1
T23SW	225	Project	161	0	128	32	139	0
T24	1087	Project	120	0	177	298	320	6
T2-4	181	Project	0	0	0	19	0	0
T24 Addition	42	Project	0	0	0	6	0	0

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
T2-5	66	Project	0	0	0	18	0	0
T25-3	167	Project	0	0	14	47	36	0
T25N	259	Project	239	0	140	71	141	1
T25S	820	Project	682	0	331	352	381	3
T26	852	Project	289	0	320	223	470	21
T27 Addition	50	Project	0	0	0	15	0	0
T27N	548	Project	32	0	136	200	259	37
T27S	545	Project	0	0	141	234	248	27
T28N	453	Project	0	101	156	88	250	46
T28S	300	Project	0	82	109	54	167	35
T29-1	220	Project	72	0	50	31	53	1
T29-2	480	Project	252	68	100	109	147	16
T29-3	258	Project	46	0	30	32	42	0
T29-4	163	Project	0	0	0	32	0	0
T30-1	693	Project	324	217	89	64	73	262
T30-2	316	Project	154	0	96	46	153	1
T30-3	172	Project	45	0	59	33	82	0
T32-1	115	Project	0	0	0	2	0	0
T35-1	79	Project	42	0	16	16	26	0
T35-2	85	Project	26	0	6	14	9	0
T36-1E	289	Project	98	94	101	54	157	9
T36-1W	357	Project	120	0	120	92	192	14
T36-2E	276	Project	135	0	99	47	112	1
T36-2W	393	Project	0	0	0	70	0	0
T36-3 Addition	20	Project	0	0	0	2	0	0
T36-3E	144	Project	0	0	0	34	0	0
T36-3W	83	Project	0	0	0	28	0	0
T37-1	137	Project	0	0	0	2	0	0
T37-2	378	Project	0	0	0	10	0	1
T3NE	150	Project	0	0	0	15	0	0
T3SE	314	Project	0	0	0	69	0	0

Area Name	Acres	Dust Control Project	Diving Waterbird Value-acres	Breeding Waterfowl Value-acres	Migrating Waterfowl Value-acres	Breeding Shorebird Value-acres	Migrating Shorebird Value-acres	Meadow Guild Value-acres
T3SE Addition	78	Project	0	0	0	23	0	0
T3SW	389	Project	0	0	0	46	0	0
T4-3	152	Project	0	0	21	47	57	0
T4-3 Addition	87	Project	0	0	6	26	16	0
T4-4	166	Project	36	0	51	25	68	0
T4-5	70	Project	6	0	8	13	9	0
T5-1	87	Project	0	16	30	28	49	4
T5-1 Addition	20	Project	0	0	0	2	0	0
T5-2	20	Project	0	4	6	9	8	0
T5-3	141	Project	0	21	42	56	67	2
T5-3 Addition	137	Project	87	0	9	35	14	7
T5-4	40	Project	0	0	21	6	4	0
T8W	133	Project	0	0	0	27	0	0
T9	293	Project	173	0	41	102	92	0
Trucksticker	146	Non-project	0	8	3	17	5	28
Tubman Springs	378	Non-project	0	45	27	78	50	61
Upland 1	241	Non-project	0	1	0	10	0	18
Upland 2	403	Non-project	0	0	0	18	0	2
Upland 3	1	Non-project	0	0	0	0	0	0
Upland 4	69	Non-project	0	0	0	5	0	4
Upland 5	166	Non-project	0	1	0	10	0	13
Upland 6	630	Non-project	0	3	1	44	2	27
US Borax	487	Non-project	0	0	0	15	0	0
VOS	57	Non-project	0	1	0	4	0	13
Wahoo	304	Non-project	0	7	1	16	2	28
Whiskey Springs	242	Non-project	0	9	4	27	7	25
Willow Dip	322	Non-project	0	44	18	54	32	131

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APPENDIX G INDEPENDENT SCIENCE REVIEW PANEL

DRAFT

The Independent Scientific Review Panel for the Owens Lake Habitat Suitability Models

Scientist	Affiliation
Gary Page, M.S.	Director, Wetland Ecology Division, PRBO Conservation Science
Don Sada, Ph.D.	Associate Research Professor, Division of Hydrologic Sciences, Desert Research Institute
Bart O'Brien, M.S.	Director of Special Projects, Rancho Santa Ana Botanic Garden

History of Review

February 22, 2011	Preliminary draft of the Master Plan was sent electronically to the Independent Scientific Review Panel for background, including the vision statement and goals of the Planning Committee.
March 15, 2011	The Independent Review Panel met with the Habitat Working Group for a tour of the current dust control project at Owens Lake. Met with the Habitat Working Group in Keeler, CA for an overview presentation on the Owens Lake Habitat Suitability Index Model.
April 20, 2011	The Independent Scientific Review Panel met with the Planning Committee to give an overview of their comments on the Habitat Suitability Index Model.
April 21, 2011	The Independent Scientific Review Panel met with the Habitat Working Group to present and discuss their comments on the Habitat Suitability Index Model and the approach to maintaining habitat. The panel also presented written comments individually, and these comment letters are attached to this appendix.

Comments on the Habitat Suitability Model in the Owens Lakebed Master Plan

Gary Page

15 April 2011

From reviewing the draft Owens Lakebed Master Plan and its Habitat Suitability Model, I am impressed by the efforts LDWP has taken to produce a scientifically-integrated plan for dust control management, water conservation, and wildlife habitat for Owens Lake. It is great that the baseline conditions for the habitat value acres for each guild will be based on conditions in 2010. I like the approach you have taken. Here are some suggestions and comments on the Habitat Suitability Model and Master Plan that I felt were worth your consideration.

I suggest that the Open Water Guild should include only (and all birds) that dive beneath the water to obtain their food and thus should include all diving ducks but exclude the Red-necked Phalarope. These are the birds that require the deepest water to feed in their traditional manner and my suggestion would be consistent with the fact that water depth is regarded the most important variable determining the accessibility of food for different waterbirds at Owens Lake. The Red-necked Phalarope should be included in the Shorebird Guild. If this suggestion were accepted the Waterfowl Guild would then be comprised mostly of dabbling ducks but could also include the American Coot which often associates with them.

I also suggest breaking out breeding shorebirds out into a fifth guild (Breeding Shorebirds) to capture more precisely the set of circumstances they require for successful reproduction.

For all guilds, I recommend that salinity Habitat Value Measurements and associated SIVs be based solely on invertebrate productivity information rather than being tweaking from limited observations of bird abundance on ponds of differing salinity. Thus salinities would be ranked the same for each guild of birds.

There was not much specific information in the Master Plan on how the value acres for each guild in the Habitat Suitability Model would be used to guide future habitat changes on the lakebed. Will there be prescribed guidelines for habitat conversions? For example, if a project ends up reducing the number of Open Water Suitability Value Acres can they be replaced by Meadow Guild Habitat Suitability Value Acres or can they only be offset by increasing the Open Water Suitability Value Acres elsewhere on the lakebed? Presenting more information in the Master Plan about how the Suitability Modeling output will be used to balance dust control management actions and wildlife habitat protection would be helpful.

Below are more specific comments on the Habitat Suitability Models for Species Guilds at Owens Lakebed.

<u>Open Water Guild</u>

It is unclear why there is an open water guild consisting of three species in different orders -- a diving duck, a grebe and a shorebird (Red-necked Phalarope). Instead, would not required water depths and taxonomy be better criteria for assembling all water bird guilds? Two of the species in the open water guild dive for food while the Red-necked Phalarope gleans its food from the water surface. The Wilsons Phalarope is not included in the open water guild even though it commonly forages with Red-necked Phalaropes on similar food resources, especially in spring. As an alternative, I suggest combining the grebe with all the diving ducks (including Ruddy Duck) to form a diving-bird guild. Then the diving bird guild would include species that forage on invertebrates captured below the water surface and require the deepest water of all the guilds. The Red-necked Phalarope would move to the Shorebird Guild. Deep water is not necessary for phalaropes as they can use the shallow waters preferred by other shorebirds and even wet mud (where Wilson's Phalaropes sometimes forage). As coots are fairly common at times, I would also include them in one of the guilds – probably in the waterfowl guild. I don't think my suggestion should change any Habitat Value Measurements of the Open Water Guild. It would just change the assemblage of waterbirds included in the guild.

Open Water Guild: Model Parameters

Water Depth

The 25-40 cm depth profile was ranked slightly higher than the >40 cm depths based on the assumption that a shallower water depth may be more productive for benthic invertebrates. The basis for this adjustment was a study of diving ducks in the prairie pothole region. This would not apply to phalaropes since they don't dive. Also, a diving bird would not need to dive all the way to the bottom if it derived some or all of its food from the water column as do Eared Grebes at Mono Lake (and therefore probably at Owens Lake). Simplifying your model so it does not penalize for water depths > 40 cm is worth considering to avoid a condition that may not apply to two of the three species in the guild. It would be more justified if you took my suggestion for a diving-bird guild which would include more species that feed on benthos.

Salinity

In the preamble reference is made to invertebrate productivity and biodiversity. Is productivity a synonym for invertebrate biomass? As a food for birds I assume invertebrate biomass would be the best measure of food availability.

The information you present (from Herbst 2001a & 2001b) suggest different categories for maximum invertebrate productivity than those used for modeling (Table 1, derived from Herbst (1997). For example, from Herbst (2001b) you say the maximum productivity of aquatic invertebrates occurs when specific conductivity is 15-20mS/cm but in Table 1 the highest Suitability Index Value is for a conductivity of 25-70mS/cm. You also indicate that Herbst (2001a) shows that salinities of 17.8-53.4 mS/cm promote the most productive habitat. This is more in line with, but still lower than, the peak SIV value of 25-70 mS/cm in Table 1. Taking Herbst (2001a & b) together would suggest maximum productivity in the range of 15-50 mS/cm.

Would it not be preferable to use the salinity/productivity information solely to categorize the Habitat Value Measurements instead of bird surveys from a single season; birds may not be distributed in direct proportion to habitat productivity as they also aggregate in response to predation risk and one season of bird surveys is probably insufficient to establish a strong correlation between invertebrate productivity and bird response at Owens Lake. If peak invertebrate productivity were the sole means of setting SIVs for salinity how much would it change the Habitat Value Measurement categories?

Waterfowl Guild

Water Depth: Dabbling ducks are emphasized over diving ducks for creating habitat value measurements for the waterfowl guild. With all the diving ducks pulled out of this guild as I have suggested, this is more justified than by including all diving ducks but Ruddy Ducks in the waterfowl guild. Water depths > 30 cm receive a very low habitat value measurement (0.01) whereas the highest values for the open water guild were > 25 cm for the one small diving duck (Ruddy Duck) contained within the open water guild. Because diving ducks are included within the waterfowl guild I suspect the 0.01 SIV for depths ≥ 30 cm is too low.

Water depths in the 13-30 cm range are ranked higher than depths below 13 cm because there are proportionally more large waterfowl than smaller ones on Owens lakebed. Even so, the larger waterfowl should be able to use the shallower depths as well as the deeper ones so it could be argued that shallower depths should receive a higher value than the deeper ones because the shallower depths accommodate both small and large species whereas the deeper depths only accommodate only the larger species.

Salinity: For examining this variable there is an emphasis on the spring season and a negative correlation between water salinity and waterfowl abundance and diversity. But many of the waterfowl in spring were likely potential breeders and the freshwater cell with the most birds also had the highest vegetative cover – a factor that also favored breeders. Had fall surveys been emphasized then brackish ponds may have shown the heaviest bird use because they are favored by the Northern Shoveler, the most common duck during fall. Then the salinity SIVs, for fresh and brackish water would be reversed since the shoveler is the predominant fall species and it demonstrates a preference for brackish water at Owens Lake. Such ambiguity would be eliminated if salinity gradients were ranked solely on their invertebrate productivity rather than on relative bird use observed on relatively few surveys.

Shorebird Guild

Guild Description: The Long-billed Curlew has been recording breeding at Owens Lake at least twice. I found a brood in the Ash Creek area a few years ago. I think you could describe it as breeding "at least rarely".

Salinity: I don't feel the limited observations of shorebird use of ponds differing in salinity on one survey (April 2009) are sufficient for ranking saline ponds as having the highest habitat value. As I suggested for the other guilds, it would be preferable to use the salinity/productivity information instead of the limited bird use information to select the highest SIV for the salinity range.

Seasonal Water Availability: Spring and fall receive the highest value because shorebirds are most abundant then. But water is critical to breeding shorebirds and the reproduction of shorebirds at Owens Lake could be viewed as having higher conservation value than the foraging of migratory shorebirds. The relative abundance of shorebirds differs greatly among species. The North American population sizes of the small sandpiper species using Owens Lake as a migratory staging area are much larger than the North American populations of American Avocets or Snowy Plovers. Therefore proportionally, Owens Lake may be more important to the North American breeding populations of American Avocets and Snowy Plovers than it is to migrant Western and Least sandpipers. Since the greatest need for water for breeding shorebirds is in summer, it could be argued that water availability should be given precedence for breeding shorebirds and therefore be a component of the SIR instead of the SIF. Conversely, would it not be preferable to make breeding shorebirds a fifth guild?

Islands: Islands are more important to nesting shorebirds, especially American Avocets, than migrating shorebirds. Migrant shorebirds can roost on the levees and roads surrounding the cells as they do around the salt ponds in San Francisco Bay. Shouldn't islands be part of SIR rather than SIF?

Dry Area: You mention that Watershed Resources staff noted that the drier parts of the cell often have the highest use by plovers. I would say this may apply to incubating birds but not necessarily to foraging adults or chicks; however, I agree that the amount of dry area in a cell should be an important SIR variable, especially for nesting plovers.

incorporated to achieve long-term success of this habitat enhancement program. Most of these are summarized in the Owens Lakebed Master Plan (Owens Lakebed Planning Committee 2011) and highlighted here:

- A monitoring plan should be designed and implemented to track change that will occur over time.
- An Adaptive Management Plan should be prepared and implemented to incorporate change into management, and describe how anticipated changes relate to long term goals of this project.

Sincerely,

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Citations

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Comments on the Draft Habitat Suitability Models for Species Guilds that occur on Owens Lakebed
Bart C. O'Brien, Director of Special Projects, Rancho Santa Ana Botanic Garden, Claremont, CA

Overall, the avian guild approach as described in the draft document is sound and is, in my opinion, a viable innovation for management of the avian resources of the project area. Although I am not an ornithologist, the avian guild system appears to be quite similar to using plant communities as the basis for planning and management. Planning around avian guilds provides the opportunity for a much more holistic view of the biological resources of Owens lakebed rather than an approach that chooses a single keystone species or an approach that specifically focuses on one or more state or federal listed rare and/or endangered species.

How will decisions be made with regard to the value of each of the recognized guilds? What is the relative weight given to each guild? It was mentioned at our meeting that the total value-acres would not decrease, but thus far there is no mention about how this will be accomplished.

The relationship of vegetation (structure, extent, richness, and composition) to water quality and increasing salinity over time should be addressed in the planning as this may greatly impact HSI values in the future.

Since one of the goals of the planning process is to reduce the amount of water applied to control dust, this goal apparently conflicts with the stated desire to maintain the current water-based avian guilds at their recent levels.

Riparian Woodlands
Establishment of riparian woodland taxa in appropriate areas within the project boundaries should be encouraged. Additional riparian woodland habitat should be encouraged or restored in appropriate upland habitat areas adjacent to the Owens lakebed project, as this habitat type is likely much more sustainable beyond the established boundary of the Owens lakebed project.

Endangered Species
While not addressed in these plans, I think that it would be a good idea to consider the possibility of federal or state listed species (bird, plant, fish, invertebrate, etc.) at the Owens lakebed in this planning process. A similar situation existed in the southern portion of the Salton Sea, where constructed "experimental ponds" were later found to house over a million endangered desert pupfish. When these ponds were eliminated in 2010, all of those fish were relocated to "nearby habitats and managed refugia."

Specific questions and comments about the Four Species Guilds follow:

Open Water Guild HSI Model

1. Question regarding the Water Depth HVMs: Why is the division between 0 to 10, and then 10 to 25? On page 13 the text states, "...species richness of diving waterbird[s] declined when average wetland depth was below 15 cm." Perhaps the demarcation in the HVM should be 0 to 15 and 15 to 25.
2. Some sort of vegetation parameter should be added to this model as plant material is directly or indirectly the basic food source for all animal life (vertebrate and invertebrate) at Owens lakebed.

Waterfowl Guild HSI Model

1. Vegetation Extent should be included in the SIF calculation (not just in the SIR calculation). On page 19 the text states that, "Increasing the amount of wetland and herbaceous-dominated vegetation on Owens lakebed will ... directly and indirectly increase food supply." This is a critical component of foraging success. Yes, this would mean that this factor would be more weighted overall, but that is the reality of this complex factor.
2. What is/are the criteria for differentiation between "Saltgrass dominated with isolated areas of additional herbaceous structure" and "Low growing, usually saltgrass dominant" in the Vegetation Structure parameter? These two categories appear to be very similar to one another and require explicit differentiation so that future evaluations are done in a consistent manner.
3. The tamarisk issue (and the larger issue of invasive exotic species). It is true, and correctly cited, that tamarisk and other exotic species may be used by some native bird species. However, it is widely accepted that invasive exotic species (and tamarisk is on everyone's list of invasive exotic plants) are the second most negatively impactful factor to the conservation and management of biodiversity and intact native ecosystems (behind outright habitat destruction). The model should go further in recognition of the overall negative impacts of these invasive exotic plants not just tamarisk. These plants (and animals) have the ability to adversely affect habitats and ecosystems beyond the Owens lakebed via seeds and other propagules – such that their presence in the Owens lakebed could act as an ongoing reservoir for ongoing infestations of pest plants into surrounding and downstream properties. Instead of this factor being stated as "Tamarisk presence" I would strongly advocate for "Presence of non-native plants" or other wording that would convey the same meaning. Additionally, tamarisk adversely affects the surrounding vegetation by raising the salinity of the surrounding soil as it sheds its salt laden foliage.
4. Question regarding Seasonal Water Availability: Why is "Fall" of greater importance than "Spring"? Text on page 18 states that "Migration periods of spring and fall receive the highest value..."

Shorebird Guild HSI Model

1. Question regarding Seasonal Water Availability: Why is "Fall" of greater importance than "Spring"? Since this is the "primary nesting guild," as stated on page 21, shouldn't spring be more important for this guild? Or perhaps spring and fall should be equal for this guild?
2. Also, since this is the "primary nesting guild" perhaps the SIR should be more highly weighted than the SIF?
3. Although it isn't stated for this guild, I would assume that Vegetation Extent should be more highly weighted for the same reasons listed in #1 of the Waterfowl Guild (above).
4. Question regarding the Dry Area HVMs: Why is the division at 3/4 mile, when the text on page 23 references 1/2 mile as the meaningful measurement for the Snowy Plover? The 3/4 mile demarcation does not have meaning for the project area either as the text states that there are no polygons that are greater than 3/4 mile from water.

Meadow Guild HSI Model

1. Conceptually, I have a problem with modeling for all terrestrial vertebrate species, but not taking any specific, or generic, invertebrates or plant communities into account. Especially when there are rare plant species referenced: *Sidalcea covillei* and *Plagiobothrys parishii*. There is no mention of presence or absence of rare invertebrates. Some plants (such as the rare taxa listed above) and/or some plant communities/assemblages/series should be specifically identified as targets for inclusion in the Meadow Guild model.

2. The tamarisk issue (see #3 of Waterfowl Guild above), but in this case, I would recommend that the presence of each exotic plant species in a polygon would be a -0.1, such that if there are 3 exotic plant taxa in a polygon it would amount to a -0.3.
3. Would it be appropriate to assign an SIV to the presence of native woody taxa, such as *Populus fremontii* and *Salix* spp.? If the presence of Tamarisk is a -0.3, there should be a positive benefit from the presence of the local riparian woodland taxa for their parallel ecosystem services even if these are very rare within the project area, and often do not survive due to salinity.

Other Management Considerations (section 2.6, page 31)
It is stated that a "Drydown in late spring is needed where feasible to grow plants and to retard cattail growth." The reasons why it is desirable to retard the growth of cattails (a native species) is not stated, and it should be.

Vegetation Richness (section 3.9, page 43)
With regard to the classification of Vegetation Richness and Vegetation Structure (section 3.9), the primary field survey period of 11 days between January 10, 2011 and February 3, 2011 is less than ideal. Annual and herbaceous perennial plants would be completely absent during this time period, and in such a windy area there is a high likelihood that the remains of these plants would not be present or identifiable to species. Deciduous species, such as willows (Salix spp.) and others would be difficult to identify to species. A much more thorough assessment of vegetation richness should be made over the course of the actual growing season for the plants in the project area. Ideally, such a survey of the vegetation would be conducted over the course of several years in the expectation that collections and observations can be made in both "good" and "bad" years for the local flora. Such a survey would have much more credibility, and may lead to the need to revise the Vegetation Richness numbers upward for many of the HVMs. Since knowledge of vegetation richness is fundamental baseline data, collection of this data is of critical concern. Were their duplicate vouchered collections made of each taxon/species? Were these specimens filed in more than one accredited herbaria or museums? If not, this should definitely be done as part of the necessary base line information.

References (section 5.0, page 54)
The following books should be added to your list of reference material:

Dedecker, Mary. 1984. Flora of the Northern Mojave Desert, California. California Native Plant Society, Sacramento, CA

Sawyer, John O., Todd Keeler-Wolf, and Julie Evens. 2010. A Manual of California Vegetation, second edition California Native Plant Society, Sacramento, CA

APPENDIX H BLM VISUAL RESOURCE CONTRAST RATING SYSTEM

BLM Manual 8431
Visual Resource Contrast Rating

available at http://www.blm.gov/nstc/VRM/8431.html

I. Introduction.

A. Overview. The contrast rating system is a systematic process used by the Bureau of Land Management (BLM) to analyze potential visual impact of proposed projects and activities. It is primarily intended to assist Bureau personnel who are not formally trained in the design arts to apply the basic principles of design in the resolution of visual impacts. It is not intended to be the only means of resolving these impacts. It should be used as a guide, tempered by common sense, to ensure that every attempt is made to minimize potential visual impacts. The basic philosophy underlying the system is: The degree to which a management activity affects the visual quality of a landscape depends on the visual contrast created between a project and the existing landscape. The contrast can be measured by comparing the project features with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the project. This assessment process provides a means for determining visual impacts and for identifying measures to mitigate these impacts.

II. Steps in the Contrast Rating Process.

A. Obtain Project Description. To effectively evaluate the visual impacts of a proposed project, a detailed project description is needed. Appendix 1 provides guidance on the type of information needed. The level of detail required in the description should be commensurate with the type of project proposed. This information is usually supplied by the project sponsor for BLM-initiated projects or by the applicant for non-Bureau of Land Management initiated projects.

B. Identify VRM Objectives. Use the RMP generated objectives when available. Where there are no RMP approved objectives, interim Visual Resource Management (VRM) classes will be developed using the guidelines in Handbook H-8410-1 except: (1) The inventory will be limited to the area affected by the project; and (2) the VRM classes will reflect the management decision made in existing RMP's. An RMP amendment is not required unless the project that is driving the evaluation requires an amendment.

C. Select Key Observation Points (KOP's). The contrast rating is done from the most critical viewpoints. This is usually along commonly traveled routes or at other likely observation points. Factors that should be considered in selecting KOP's are; angle of observation, number of

viewers, length of time the project is in view, relative project size, season of use, and light conditions (see Section IIID2b for a more detailed description of these factors). Linear projects such as powerlines should be rated from several viewpoints representing:

- Most critical viewpoints, e.g., views from communities, road crossings
- Typical views encountered in representative landscapes, if not covered by critical viewpoints.
- Any special project or landscape features such as skyline crossings, river crossings, substations, etc.

D. Prepare Visual Simulations. Visual simulations are an invaluable tool in effectively evaluating the impacts of a proposed project (see Illustration 1). Simulations are strongly recommended for potentially high impact projects. The level of sophistication should be commensurate with the quality of the visual resource and the severity of the anticipated impact. Simulations are extremely important to portray the relative scale and extent of a project. They also help public groups visualize and respond to development proposals, making public participation in the planning process more effective. The BLM publication Visual Simulation Techniques should be consulted for the appropriate simulation methods.

E. Complete the Contrast Rating. Complete contrast rating from key observation point(s) using Bureau Form 8400-4 - Visual Contrast Rating Worksheet (see Illustration 2).

III. Requirements for Completing the Contrast Rating Worksheet.

A. Project Information (Section A). Complete the background information requested. It is important to precisely record the location of the KOP. A sketch of the KOP/project location should be shown in the "location" block. If several different key observation points are used for the project evaluation, give each viewpoint a separate number for reference purposes.

B. Descriptions (Section B and C). To properly assess the contrasts between the proposed and existing situation, it is necessary to break each down into the basic features (i.,e., landform/water, vegetation, and structures) and basic elements (i.e., form, line, color, and texture) so that the specific features and elements that cause contrast can be accurately identified. When describing the project, be sure to include approved mitigating measures. Refer to Illustrations 3, 4, 5, and 6 for the suggested vocabulary for describing characteristic landscapes and the proposed projects.
C. Categorizing Projects Under Features (Sections B and C). It is sometimes difficult to determine which type feature a project fits under. Use the following as a guide to categorize projects:

Landform/Water Features	Vegetative Features	Structural Features
Roads	Timber Harvests	Transmission Lines
Mining	Grazing Systems	Generation Plants
Gravel Pits	Vegetative Manipulations	Oil and Gas Developments

Landfills

Water Impoundments

Recreation Facilities

Water Tanks

Microwave Stations

Buildings

D. Contrast Rating (Section D). The actual rating should be completed in the field from the KOP(s). It can be done as a team effort or individually, depending on the sensitivity and impacts of the project and the availability of personnel (see Manual Section 8431.12). If done as a team, it is best to do the ratings individually and then compare ratings. A simulation should be available to show scale, relative placement of disturbing features, and other important information necessary to complete an objective rating.

1. Selecting the Timeframe. Projects may be rated on either a short-term or long-term basis. Short-term is through the first 5 years and long-term is through the life of the project. If the project has significantly different short-term and long-term effects, two contrast ratings should be completed using two separate forms. Check the appropriate block under section D on the rating form to indicate the term of the rating.

2. Rating the Degree of Contrast (Section D1). Using the matrix provided in section D of the form, rate the degree of contrast. Be sure to include the proposed mitigating measures and standard stipulations in the rating. The rating is completed by determining the degree of contrast (i.e., strong, moderate, weak, or none) for each element. Use the following general criteria and factors when rating the degree of contrast:

a. Degree of Contrast Criteria.

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

b. Factors to be considered. Consider the following factors when applying the criteria (see also Illustrations 3, 4, 5, and 6):

(1) Distance. The contrast created by a project usually is less as viewing distance increases.

(2) Angle of Observation. The apparent size of a project is directly related to the angle between the viewer's line-of-sight and the slope upon which the project is to take place. As this angle nears 90 degrees (vertical and horizontal), the maximum area is viewable.

(3) Length of Time the Project Is In View. If the viewer has only a brief glimpse of the project, the contrast may not be of great concern. If, however, the project is subject to view for along period, as from an overlook, the contrast may be very significant.

(4) Relative Size or Scale. The contrast created by the project is directly related to its size and scale as compared to the surroundings in which it is place (see Illustration 7).

(5) Season of Use. Contrast ratings should consider the physical conditions that exist during the heaviest or most critical visitor use season, such as snow cover and tree defoliation during the winter, leaf color in the fall, and lush vegetation and flowering in the spring.

(6) Light Conditions. The amount of contrast can be substantially affected by the light conditions. The direction and angle of lighting can affect color intensity, reflection, shadow, from, texture, and many other visual aspects of the landscape. Light conditions during heavy periods must be a consideration in contrast ratings.

(7) Recovery Time. The amount of time required for successful revegetation should be considered. Few projects meet the VRM management objectives during construction activities. Recovery usually takes several years and goes through several phrases (e.g., bare ground to grasses, to shrubs, to trees, etc.). It may be necessary to conduct contrast ratings for each of the phases that extend over long time periods. Those conducting contrast rating should verify the probability and timing of vegetative recovery.

(8) Spatial Relationships. The spacial relationship within a landscape is a major factor in determining the degree of contrast (see Illustration 8).

(9) Atmospheric Conditions. The visibility of projects due to atmospheric conditions such as air pollution or natural haze should be considered.
(10) Motion. Movement such as waterfalls, vehicles, or plumes draw attention to a project.

c. General Guidance for Accessing Contrast.

(1) Form. Contrast in form results from changes in the shape and mass of landforms or structures. The degree of change depends on how dissimilar the introduced forms are to those continuing to exist in the landscape.

(2) Line. Contrasts in line results from changes in edge types and interruption or introduction of edges, bands, and silhouette lines. New lines may differ in their subelements (boldness, complexity, and orientation) from existing lines.

(3) Color. Changes in value and hue tend to create the greatest contrast. Other factors such as chroma, reflectivity, color temperature, also increase the contrast.

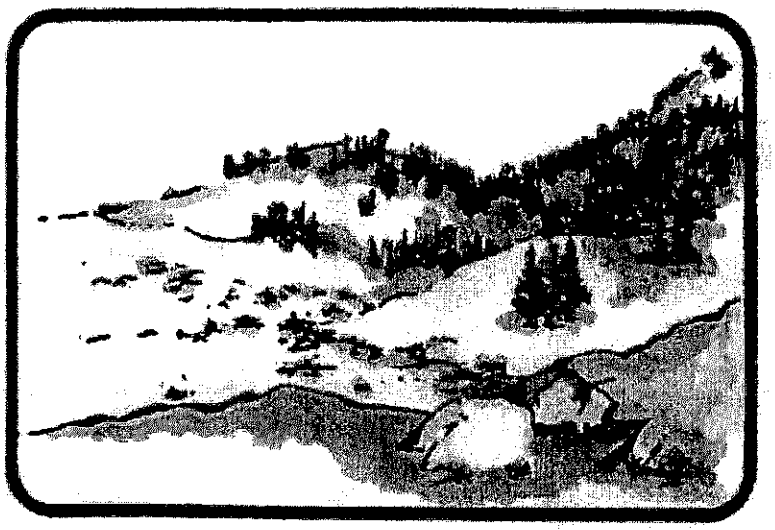
(4) Texture. Noticeable contrast in texture usually stems from differences in the grain, density, and internal contrast. Other factors such as irregularity and directional patterns of texture may affect the rating.

3. Determining Whether VRM Objectives are Met (Section D2). Compare the contrast ratings with the objectives for the approved VRM Class (see Appendix 2 for definitions of VRM classes). For comparative purposes, the four levels of contrast (i.e., none, weak, moderate, and strong) roughly correspond with classes I, II, III, and IV, respectively. This means that a "strong" contrast rating may be acceptable in a class IV area but probably would not meet the VRM objectives for a class III area. In making these comparisons, one must also look at the cumulative effect of all the contrast ratings. Certain combinations of ratings may indicate there is a stronger overall contrast that the individual ratings show. For example, several "moderate" ratings when viewed in combination may warrant an overall "strong" rating. This is a judgmental call that must be documented on the back side of the form. If the rater checks the "no" block on the form, indicating the VRM objectives are not met, the reasons for not meeting the objectives must also be documented on the back of the form.

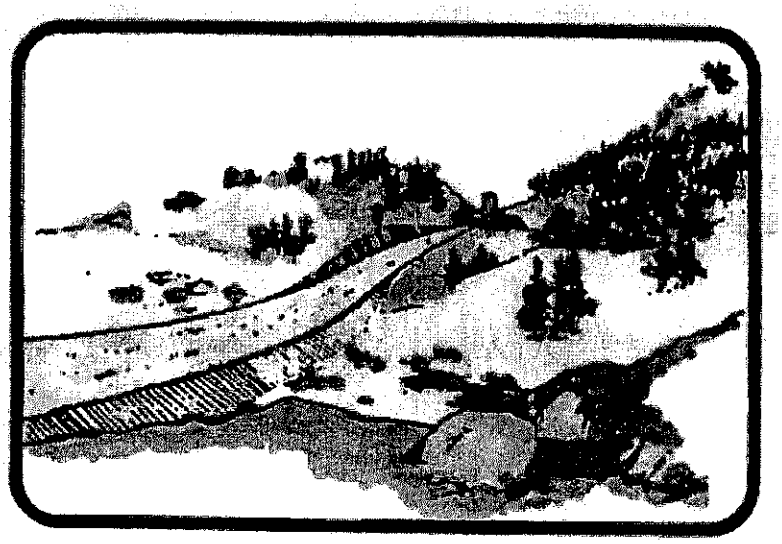
4. Developing Additional Mitigating Measures (Section D3). Since the overall VRM goal is to minimize visual impacts, mitigating measures should be prepared for all adverse contrasts that can be reduced. This includes reduction of contrast in projects which have met the VRM objectives. Mitigating measures should be written so they can easily be extracted and used as stipulations in leases, permits, contracts, etc. When preparing mitigating measures, keep in mind the concepts of strategic location (in less visible and less sensitive areas), minimizing disturbance, and repetition of the basic elements (form, line, color, and texture). Also make sure that mitigating measures are realistic (i.e., do not propose revegetation where the probability of success is very low). Other suggestions for reducing contrast are shown in Appendix 3. The publications listed in the bibliography of Manual Section 8400 also provide additional guidance on mitigating measures.

Illustration 1 - Example of Visual Simulation Technique

Existing site



Proposed project



Project modified

Form 8400-4
(September 1985)

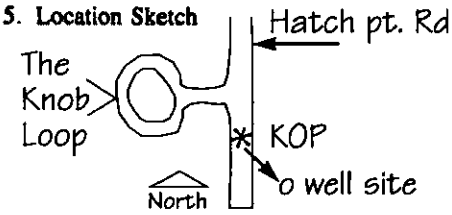
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date: Aug. 15, 1985
District: Moab
Resource Area: Grand
Activity (program): Oil & Gas

SECTION A. PROJECT INFORMATION

1. Project Name: Well Site #136
2. Key Observation Point: #15 on Hatch Pt. Rd.
3. VRM Class: Class II
4. Location
   Township: 27S
   Range: 21 E
   Section: 24
5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	flat to rolling terrain	simple forms created by vegetative patterns	—
LINE	horizontal & diagonal	weak & undulating	—
COLOR	dark tans to orange	light to dark green, mottled	—
TEXTURE	smooth	smooth to course	—

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	flat	geometric & linear forms created by clearings	cylindrical, geometric, & angular
LINE	horizontal (pad) curved (road)	strong irregular lines created by edge effect of clearings & roads	vertical, horizontal, & angular
COLOR	tan	light green	tan
TEXTURE	fine to smooth	patchy	course

SECTION D. CONTRAST RATING ☐ SHORT TERM ☐ LONG TERM

1. DEGREE OF CONTRAST

ELEMENTS	FEATURES: LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form			√				√				√	
Line		√				√					√	
Color			√				√				√	
Texture			√				√				√	

2. Does project design meet visual resource management objectives? ☐ Yes ☑ No (Explain on reverse side)
3. Additional mitigating measures recommended ☑ Yes ☐ No (Explain on reverse side)

Evaluator's Names: Bob Tumwater, Russ Grimes, Pete Jordan
Date: Aug. 15, 1985

SECTION D. (Continued)

Comments from item 2.

The strong line created by the clearing for the road and the drill pad creates a contrast that will attract attention.

Additional Mitigating Measures (See item 3)

1. Relocate access road off from ridge

2. Revegetate the edge of the drill pad with random clumps of trees and shrubs to break up the flat horizontal line.

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Illustration 3 - Description of the element FORM

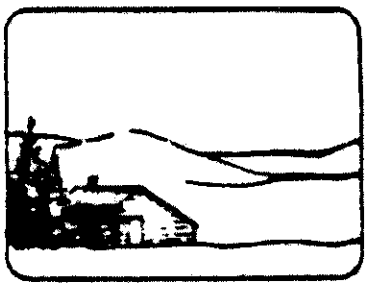
definition

The mass or shape of an object or of objects which appear unified.

types

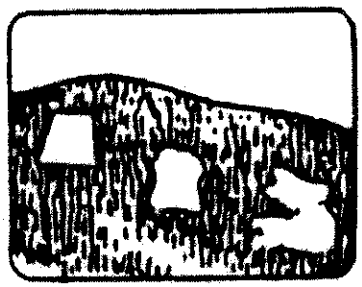
2-Dimensional Shape - the presence of an area or areas which contrast in color and/or texture from adjacent areas creating a two-dimensional shape in the landscape.

3-Dimensional Mass - the volume of a landform, natural object, or manmade structure in the landscape.

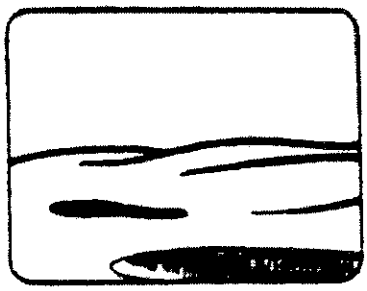


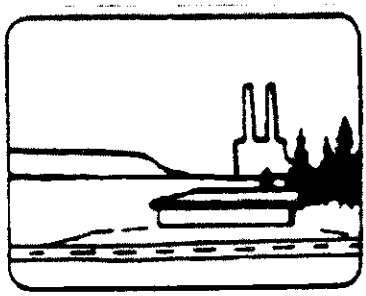
subelements

Geometry - the extent to which a form approaches a standard geometrical figure of two or three dimensions e.g., square, circle, triangle, cube, sphere, cone, etc.



Complexity - the degree of simplicity or intricacy of a form, Simpler forms tend to be regular, and complex forms to be irregular.





Orientation - the relationship of the form to the horizontal axis of the landscape (e.g., vertical, horizontal, diagonal, nondirectional), or to the points of the compass (e.g., north-south, ENE WSW).

suggested vocabulary

Bold/definite/indistinct
Prominent
Flat/rolling/rugged
Rounded/angular
Rough/smooth
Jagged/domed/flattened
Steep/moderate/gentle
Solid/transparent
Simple/complex
Amorphous/geometric
Regular/irregular
Narrow/wide
Long/short/tall
High/low

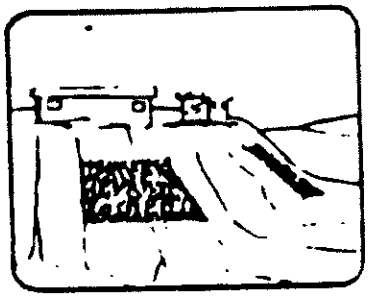
Diverse/numerous/few
Large/small
Convex/concave
Circular/oval
Square/rectangular/rhomboid
Triangular/trapezoid
Linear/parallel/curving
Conical/cylindrical/cubic
Pyramidal/spherical
Contrasting/compatible
Vertical/horizontal/diagonal
Nondirectional
Symmetrical/asymmetrical
Strip/block/patch

dominance

Forms that are bold solid or vertical tend to be dominant in the landscape

variable effects

Viewing Angle - the visual proportions of forms change with the direction and angle of viewing, due to perspective effects. Two-dimensional forms become foreshortened with lower observer positions and oblique viewing angles. Three-dimensional forms appear to diminish towards the horizon, especially with oblique viewing angles.



Lighting - frontlighting and backlighting tend to flattened three-dimensional forms. Backlighting may emphasize two-dimensional silhouettes. Sidelighting enhances three-dimensional effect.

Movement - the eye is attracted to movement in the landscape, e.g., such changing forms as waterfalls, steam from cooling towers, or smoke plumes

Illustration 4 - Description of the element LINE

definition

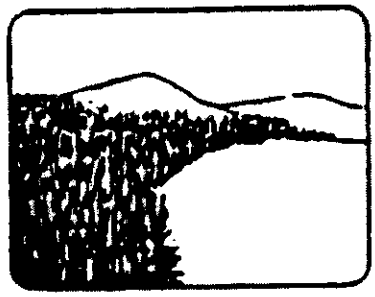
The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture or when objects are aligned in a one-dimensional sequence. Usually evident as the edge of shapes or masses in the landscape.

types

Edge

the boundary along which two contrasting areas are related and joined together - - the outline of a two-dimensional shape on the land surface.

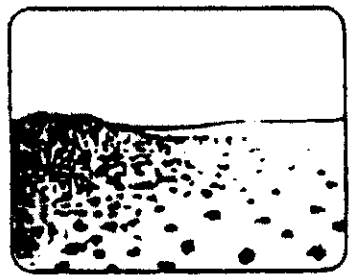
BUTT EDGE - the simple sharp edge between two contrasting areas.



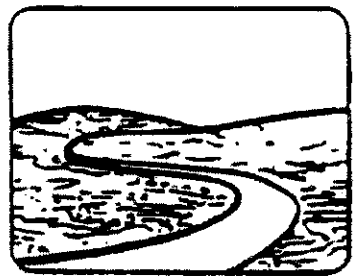
DIGITATE EDGE - the complex indented edge between two interlocking and contrasting areas.

TRANSITIONAL EDGE - the presence of one or more band(s) connecting two contrasting areas, forming a transitional stage between the two.

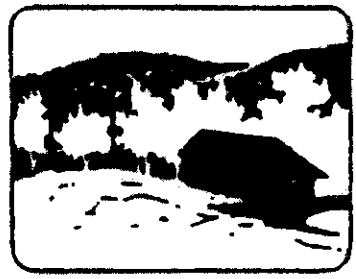
DIFFUSE EDGE - soft edge formed by a gradation between two contrasting areas.



Band - contrasting linear form with two roughly parallel edges dividing an area in two.

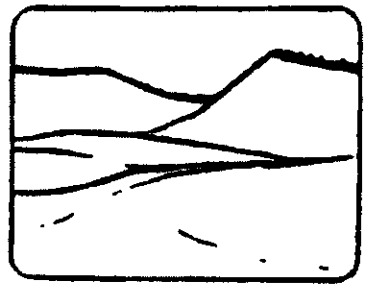


Silhouette-line - the outline of a mass seen against a backdrop. The skyline is the silhouette-line of the land against the sky.

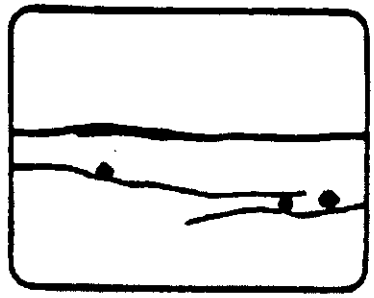


subelements

Boldness - the visual strength of a line. Smooth, long and sweeping lines are stronger than lines formed by the overlapping of numerous forms, e.g., treetops; edges between strongly contrasting colors, e.g., skylines are bolder than those between similar colors.



Complexity - the degree of simplicity or intricacy of a line, determined by the variety of directions it follows: skylines in ruffed terrain are more complex than on flat plains.



Orientation - the overall relationship of the line to the (horizontal) axis of the landscape or to compass bearings.

suggested vocabulary

Bold/weak	Concave/Convex
Complex/simple	Angular/subangular
Regular/irregular	Converging/diverging
Soft/hard	Jagged/rugged/smooth
Straight/curving	Parallel/perpendicular
Broken/continuous	Undulating/flowing
Diagonal/horizontal/vertical	Geometric/circular/semicircular

dominance

Bold vertical lines which interrupt the skyline tend to dominate weak horizontal lines.

variable effects

Distance - the strength of a line can decrease with distance due to atmospheric haze.

Atmospheric Conditions - clouds, fog, haze, snow can obliterate skylines.

Lighting - frontlighting flattens form and reduces line strength. Often only the skyline remains evident (e.g., mountain ranges). Sidelighting accentuates the silhouette-lines of separate forms. Backlighting blends together forms of equal distance into one outline. In mountain ranges, the ridgelines delineate overlapping flat silhouettes.

Illustration 5 - Description of the element COLOR

definition

The property of reflecting light of a particular intensity and wavelength (or mixture of wavelengths) to which the eye is sensitive. It is the major visual property of surfaces.

subelements

Hue - the aspect of color which we know by particular names, e.g., red, blue, orange, and which forms the visible spectrum. A given hue or color tint is caused by a particular wavelength.

Value - the degree of lightness or darkness, caused by the intensity of light being reflected, ranging from black to white.

Chroma - the degree of color saturation or brilliance, determined by the mixture of light rays. It is the degree of grayness in a color, ranging from pure (high chroma) to dull (low chroma).

suggested vocabulary

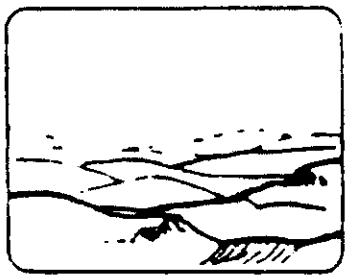
- Hues - red, yellow, brown, olive gray, reddish brown, etc. (See Munsell color books for precise terms.)
- Primary colors - red, blue, yellow
- Secondary colors - green, orange, violet
- Tertiary colors - mixtures of secondary colors.
- Value - dark to light
- Chroma - brilliant, pure, saturated, dull, grayish.
- Color temperature - warm to cold, temperature is caused by hue.
    - Red, yellow, brown, and orange are considered warm and sunny.
    - Blues and green are cool and shady.
- Vivid color - usually primary or secondary colors, with high chroma.
- Subtle color - colors or mixtures which are delicate, usually tertiary or low chroma colors.
- Luminous color - emitting its own light.
- Glare - reflection of high intensity light (very high value).
- Pastel color - delicate "soft" color of high value but low chroma.
- Monotone - the sameness or uniformity of color.
- Color harmony - the assortment of combinations of colors which readily and pleasantly blend with each other.

dominance

With other things equal, light, warm, bright colors in a scene will "advance" and tend to dominate dark, cool, dull colors which "retreat." Dark next to light tends to attract the eye and become a visual focal point.

variable effects

Distance - atmospheric perspective, due to scattering of light by dust particles, makes colors become paler, lower in chroma, and bluer as viewing distance increases. High value colors tend to remain most recognizable over great distances.



Atmospheric Conditions - haze, fog, dust, rain, etc., may cause atmospheric perspective to become extreme, even over short viewing distances. Compared with sunshine, clouds reduce value and chroma.

Lighting Direction - objects which are frontlighted (i.e., illuminated from the front, behind the observer) appear paler and brighter than those which are backlit (i.e., illuminated from behind).

Time of Day - illuminated surfaces tend to become paler during midday sun and to become darker and redder early and late.

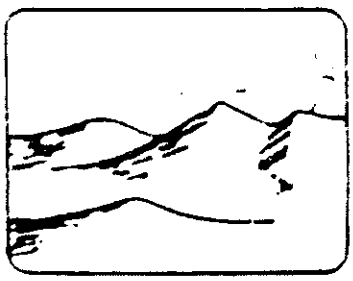


Illustration 6 - Description of the element TEXTURE

definition

The aggregation of small forms or color mixtures into a continuous surface pattern; the aggregated parts are enough that they do not appear as discrete objects in the composition of the scene.

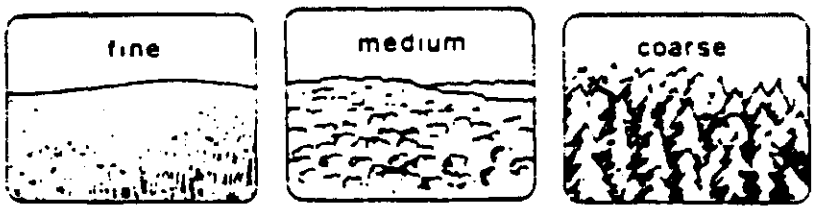
type

Color Mixture (motting) - intrinsic surface color contrasts of very small scale in relation to the perceived may be due to hue, chroma, or value, alone or in combination.

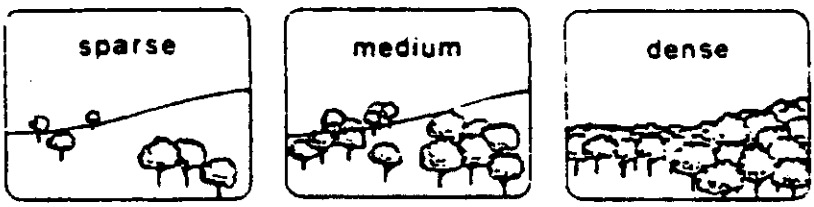
Light and Shade - the color contrast particularly in value, created by differences in lighting on a varied surface or repeated forms. It consists of the repetition of a lit side, shaded side, and the shadow cast.

subelements

Grain - the relative dimensions of the surface variations, ranging from large (coarse texture, e.g., coniferous forest) to small (fine texture, e.g., grassland).

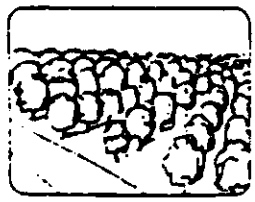


Density - the spacing of surface variations creating the texture



Regularity - the degree of uniform recurrence and symmetrical arrangement of the surface variation. Based on density distribution (uniform vs. variable) and spatial arrangement (ordered vs. random).

uneven/random



even/ordered

Desert Research Institute

April 19, 2011

Mr. Brian Tillemans
City of Los Angeles Department of Water and Power
300 Mandich Street
Bishop, CA 93514

Re. Habitat Suitability Models for Species Guilds that Occur on Owens Lakebed

Dear Mr. Tillemens;

Thank you for the opportunity to review plans by the City of Los Angeles (LADWP) to incorporate wildlife habitat suitability (HSI) models into the Owens Lakebed Dust Control Program.

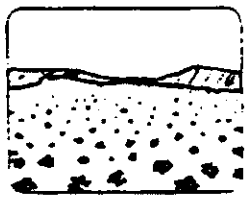
Owens Lakebed is the historical terminus of the Owens River and covers approximately 110 mi^2 in southern Inyo County, California. It is currently a playa and a remnant of Owens Lake that covered the lakebed and dried when water was diverted from the Owens River during the early 1900s. Disappearance of the lake exposed ancient lake sediments that become airborne dust during wind events, and a hazard to human health. Diminishing the frequency, magnitude, and duration of fugitive dust events has been a challenge, and innovative methods have been developed to resolve the problem by reducing dust emission from approximately 40 mi^2 of the most problematic playa. Flooding, gravel, and vegetation management are currently employed measures to control dust emission.

Some of these measures may also increase wildlife habitat where none previously existed on the playa, and LADWP is interested in using HSI models to determine the value of these created habitats for bird species that comprise open water, waterfowl, shorebird, and meadow guilds (an assemblage of species that occupy similar habitats) that occur on the lakebed. Habitat suitability models are based on the concept that ecological niches are related to a suite of environmental variables that influence fitness and population health of individual species or of species in a guild, or assemblage of species with similar life history characteristics. Hence, each species or guild occupies habitat(s) that can be defined by their environment. These models have been created for a number of species using qualitative data that rely on professional judgment (e.g., Kilog et al. 2002) and empirical models that are based on quantified data (e.g., Prosser and

Brooks 1998). They are used in landscape studies to assess the potential distribution of species in a region, and more focused work where programs improve or restore habitat for target species or assemblages. They can also be used to assess the quality of an environment or habitat for assemblages or individual species. Habitat suitability models are criticized by some because they lack rigor to quantify the relationship between habitat quality and population health or fitness, they do not consider effects biological interactions on population fitness, they weakly consider the temporal influence of changing environments and assemblages relative to ecological succession, and they cannot consider real-life response of organisms to a complex of interdependent factors (Stauffer 2002, Seoane et al. 2005, Tirpak et al. 2008).

Owens Lakebed dust control and creation of wildlife habitat is being accomplished by construction of a highly managed array of pipes, canals, pumps, and roads to deliver water and manage and maintain facilities (Owens Lakebed Planning Committee 2011). This work is not intended to 'restore' Owens Lake to historical conditions, but it is designed to construct selected habitats that may have been historically associated with the lake. This project has been under construction for most of a decade, wildlife habitat has been created over large portions of the lakebed, and environmental characteristics (e.g., water seasonality, depth, and salinity, vegetation cover, structure, and richness, and topographic structure, etc.) have been quantified in most areas. It is the intent of LADWP to use this environmental data to assess the value of wildlife habitat that is being created for open water, waterfowl, shorebird, and meadow bird guilds using HSI models. Models used for this project were primarily derived from literature reviews and expert opinions, and separate models are proposed for each avian guild and habitat type. These HSI models assign values from 0 to 1 to each environmental parameter that describes elements of every habitat polygon and calculates a value that is derived from factors created by pooling data. For instance, the waterfowl guild HSI is calculated using values for foraging and reproduction that are calculated by pooling data for water depth, salinity, islands and seasonal water availability (for foraging) and vegetation extent and vegetation structure (for reproduction). Pooling data in this manner is intended to assess habitat quality in context of different life stages of each assemblage.

Although the utility of HSI models is limited in number of ways, it is a valid method to use on Owens Lakebed because most of the target guilds include widespread species with relatively cosmopolitan habitat requirements, they will be used to assess efficacy of a highly managed dust control program to provide wildlife habitat, and their efficacy can be continually assessed through biotic and environmental surveys. There are several considerations that should be



even/random

gradation

Internal Contrast - the degree of contrast in colors or values creating the texture

suggested vocabulary

Coarse/medium/fine	Glossy/matte
Smooth/rough	Striated
Uniform/patchy/gradational	Scattered
Directional/nondirectional	Dotted
Discontinuous/continuous	Clumped
Random/ordered	Striped
Contrasty/subtle	Stippled
Dense/sparse	Granular

dominance

Coarse and contrasty textures tend to dominate fine-grained textures of low internal contrast.

variable effects

Distance - internal contrast and the apparent grain of the texture is lessened with distance - - coarse textures of coniferous forest may remain visible at up to 8-10 miles, while fine textures of grassland may disappear within 1/4 mile of the observer.

Atmospheric Conditions - haze, cloud, dust, etc., reduce the distance at which textures disappear and lose internal contrast.

Illumination - light and shade textures are most obvious in side-lighting and when light intensity is strong, casting distinct dark shadows. Strong side-lighting increases distance-range within which textures remain visible

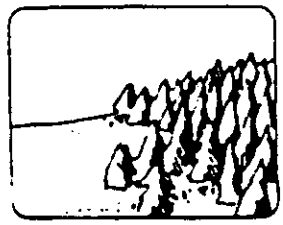


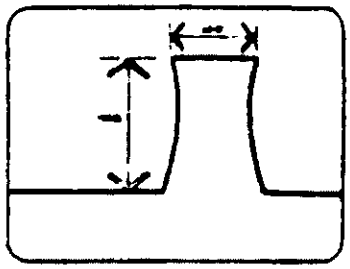
Illustration 7 - Description of the element SCALE

definition

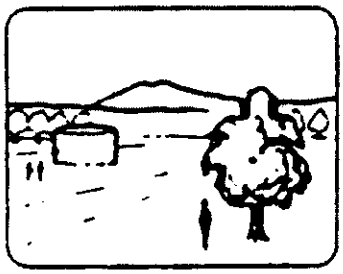
The proportionate size relationship between an object and the surroundings in which it is placed

types

Absolute Scale - the absolute size of an object obtained by relating the size of the object to a definitely designated standard, (i.e., measurements).



Relative Scale - the relative size of objects, the apparent size relationship between landscape components and their surroundings.



subelements

Proportion of landscape setting (scale dominance) - the scale of an object relative to the visible expanse of the landscape which forms its setting.

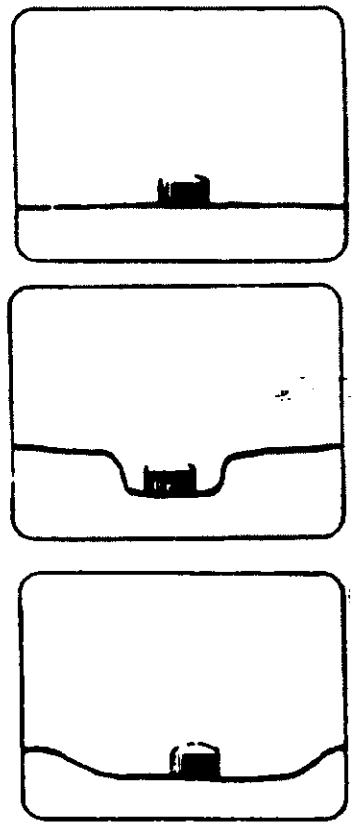
Scale contrast - the scale of an object relative to other distance objects or areas in the landscape

Proportion of field-of-view - the scale of an object relative to the total field-of-view accepted by the human eye or camera.

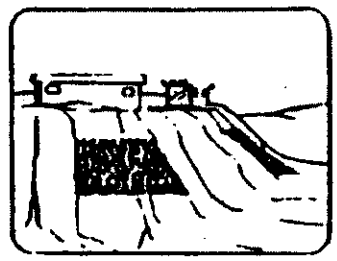
variable effects

Distance - the apparent size of an object decreases with distance from the observer.

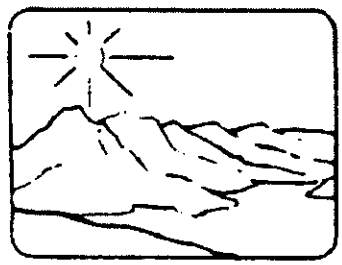
Spatial Enclosure - the size of the enclosing space inversely affects an object's relative scale - - small spaces make objects appear larger.



Viewing Angle - the apparent scale of an object in the landscape is affected by the observer's angle of view in two ways:
(1) perspective foreshortening reduces the apparent size of surfaces of areas or objects, when seen obliquely or at low viewing angles.
(2) by increasing an object's elevation in relation to the observer's position, the objects's relative scale tends to increase.



Atmospheric Conditions - increased haziness may increase the apparent scale of the landscape's space by obscuring its boundaries.



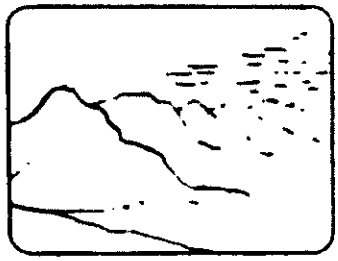


Illustration 8 - Description of the element SPACE

definition

The spatial qualities of a landscape are determined by the three-dimensional arrangement of objects and voids.

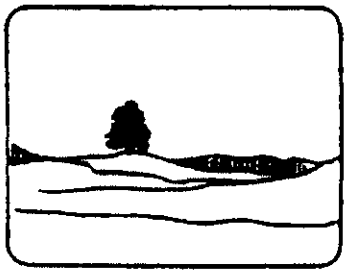
subelements

Landscape Composition - the arrangement of objects and voids in the landscape can be categorized by their spatial composition:

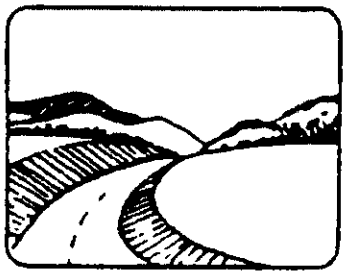
PANORAMIC - a broad horizontal composition, with no apparent limits to the view. Includes plains, expanses of water, and distant mountain ranges. Sky and foreground elements may occupy much of the scene.

ENCLOSED - the space is bounded by an enclosing facade of cliffs, slopes, or forest edge, creating "wall" and "floor" elements.

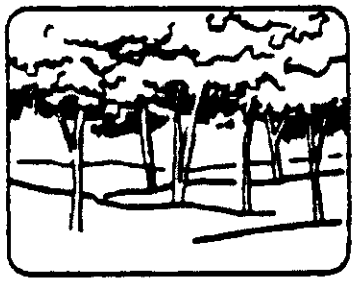
FEATURE - a composition dominated by a distance object or cluster of objects such as a waterfall, prominent landform, or tree.



FOCAL - converging lines in the landscape or progressions of aligned objects lead the eye to a focal area in the scene.

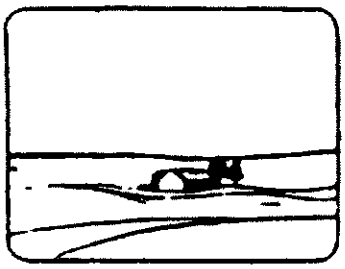


CANOPIED - the scene within or at the edge of a forest, where branches and foliage above eyelevel create a canopy or "ceiling."



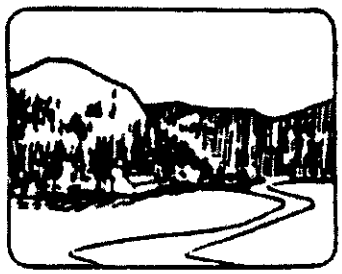
Some compositions, especially those which are distinctly focal, enclosed, or feature-oriented, are more vulnerable to modifications than others, depending upon how strongly the spatial configuration draws the eye to certain locations.

Spatial Position - the elevation and location of objects in the landscape relative to topography affect their prominence: high and exposed positions are more prominent than low obscured positions.



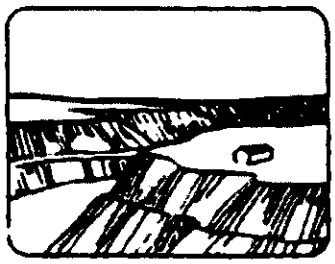
plain

valley floor

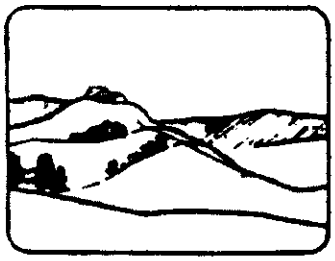


slope-toe

side-slope



plateau/bench

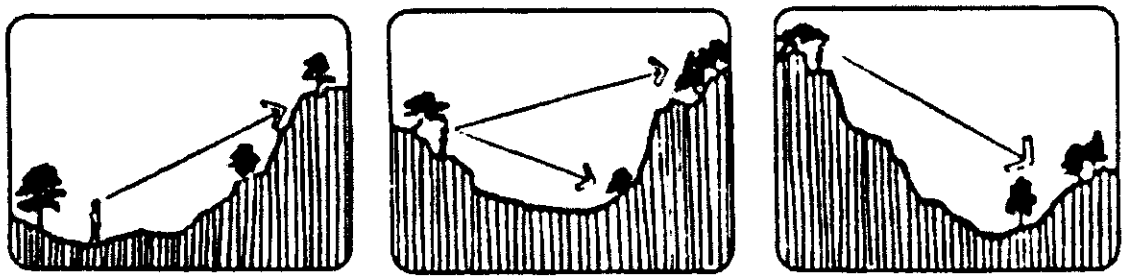


ridge-top

Backdrop - the backdrop against which an object is seen affects its visual contrast. Modifications seen against the sky or water are usually more prominent than against a land backdrop.

variable effects

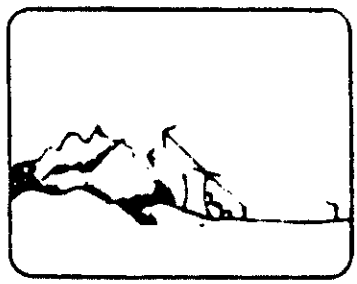
Observer Position - the position of the observer relative to the landscape may be described as:



inferior (below) normal superior (above)

A change in position can affect the observer's perceptions of degree of enclosure on an object's degree of spatial dominance. Inferior positions may increase both apparent degree of enclosure and spatial dominance.

Distance - the observer's proximity to elements will affect perception of their spatial importance. Longer viewing distances tend to reduce the impression of spacial enclosure and dominance.



Manual 8431 - Visual Resource Contrast Rating

Appendix 1 - Project Description Guidelines

Project proposals, whether site-specific, corridor, or large-scale, must be described using plans, sketches, simulations, or narratives in sufficient detail so that the expected changes in the landscape features (landform/water, vegetation, and structu4es) can be visualized. If a proposal does not contain sufficient detailed information, it must ve obtained or the assumptions clearly documented. Use the following checklist as a guide when identifying the information needed for each proposal:

1. General
    a. Type of project.
    b. Specific location(s).
    c. Proposed methods of operation form preplanning and design through project completion.
    d. Size and magnitude.
    e. Time period of operation, including specific phasing and discrete operation.
    f. Specific committed standard operational procedures of proposal.
    g. Projected ultimate land use and adjacent land use..
2. Specific.
    a. Feature: Landform and Water.
        1. Exact location of undertaking, and depth of excavation and fill (horizontal, vertical, and slope).
        2. Color of the exposed soils, subsoils, bedrock, overburden, or fill material when major excavations or fills are anticipated.
        3. Anticipated water coloration where reservoir, tailing areas, etc., are planned.
        4. Timing and duration of exposed excavation or fill.
        5. Methods of operation, how long each phase of the operation will last.
        6. Reshaping after use, including final landform appearance (grades, slopes, drainage patterns).
        7. Anticipated ultimate use.
    b. Feature: Vegetation.
        1. Exact location and method of vegetative manipulation (extent of clearing and modification).
        2. Size and magnitude of change.
        3. Type, location, method, quantity, and timing of replacing and/or receding.
    c. Feature: Structures.
        1. Exact locations where structures are to be placed withing the project areas.
        2. Design of structures.
            a. Size and type.
            b. Form.
            c. Texture(s) and color(s) of exterior material and construction method to be used).

3. Life expectancy.
4. Operations and maintenance (schedule and methods).

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Manual 8431 - Visual Resource Contrast Rating

Appendix 2 - VRM Class Objectives

Class I Objective. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II Objective. The objective to this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III Objective. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should bot dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV Objectives. The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

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Appendix 3 - A Sample List of Design Techniques for Mitigating Visual Impacts

A. LANDFORM/WATER BODY.

1. Reduce Size of Cut and Fill Slopes. Consider:
   a. relocating to an area with less slope.
   b. changing road width, grade, etc.
   c. changing alignment to follow existing grades.
   d. prohibiting dumping of excess material on downhill slopes.
2. Reduce Earthwork Contrasts. Consider:
   a. rounding and/or warping slopes.
   b. retaining rocks, trees, drainage, etc.
   c. toning down freshly broken rock faces with asphalt emulsion spray or with gray point.
   d. (dding mulch, hydromulch, or topsoil.
   e. shaping cuts and fills to appear as natural forms.
   f. cutting rock areas so forms are irregular.
   g. designing to take advantage of natural screens (i.e., vegetation, land forms).
   h. grass seeding of cuts and fills.
3. Maintain the Integrity of Topographic Units. Consider:
   a. locating projects away from prominent topographic features.
   b. designing projects to blend with topographic forms in shape and placement.

B. VEGETATION.

1. Retain Existing Vegetation. Consider:
   a. using retaining walls on fill slopes.
   b. reducing surface disturbance.
   c. protecting roots from damage during excavations.
2. Enhance Revegetation. Consider:
   a. mulching cleared areas.
   b. controlling planting times.
   c. furrowing slopes.
   d. planting holes on cut/fill slopes.
   e. choosing native plant species.
   f. stockpiling and reusing topsoil.
   g. fertilizing, mulching, and watering vegetation.
3. Minimize Impact on Existing Vegetation. Consider:
   a. partial cut instead of clear cut.
   b. using irregular clearing shapes.

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

For Clerk's Use Only:
AGENDA NUMBER
16

☐ Consent ☒ Departmental ☐ Correspondence Action ☐ Public Hearing

☐ Scheduled Time for ☐ Closed Session ☐ Informational

FROM: **Water Department**

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Integrated Regional Water Management Plan: Regional Water Management January 25 meeting

DEPARTMENTAL RECOMMENDATION:

The Water Department requests your Board receive an update on IRWMP activities and provide direction concerning the January 25, 2012 Regional Water Management Group meeting for the Inyo-Mono Integrated Regional Water Management Plan (IRWMP).

SUMMARY DISCUSSION:

The Inyo-Mono Regional Water Management Group (RWMG) is meeting January 25 at the Bishop Paiute Tribe Community Center to consider rankings of proposals from the RWMG members to submit to California Department of Water Resources under the Proposition 84 Round 2 Planning Grant Proposal Solicitation Package.

The following proposals have been submitted to the RWMG for inclusion in the Inyo-Mono IRWMP (project proponent in parentheses):

1. **Continued Program Office Support Inyo-Mono Program Office** (California Trout). The Inyo-Mono IRWM Program Office has been overseeing the day-to-day operations of the Inyo-Mono RWMG for almost four years. This funding request is to continue the regular operations of the Program Office, further enhance the Inyo-Mono IRWM planning process, and develop a long-term plan for supporting and sustaining the activities of the RWMG into the future.

2. **Inyo/Mono Watersheds Invasive Plant Inventory Project** (Inyo/Mono Agricultural Commissioner's Office). The goal of this project is to complete a survey of selected invasive weeds of regional importance, using existing data, interagency cooperation, and field surveys. This project will create accurate, comprehensive, and accessible data for multiple future uses. As a member in the Eastern Sierra Weed Management Area Group and the current database administrator, the Inyo/Mono Counties Agriculture Department can acquire and compile data from these various sources. The Agricultural Commissioner's office can then disseminate this data to agencies or individuals, allowing future planning efforts and project proponents to assess potential invasive plant consequences to mitigate the effects of these species on project success.

3. **Oak Creek Channel Stabilization Technical Study** (USFS/Fort Independence Tribe). This planning effort would be conducted within the Oak Creek watershed analyzing resources and impacts to water quality and flood management at a watershed scale. The

project proponents propose to collect and analyze relevant geomorphologic, hydrologic, biologic, and climatic data to determine feasibility of restoration techniques to address on-site impacts to National Forest resources and downstream turbidity and increased peak flows adversely impacting values at risk.

4. **Town of Mammoth Lakes Stormwater Master Plan Development** (Town of Mammoth Lakes). This project will developing standards that require development projects to infiltrate portions of stormwater to enhance water quality and groundwater by capturing and managing runoff, and develop standards to improve the quality of urban runoff and stormwater, by developing standards and projects that will reduce erosion and sedimentation, by developing standards to protect public and aquatic ecosystem health while supporting appropriate recreational activities.

5. **West Walker River Restoration Plan** (California Trout). The goal of this project is to develop a restoration plan via the completion of an assessment of the riverine and riparian conditions associated with approximately three miles of the West Walker River located within the Antelope Valley-designated as an economically disadvantaged community.

6. **Water Master Plans for Independence, Lone Pine and Laws** (Inyo County Public Works). The project will create planning documents to be included in the Inyo Mono IRWM Plan and website as an excel spreadsheet or database of water main size, material, age, soil characteristics, acidity, etc. conforming to the American Water Works Association Research Foundation's project # 4195 which is an adaptation of the United Kingdom Water Industry Research database. Further, the spreadsheet will be offered up for inclusion on the Inyo Mono website to make it available to the general public worldwide.

7. **Sewer Master Plan for CSA-2, Aspendell** (Inyo County Public Works/USFS). The CSA-2 (County Service Area number 2) sewer collection system and the USFS Bishop Creek sewage treatment plant are in dire need of renovation because of continued seepage, reoccurring blockages, infiltration inflow and an aging sewer plant and ponds. These conditions have created a situation where costs for system maintenance, operations and effluent treatment are high and also create a potential for significant environmental impacts. The collection system has not been evaluated since the late 1970's and no accurate plans for the collection system exist. The proposed master plan evaluation would consist of survey mapping and measure the entire system as well as preforming a video inspection of the existing main lines to document the existing conditions and problem areas in the sewer mains and the treatment plant. Following the map and measure portion of the evaluation, plan and profile drawings would be created and these drawings would be used to develop recommendations for the rehabilitation of the sewer system and plant.

Summaries of these proposals are attached. By the time of the January 17 Board meeting, the RWMG should have ranked these proposals for submittal to the California Department of Water Resources; however, the rankings are not available at the time of the preparation of this agenda request. Criteria for ranking the proposals (attached) were developed by a RWMG working group.

The Water Department requests your Board consider rankings produced by the RWMG members and provide direction to staff.

ALTERNATIVES:

OTHER AGENCY INVOLVEMENT:

Numerous MOU signatories.

FINANCING:

No impact.

APPROVALS	
COUNTY COUNSEL: N/A	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the board clerk.)* Approved: _____ Date_____
AUDITOR/CONTROLLER: N/A	ACCOUNTING/FINANCE AND RELATED ITEMS (*Must be reviewed and approved by the auditor-controller prior to submission to the board clerk.)* Approved:_____ Date_____
PERSONNEL DIRECTOR: N/A	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.) Approved:_____ Date_____

DEPARTMENT HEAD SIGNATURE: Robert Hanning Date: 1/6/12
(Not to be signed until all approvals are received)
(The Original plus 20 copies of this document are required)

DEPARTMENT OF PUBLIC WORKS

168 NORTH EDWARDS STREET - P.O. DRAWER Q
INDEPENDENCE, CA 93526
PHONE: (760) 878-0201 FAX: (760) 878-2001

COUNTY OF **INYO**

Doug Wilson, Interim Director
Jeff Ahlstrom, Interim Deputy Director

Inyo-Mono IRWMP Round 2 Planning Grant Project Proposal

Name of project: **BISHOP CREEK SEWER SYSTEM MASTER PLAN**

Project proponent: **INYO COUNTY, DEPARTMENT OF PUBLIC WORKS / US FOREST SERVICE**

Contact persons: **Doug Wilson, Interim Director of Public Works, Olin Beale, Forest Engineer**

Phone: **760-878-0201 (Doug Wilson)** **760-873-2487(Olin Beale)**

E-mail: **dwilson@inyocounty.us** **obeall@fs.fed.us**

Submitted: **December 22, 2011**

Project Proposal

The CSA-2 (County Service Area number 2) sewer collection system and the USFS Bishop Creek sewage treatment plant are in dire need of renovation because of continued seepage, reoccurring blockages, infiltration inflow and an aging sewer plant and ponds. These conditions have created a situation where costs for system maintenance, operations and effluent treatment are high and also create a potential for significant environmental impacts.

The collection system has not been evaluated since the late 1970's and no accurate plans for the collection system exist. The proposed master plan evaluation would consist of survey mapping and measure the entire system as well as preforming a video inspection of the existing main lines to document the existing conditions and problem areas in the sewer mains and the treatment plant. Following the map and measure portion of the evaluation, plan and profile drawings would be created and these drawings would be used to develop recommendations for the rehabilitation of the sewer system and plant.

A consulting engineering firm specializing in sewer system evaluations will be selected to make recommendations for treatment plant options and equipment upgrades/replacements at the plant; collection and conveyance system upgrades, replacements or repairs and a rates analysis.

The preliminary engineering report and master plan prepared as part of the proposed evaluation is often required for application for State and Federal Grant and Loan Programs. A rough estimate of the cost for completion of the evaluation and preparation of the master plan is in the range of $75,000. The proposed budget is included as **Attachment A**. The collection system is a community owned and County operated system and is located in Aspendell, east of Bishop, CA.

The treatment facilities are owned and operated by the US Forest Service. The treatment plant was installed in 1973 to treat effluent generated from the USFS operated campgrounds and was later connected to the CSA-2 collection system. The evaluation and master plan proposed here will also include of the Forest Service portion of the system. The USFS has indicated that they will partner in the application for future grant funds. CSA-2 provides proportionate payment to the Forest Service for the effluent treated in the Forest Service plant.

Round 2 Planning Grant Project Evaluation Criteria discussion

The Proposed project will meet the evaluation criteria by the ability of the County and Forest Service to provide the 25% grant match. The CSA-2 Board has in the past gone on record that they will support a recommendation to the Inyo County Board of Supervisors to provide matching funds. The Inyo County Board of Supervisors has approved past Grant applications with the same requirements.

The project clearly qualifies for a planning grant because the project proposes the development of a sewer system master plan and system evaluation, if the project proposal is approved.

The proposed master plan supports the Inyo-Mono IRWM Planning Program by addressing water related issues and strategies to deal with them. Inyo County and the Forest Service are entities that were originally identified to be served by the IRWMP plan. And, the proposed project falls into the categories identified in the scope of the original Inyo-Mono IRWMP Phase I Plan.

The proposed evaluation also clearly addresses the Inyo Mono Phase 1 regional Objectives and Management Strategies criteria by:

- The protection and enhancement of the water quality of the Bishop Creek watershed by insuring that leachate and spillage from the sewer system does not enter the groundwater or the flowing channel of Bishop Creek. The Bishop Paiute Tribe has indicated support for the proposed project because the tribe obtains irrigation water and groundwater derived from this watershed. This will also support California Regional Water Quality Board standards by reducing the potential for Regional Board violations. Potential sewage spillage in Bishop Creek may cause the creek to be closed to fishing, thereby reducing recreational opportunities.
- Provide stewardship by demonstrating environmental responsibility for the Bishop Creek watershed through efficient management and operation of the sewer system. This will also protect the wetlands in the area by preventing infiltration of leachate and prevention of sewer spillage.
- Providing for more efficient and reliable treatment of waste water in the collection and Forest Service treatment facilities. The master plan will identify areas needed for replacement and rehabilitation. The increased efficiency will reduce overall operations cost to both the Forest Service and the County as well as reduce greenhouse gasses.
- Addressing climate variability by planning and designing a more energy efficient plant, thereby reducing effluent treatment, which reduces plant operational costs. The reduced effluent treatment will provide a direct reduction in electrical consumption. There is a possibility that Southern California Edison will coordinate with the project proponents for a more efficient design of treatment equipment. The overall goal is to reduce electrical consumption, costs to the USFS and the County and reduce greenhouse gasses.

The proposed project is will address planning gaps in the Inyo-Mono planning region by developing a wastewater related master plan, which if followed will allow for the development of infrastructure that reduces overall costs of operation, reduces greenhouse gas emissions, provides for protection of the watershed of Bishop Creek.

The proposed budget, in the opinion of the project proponents is reasonable considering the proposed scope of work.

The improvements identified in the master plan, if constructed also addresses the DWR priorities by:

- Indirectly providing water quality benefits to the Bishop Paiute Tribe.
- Reducing the potential for ground and surface water pollution. These measures will also provide watershed protection, including ecosystem protection. The proposed project could possibly address nutrient planning by limiting potential nitrate groundwater pollution and eliminating non-point source pollution in the sewer collection system area.
- Helping the IRWMP Group meet the Plan Standards in the DWR Prop 84 guidelines as the pertain to objectives, resource management strategies, impact and benefits stakeholder involvement, providing a technical analysis, coordination between governmental agencies and climate change.

The project will help address IRWM program preferences as identified in the PSP by:

- Reducing overall treatment plant electrical consumption and thereby reducing greenhouse gas emissions.

Continued Program Office Support
Inyo-Mono Program Office
Scope of Work
Round 2 Planning Grant

Project Synopsis:

The Inyo-Mono IRWM Program Office has been overseeing the day-to-day operations of the Inyo-Mono RWMG for almost four years. This funding request is to continue the regular operations of the Program Office, further enhance the Inyo-Mono IRWM planning process, and develop a long-term plan for supporting and sustaining the activities of the RWMG into the future. Task 1 will allow the Program Office to continue supporting the RWMG on a daily basis, while Tasks 2, 3, 5, and 6 include activities specific to updating and enhancing the Inyo-Mono IRWM Plan, including a deeper consideration of climate change and the concept of integration for our planning region.

Recognizing the uncertainty of future bond funding availability for the statewide IRWM Program, the Program Office intends to develop a long-term operations and funding plan for the Inyo-Mono IRWM Program through Task 4 of this work plan. The Inyo-Mono RWMG sees value in continuing its successful and collaborative work to enhance and improve water management in the planning region.

Task 1: Program operations:

1. Regularly scheduled Group & Admin. Committee meetings (bi-monthly at MOST for Group meetings; up to monthly AC meetings)
2. Revisiting of MOU/governance, organizational structure (org. structure work will be based on outcomes of Round 1 Planning Grant work)
3. Grant and project administration-both with subcontractees and DWR
4. Liaison with DWR, Sierra Water Workgroup, Roundtable of Regions and others as needed (includes trips to Sac for DWR meetings and workshops)
5. Conference presentations of Inyo-Mono IRWM planning process as a case study
6. Other day to day business

Task 2: Integration

1. Articulation of what integration means at the regional, Sierra Nevada, state and "basin" scales
    - Outreach to discuss concept of integration with stakeholders based on geography, water issue, and stakeholder category, as well as moving forward with project needs
    - Consideration of integrating climate change adaptation and mitigation options into project ideas
2. Analysis of Inyo-Mono IRWM program in comparison to other state and/or national integrated resource management programs.
3. Proposed strategy to realize and actively promote integration at different hierarchical scales

Task 3: Climate change:

1. Identification of the State of Knowledge regarding climate change at the regional and sub-regional (community) level

2. Inventory of existing tools/models relevant to climate change within the region (and possibly state/federal levels?)
3. Identify and prioritize vulnerabilities based on the vulnerability assessment and I-M's decision making process (PSP requirement)
4. Develop plan, program and/or methodology for further data gathering/analyzing of prioritized vulnerabilities (PSP requirement)
5. Quantitative CO_2 emission evaluation
6. Assessment of water/energy nexus for the I-M region.

Task 4: Long-term funding plan:

1. Long-term identification of funding needs
2. Development of comprehensive list of local, state, federal, foundation funding opportunities with detailed information
3. Development of strategic approach/plan to meet anticipated short and long-term funding needs.

Task 5: Updating Phase II Plan

1. Filling newly identified gaps/further gap analysis
2. Phase III Plan revisions-to include findings from DAC grant, needs assessments, integration workshops, climate change analyses, and responding to revised Guidelines
3. Development of Round II & III Implementation proposals
4. Assess current status of Salt and Nutrient planning within the Inyo-Mono IRWM Region

Task 6: Program Technical Development, Analyses, and Management

1. Website maintenance and development
2. GIS data maintenance, management and development.
3. Specific analyses in support of Tasks 1-5 above.
4. Define spatial analysis needs of the region and develop strategy to meet identified needs.

R2PE Criteria Responses:

1. Has the applicant demonstrated BY JANUARY 11, 2011, with significant confidence, that there is a minimum 25% match available? (This criterion will be used in the January 11 ranking discussion)
   Yes. Similar to the Round 1 Planning Grant, the large majority of the match will come from the time and expense of RWMG Members in traveling to, attending, and participating in RWMG, Administrative Committee, and working committee meetings. Thus, no one organization is responsible for providing or committing to the matching funds. As fiscal agent, CalTrout will be ensuring that match requirements for the Program Office budget is met.

2. Has the applicant demonstrated clearly that the application includes only planning efforts and no implementation components? (This criterion will be used in the January 11 ranking discussion)
   Yes, per the tasks provided above, all of the proposed activities center on and support planning efforts for the Inyo-Mono IRWM region. The proposed tasks will also directly support

the enhancement, based on identified gaps, of the Inyo-Mono IRWM Plan, essential to the regional program as well as to helping secure long-term funding for implementation purposes.

3. Does the proposal clearly support the Inyo-Mono IRWM Planning Program? (5 points)
   Yes. In addition to supporting the Plan as a whole, this proposal specifically targets such topics as climate change and integration, both of which have been called out in the Phase I Plan and by DWR as important components of the Inyo-Mono IRWM planning process. Also see response to #2 above.

4. Does the project help to address Inyo-Mono Phase I regional objectives and Resource Management Strategies? (5 points)
   Yes. Although the proposal is not specific to a "project" the realization of objectives 1-4 and associated RMSs are ingrained in work the Program Office performs on a daily basis in support of the Inyo-Mono IRWM program. Task 5 of our proposal includes support work for pursuit of Phase II and III of DWR Implementation Proposals. Implementation projects are the basis on which these objectives and RMSs can be realized and the Program Office support is crucial to the success of future Implementation rounds. Objective 5 is aggressively addressed in this proposal in Task 3: Climate Change. Objective 6 has been addressed by the receipt of a separate DAC grant awarded in Fall of 2011. As outlined in Task 5 of this proposal, findings from the DAC grant work will be incorporated into the Phase III plan per the anticipated rewrite of the plan in response to revised DWR guidelines.

5. Does the project help to fill planning gaps in the Inyo-Mono planning region? (5 points)
   Yes. As proposed, the current scope of work will identify existing data gaps. Most notably are the call to identify State of Knowledge of Climate Change at the regional and sub-regional level, inventory of existing tools and models relevant to Climate Change in the region, and development of a plan for further data acquisition in support of the many facets of Climate Change. Additionally the work outlined in the Scope of Work aims to conduct an assessment of the current water/energy nexus for the region as well as conduct a quantitative CO_2 emissions evaluation. Task 3 will result in needs and direction with respect to how the Program aims to integrate activities within the Inyo-Mono Region, with neighboring IRWMP efforts as well as assessing the potential to integrate our work with neighboring states. In addition, the proposed Task 4 will fill an essential need to develop a short and long-term funding strategy for the Inyo-Mono IRWM Program. This particular task will be critical to the success of the Program given Prop. 84 funds are to be completely expended by 2015.

6. Is the budget reasonable for the scope of work? (10 points)
   Yes. The Program Office has strategically recorded all hours worked on current Planning Grant operations to date in an effort to produce more meaningful future budgets. The current budget has been developed using those data and accurately and realistically reflects time needed to successfully complete the outlined tasks. Indeed, the proposed budget, while able to fund the proposed work, contains very limited discretionary funds. The Program Office paid close attention to what the PSP is calling for, what the needs of the Inyo-Mono Region were and crafted a scope of work and budget accordingly.

7. Discretionary points based on overall merit and importance of project to the planning region (up to 10 points)
The Program Office performs daily duties vital to the continued success of the Inyo-Mono IRWM Program. The Staff provide professional assistance to the RWMG as well as focused attention to IRWM matters without the daily distractions of additional professional obligations. Paramount to our duties is the facilitation of communication of the RWMG, organization and administration of RWMG meetings and ensuring adherence to DWR grant and overall IRWM Program guidelines. Secondarily, the Staff works to realize tasks set forth in the Phase I Plan, coordinates and collates future funding opportunities, continues to strive to learn about new water issues throughout the region and maintains the Inyo-Mono IRWM Website. The Program Office also serves as a liaison between DWR and the RWMG as well as performs the critical tasks of Grant Administration for the current Planning Grant. Internally the Program Office has continued to strengthen its taskforce and currently maintains a robust team of professionals capable of producing professional quality products and services to both the RWMG and DWR alike. Additionally, the Program office keeps pulse on the larger Statewide IRWM programs and participates using other funding sources in broader State level programs such as the California Water Plan and various caucuses, thereby further strengthening our reputation as a valid IRWM region. The Inyo-Mono IRWM Program is currently emerging as a leader at the State level in areas such as Climate Change and DAC Program development.

It is important to note Task 4 of this proposal concentrates on the development of a long term funding strategy for the Inyo-Mono IRWM program. The fact that in 2015 Prop. 84 funds will terminate necessitates a strategy such as called out in Task 4 to ensure the perpetuation of the IRWM Program. The anticipation by the Program Staff of future IRWM funding shortages and their willingness to proactively pursue alternatives speaks to the dedication and resolve the Staff possesses to seeing this region's water needs continue to be addressed.

DWR Priorities

8. Does the project proposal address current DWR priorities, *as set out in the PSP*?

   a. Does the project involve and/or benefit a DAC (must be demonstrated)? (5 points)
   Yes. There are numerous DACs throughout the planning region. As such, the various tasks proposed will have relevance to the region as a whole and in turn will benefit the DACs within. Additionally Task 5 calls out the synthesis of information gained from work in the separately funded DAC grant currently underway. The Inyo-Mono region is in a prime position to demonstrate statewide leadership with insights gained from our current DAC work. We fully intend to apply knowledge gained from our work on the DAC grant to the Phase III Plan and future planning strategies within the Inyo-Mono region.

   b. Does the project involve and/or benefit a Tribe? (5 points)
   Yes. There are numerous tribes involved in the Inyo-Mono IRWM Program and others that are within the region that have yet to be engaged. The Program Office intends to engage and work with as many tribal entities within the region as possible. Moreover,

the various tasks proposed will have relevance to the region as a whole and by default will at minimum involve and ideally benefit tribes within the region.

c. Does project help to integrate stormwater resource plan requirements into the IRWM Plan as specified in California Water Code Section 10562? (5 points)
Yes, in that the revised Inyo-Mono Phase II Plan will provide necessary information for Cities, Counties and/or Special Districts to comply with California Water Code section 10562 and may be able to use in their respective planning efforts.

d. Does the project address stormwater and/or flood management? (5 points)
Yes in that these issues will be addressed comprehensively in the revised I-M IRWM Plan per the outcome of recent outreach efforts.

e. Does the project address salt and nutrient management planning? (5 points)
Yes, Task 5 calls for an assessment of current Salt and Nutrient planning throughout the Inyo-Mono IRWM Region. The results will contribute to help guide the development of region-wide Salt and Nutrient management plans. Additionally Task 2 promotes integration which will foster collaborative planning efforts across the region by identification of similar needs/issues.

9. In the PSP, DWR specifies that the Planning Grant must help the IRWM Group meet the Plan Standards as set out in the Prop. 84 Guidelines. Does the project help to meet the IRWM Plan Standards (Guidelines provided in supplemental Information)? (5 points total)
Yes. The proposed scope of work will involve addressing essentially all of the Prop. 84 Plan Standards identified in Table 2 of the PSP. The Program Staff maintain a careful pulse on DWR planning guidelines at all times and continually strive to ensure the Inyo-Mono IRWM Program adheres to and compliments those guidelines in all the work we perform. This proposal is a reflection of that commitment.

10. Does the project help address IRWM program preferences *as set out in the PSP*? (0.5 point for each of the following, for a maximum of 7 points)

The majority of the program preferences from the Round 2 Planning Grant PSP are addressed in the Program Office Proposal submitted above. (Refer to tasks 1-6 in Scope of Work)

- Include regional projects or programs
Task 1-6. The entire proposal encompasses regional level planning for both projects and programs.

- Effectively integrate water management programs and projects within hydrologic region.
Task 2 specifically addresses the need to effectively integrate programs and projects throughout the region and beyond.

- Effectively resolve significant water-related conflicts within or between regions
No, not directly, however Task 2 addresses integration at a broader level to include inter-regional as well and interstate cooperation and proposes to strategize and promote

different levels of integration. The Inyo-Mono RWMG also has established itself as the main forum for discussing and resolving water conflicts and issues in the region.

- Address critical water supply or water quality needs of disadvantaged communities.
  Tasks 1-6. Essentially the whole proposal will work to continue to address critical needs of DACs. In tandem with the DAC grant, we plan to seize the opportunity to continue to make real differences in DACs of the Inyo-Mono region.

- Effectively integrate water management with land use planning
  Task 2 is dedicated to actively promoting integration at all levels within the Inyo-Mono region.

- Include actions designed to integrate the Stormwater Resource Plan
  Again, Task 2 promotes integration at numerous levels within the planning region, this will include but not be limited to the recognition of stormwater runoff issues where applicable and the integration of needed Stormwater Management planning.

- Drought Preparedness
  Task 3,4,5. With in-house Climate Change expertise the Program Office is proactively addressing realistic shortages through Climate Change modeling and analysis as described in Task 3. Additionally, gaps will be identified though Tasks 3 and 5 and addressed in the revised Phase III plan. Lastly the plan to create long-term funding security acknowledges long term water issues across the region such as drought preparedness.

- Use and reuse water more efficiently
  Task 2 & 5. The strong emphasis on integration in our proposal facilitates responsible environmental stewardship and thus the commitment to use and reuse water in the most efficient manner possible as a region. Identified as Objective 1 in the current I-M IRWM Plan, the protection, conservation and optimization of our regional water supply is of utmost importance and will continue to take priority throughout the Plan revision process identified in Task 5.

- Climate Change Response Actions
  Task 3 is devoted to Climate Change and provides many avenues in which to address Climate related needs of the region.

- Expand environmental stewardship
  Task 2, 5, 6. By promoting integration, identifying gaps in the Planning region and development of a more robust GIS program, the Program Office has set forth the foundation to promote and expand environmental stewardship projects and plans throughout the region.

- Practice integrated flood management
  Task 2 is set aside specifically to promote and foster integration at many levels. As flood management needs continue to be identified, tasks, 2 and 5 are in place to incorporate the flood management aspects of planning into the broader IRWM Plan.

- Protect surface and groundwater quality
  Task 2 focuses on integration and will in-turn lead to greater protection of all natural resources within the planning region, including surface and groundwater quality.

- Improve tribal water and natural resources
  Task 2,3,4. Promoting Integration across the region, addressing the realities of Climate Change and securing long-term funding all intends to ensure improvement of tribal and regional water and natural resources.

- Ensure equitable distribution of benefits
  Task 1,2,4,5. Program Office oversight, the emphasis on Integration, future funding strategies and finally the gap analysis and plan revisions in Task 5 all aim to ensure equitable distribution of benefits to regional participants.

Position	Hours	Hourly Rate	Total	
Staff Time				
Program Director	1215	$60	$72,900.00	
Program Manager	1530	$35	$53,550.00	
Program Assistant	1530	$30	$45,900.00	
Consultants		Subtotal		$172,350.00
Consultants	540	$50	$27,000.00	
Supporting Funds		Subtotal		$27,000.00
Travel to Meetings			$1,000.00	
Travel for Outreach			$2,000.00	
Conference Travel & Tuition			$3,400.00	
DWR Workshop Attendance			$800.00	
Office Expenses (50% of Phone, rent, internet)			$15,500.00	
Office Supplies/printing/postage ($100/ month)			$1,800.00	
		Subtotal		$24,500.00
		Total		$223,850.00
		General O & A	12%	$26,862.00

Grand Total	$250,712
25% Match Required	$83,571
Total Project Cost	$334,283

Inyo/Mono Watersheds Invasive Plant Inventory Project

Introduction

Healthy native plant communities are a critical component of healthy watersheds, promoting many positive attributes including enrichment of wildlife habitat, normal fire regimes, and better water quality and quantity (Donaldson, 1997). Invasive plants threaten these native plant communities, and thus reduce certain advantages that watersheds gain from healthy riparian conditions. Invasive plants degrade the watershed's ability to retain surface and ground water, while decreasing quality through intensification of sediment loading through erosion and other processes (Chambers, 2008). Alteration of natural fire regimes by these invaders increases runoff and erosion as well. In addition to quality and quantity concerns, weeds compromise significantly the flood capacity of watersheds (Donaldson, 1997). Likely climate change scenarios indicate that the presence of invasive plant species exacerbates the negative effects of such change (Sada, 2008).

A required component of successful watershed management is consideration and mitigation of invasive plant threats. Projects must know of the presence of these weeds for planning, and land managers require a means by which to prioritize projects to maximize meager resources available for developing health watersheds. Proper planning protects natural resources and habitat for wildlife including threatened and endangered species. Recreational planning must also account for the potential of invasive plant spread and how to respond to those threats if they occur.

Importance of this Project to the IRWMP Region

Taking into account the linkages between invasive plant species, watershed health, and water supply and quality consequences, the importance of a comprehensive inventory of weed species of regional importance is obvious. This project will fill on information gap that exists for regional planning purposes. Addition of this data into the IRWMP knowledge base will allow proponents of future planning and implementation projects to review potential watershed consequences from invasive plant infestations within the IRWMP region. Given this data, future projects can analyze how to mitigate any potential future weed problems.

Project Description

The goal of this project is to complete a survey of selected invasive weeds of regional importance, using existing data, interagency cooperation, and field surveys. This project will create accurate, comprehensive, and accessible data for multiple future uses. As a member in the Eastern Sierra Weed Management Area (ESWMA) group and the current database administrator, the Inyo/Mono Counties Agriculture Department (AgComm) can acquire and compile data from these various sources. AgComm can then disseminate this data to agencies or individuals, allowing future planning efforts and project proponents to assess potential invasive plant

consequences to mitigate the effects of these species on project success. AgComm also has experience managing several other GIS projects (pesticide permitting database, pest exclusion database, etc.), AgComm has the experience and equipment to spearhead this project.

This project will include initial meetings with ESWMA members to assess which data are current and what survey deficiencies exist. Surveys will then evaluate deficient areas and regions of likely spread within the watersheds. Locations of likely spread and species for inclusion in the survey will be predicated on species prioritization guidelines within the ESWMA's strategic plan, which was developed by 15 land management agencies, tribal governments, and nonprofit organizations within Inyo and Mono Counties. AgComm will then organize this information in a standard geodatabase for future use.

DAC support Justification

All local communities, including disadvantaged communities and tribes, will benefit from this foresight through appropriate planning. Proper planning of future projects will minimize negative effects of weed issues on the local and regional recreation and agriculture industries, which together comprise nearly all of the local economic input. Higher future invasive plant management costs may result from the current, and incomplete, data set. Proper data can assist local agencies and groups to plan and prioritize invasive plant abatement projects, saving these agencies and groups future resources. Data from this project can assist in fire hazard identification, helping local communities to plan for prevention of and recovery from wildland fires. Additionally, if this project is selected it will employ local residents, adding jobs and economic input. These jobs, coupled with support and protection of the two largest local economic drivers, will benefit greatly the economic future of DAC's and tribes.

Stormwater Resource Plan Considerations

Invasive plants hinder the ability of a watershed to retain water during flooding events. This lack of retention often leads to increased streambed destruction during conditions of high runoff, resulting in streambank erosion or even failure. Water quality issues that can exist from this issue include increased sediment loading and altered nutrient cycles. Water quantity is affected by a watershed with degraded retention capacity. Obtaining data on invasive plant populations for mitigation and planning fosters healthy native riparian conditions, which improve the watershed's natural ability to manage floodwater and stormwater events.

Salt and Nutrient Loading Considerations

Adverse effects resulting from improper planning and weed expansion can alter the natural habitat and thus the natural nutrient cycle. Similarly, project planning that does not consider invasive plants may introduce or spread populations of certain weedy species that accumulate salt on the soil surface. Two examples of these types of weed species that occur locally include

Saltcedar and Perennial pepperweed. The elevated salt levels on soil surface generated by these two species destroy native vegetation and their associated riparian systems.

Schedule

October – December 2012	Project organization, stakeholder meetings, data needs assessment, field staff training, data collection
January – February 2013	Data entry and analysis
March – June 2013	Continue data collection
July – September 2013	No work
October 2013 – March 2014	Continue data collection
April – June 2014	Data analysis and entry, database completion and publishing

Project Budget

Confirmation of the matching requirements, as well as a resolution authorizing this project submittal is forthcoming (January 10, 2012 Inyo County Board of Supervisor's Meeting). Program staff will receive notification from the AgComm, and AgComm staff will attend the January 11 RWMG meeting as well.

Item	Rate	Quantity	In-Kind	Grant	Total
Personnel Services					
Program Coordinator (per hour)	*$40.06*	*416*	*$16,665*	-	*$16,665*
Field Technician II (per hour)	*$35.90*	*416*	*$14,934*	-	*$14,934*
Field Assistant (per hour)	*$17.25*	*1040*	-	*$17,940*	*$17,940*
Field Assistant (per hour)	*$17.25*	*1040*	-	*$17,940*	*$17,940*
Equipment Expenses					
Vehicle Mileage (per mile)	*$.52*	*40,000*	-	*$20,800*	*$20,800*
GPS Unit Rental (per day)	*$50.00*	*208*	-	*$10,400*	*$10,400*
		Subtotals	**$31,599**	**$67,080**	**$98,679**
		Administrative Costs (10%)		*$6,708*	*$6,708*
		TOTALS	**$31,599**	**$73,788**	**$105,387**

References

Chambers, J.C. (2008). Invasive species and the great basin. *Collaborative management and research in the Great Basin – examining issues and developing a framework for action.* Retrived from http://www.fs.fed.us/rm/pubs/rmrs_gtr204.pdf

Donaldson, S.G. (1997). Flood-borne noxious weeds: impacts on riparian areas and wetlands. *1997 California Exotic Plant Council symposium proceedings.* Retrieved from http://www.cal-ipc.org/symposia/archive/pdf/1997_symposium_proceedings1945.pdf

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Round 2 planning grant Evaluation Criteria

Oak Creek stream channel stabilization technical study

Draft

Todd J. Ellsworth, Inyo National Forest

December 2011

IRWM Regional Priorities

1. The Inyo National Forest has committed approximately $30,000 in FY'12 to begin studies in Oak Creek Watershed related to channel stabilization and other projects (ie. Road stabilization and restoration, weed treatments on the mud flow, re-vegetation of the mud flow, and fuels treatments. We anticipate committing at least an additional $20,000 of appropriated federal dollars in FY'13 related to this project or other projects outlined above. Additional anticipated cash and in-kind contributions for this project include:

- Bureau of Reclamation (BOR): The Ft. Independence tribe has an existing grant with the BOR related to water uses and irrigation on tribal lands. Part of the grant is to evaluate condition of the water supply and establish gauging stations to measure stream flow of Oak Creek on to tribal lands. In addition, personnel at the BOR have committed to providing matching funds for this project. I will have additional information on anticipated matching funds the week of January 2nd. The BOR can also provide technical assistance related to stream restoration techniques. I estimate a match of cash and in-kind contributions of at least $30,000 for this project.
- Natural resources Conservation Service (NRCS): The tribe recently put in a preliminary grant application with the NRCS through the Environmental Quality Incentives Program (EQIP) Tribal Initiatives program. The proposed grant would help evaluate and address water quality issues on tribal lands related to continuing impacts from the fire and flood. The NRCS has also committed to providing technical assistance in stream restoration data collection needs and stream restoration techniques. The amount of the proposed grant and in-kind contributions are unknown at this time. I would estimate an amount of $20,000-$30,000.
- LA Department of Water and Power (LADWP): The Forest is in the process of reissuing term permits for water spreading and diversions on both North South Fork of Oak Creek. This project is likely to be funded through cost recovery with LADWP. Stream channel condition and anticipated effects to the stream channel would be addressed in a limited fashion through this project. Exact cost estimates are unavailable at this time. I would estimate an amount of that $10-15,000 for this project.
- Other cash or in-kind contributions include: technical assistance for data collection and monitoring from the Sierra Nevada Aquatic Research Lab. (SNARL); data collection and

monitoring assistance from Friends of the Inyo (FOI); and State of California OHV money for road decommissioning work.

Conclusion: I anticipate that this project will have $75,000 to $100,000+ in in-kind and/or cash contributions to match the requested funds. The Forest and the Ft. Independence Tribe have been actively engaging and soliciting partnerships and will continue to do so. This is a high priority project for the Inyo National Forest and the Ft. Independence Tribe.

2. We propose to collect and analyze relevant geomorphologic, hydrologic, biologic, and climatic data to determine feasibility of restoration techniques to address on-site impacts to National Forest resources and downstream turbidity and increased peak flows adversely impacting values at risk. To this end, this project is 100% planning.

In 2008 a large debris/mud flow caused extensive hillslope rilling and gullying of the mid- and lower elevation segments of both the North Fork and South Fork of Oak Creek. The debris flow damaged the Mt. Whitney Fish Hatchery and more than 50 homes. In addition, the mud flow crossed State Hwy. 395, temporarily closing the road and causing damage to the road bed. The area remains vulnerable to accelerated hillslope erosion, increased sedimentation and turbidity and higher peak flows. The higher peak flows and turbidity are adversely affecting Ft. Independence tribal infrastructure and irrigation system. There is continued risk to LADWP infrastructure, water rights and water conveyance structures.

One of the key objectives of this planning project is to further the work of the Inyo Mono IRWM in terms of engaging a wide range of stakeholders in developing a solution to watershed specific ,on-going water quality and flood potential issues. I believe by doing such this will increase the capacity of the Inyo Mono IRWM and provide a watershed specific area to extend the collaborative and integrated planning efforts already in place.

We anticipate two phases of this planning effort as outlined below:

Phase I: Collection and analysis (bullets are not in a particular order as the planning process is iterative)

These steps would be completed in collaborative, integrated fashion with partners identified above and other interested parties.

- Identify problems (clarify values at risk)
- Determine objectives
- Inventory resources
- Analyze resources data

Phase II: Decision Support (Design)

These steps would be completed in collaborative, integrated fashion with partners identified above and other interested parties.

- Formulate alternatives
- Evaluate alternatives
- Make recommendations

This proposed planning effort addresses Inyo Mono IRWM objectives (1-6) and Resource Management Strategies. Specifically by planning this watershed based project in a collaborative, integrated fashion Objectives 1,2,3, and 6 are clearly met with Objectives 4 and 5 met in a more indirect manner. This project would address upland resource concerns affecting both on-site resources and downstream users and resources. This project would address water quality and flood management issues in a specific watershed. Processes developed, partnerships and data collected could be applied to other areas in the Inyo Mono IRWM planning area.

Funding Estimate: Total requested for round 2 planning is $75,000

Item of expense	Qty	Unit	Unit Cost	Total Cost	
Collaboration and stake holder meetings					
Project Leader	30	days	$400	$12,000	
Data Collection, Inventory +analysis					
Project Leader	10	days	$400	$4,000	
Data Collection	100	days	$300	$30,000	
Report writing + alternative evaluation					
Project Leader	20	days	$400	$8,000	
Results roll-out meetings, discussions					
Project Leader	10	days	$400	$4,000	
Misc.(vehicles, etc.)				$5,000	
NEPA (other specialists data collection and analysis)				$12,000	
Total				$75,000	

DWR priorities:

This proposed project will directly involve and/or benefit the Ft. Independence Tribe and land owners within and downstream of Oak Creek. Inyo County in its entirety is considered a DAC. The tribe is and

will continue to be a major stakeholder and partner in this planning effort. We will conduct a focused outreach to private landowners and Inyo County through this process.

This planning effort would be conducted within the Oak Creek watershed analyzing resources and impacts to water quality and flood management at a watershed scale. It also proposes to engage stakeholders and continue the integrated planning that is currently on-going in the Inyo Mono IRWM. As such it addresses the integrated stromwater resource plan requirements and addresses flood management which is also a planning gap in the Inyo-Mono planning region. I anticipate that one of the products of this planning effort is a discussion and recommendations as to continued flooding risk and specific actions that can be taken to lessen the risk to downstream users and infrastructure.

This project may address nutrient management planning related to soil productivity and soil nutrients. Nutrients can impact downstream beneficial uses such as tribal irrigation and recreation.

This project addresses the following Plan standards in the Prop. 84 guidelines:

- Objectives
- Resource Management Strategies
- Integration
- Plan performance and monitoring
- Data management
- Technical analysis
- Local water planning
- Local land use planning
- Stake holder involvement
- Coordination and
- Climate change.

This project addresses the following IRWM program preferences:

- Effectively integrate water management programs and projects within hydrologic region.
- Critical water supply or water quality needs of disadvantaged communities
- Effectively resolve significant water- related conflicts within or between regions
- Effectively integrate water management with land use planning
- Include actions designed to integrate the Stormwater Resource Plan
- Climate Change Response Actions
- Expand environmental stewardship
- Practice integrated flood management
- Protect surface and groundwater quality
- Improve tribal water and natural resources
- Ensure equitable distribution of benefits

The following would be partially met:

- Drought Preparedness
- Use and reuse water more efficiently

Inyo-Mono INTEGRATED REGIONAL WATER MANAGEMENT PROGRAM

Mammoth Lakes Stormwater Management Plan
Round 2 Planning Grant Project Evaluation Criteria

Inyo-Mono IRWM Regional Priorities

1. ***Has the applicant demonstrated BY JANUARY 11, 2011, with significant confidence, that there is a minimum 25% match available? (This criterion will be used in the January 11 ranking discussion)***

RESPONSE: The Town Council will take action of this project and grant application at the January 5, 2012 regular meeting. Adoption of a resolution will be presented for discussion and approval. The Town has several sources of funding which are restricted including the Over All Work Program for the LTC, Drainage Impact Fees, and is applying for a small urban stormwater grant from the EPA. Other unrestricted sources include General Fund and in kind services for staff time. This project will have significant data collection work for an intern and our GIS services group.

2. **Has the applicant demonstrated clearly that the application includes only planning efforts and no implementation components? (This criterion will be used in the January 11 ranking discussion)**

RESPONSE: The proposed project does not construct any new facilities but will development and preparation the implementation of a Stormwater Management Plan and include strategies to estimate cost benefit analysis for potential projects for both flooding protection and environmental water quality and restoration projects.

3. **Does the proposal clearly support the Inyo-Mono IRWM Planning Program? (5 points)**

RESPONSE: This project is a listed is project 15 in Chapter 8 of the IRWMP. The project will develop strategies and standards that include at least the following:

Objective 1, by developing standards that require development projects to infiltrate portions of stormwater to enhance water quality and groundwater by capturing and managing runoff

Objective 2, by developing standards to improve the quality of urban runoff and stormwater, by developing standards and projects that will reduce erosion and sedimentation, by developing standards to protect pubic and aquatic ecosystem health while supporting appropriate recreational activities.

Objective 3, The Master Plan will cover all of the drainage in the Mammoth Basin, which has almost the same boundaries as the Town Limits and is about 25 square miles with a population of 8,400 permanent and 25,000-30,000 on weekends. This project will develop standards to retain natural channels and restore eroded and impacted areas. All of the urban drainage from Mammoth Lakes that is not infiltrated terminates in Mammoth Creek. A component of the plan will be public education and outreach to protect the watershed resources and ecosystem.

Objective 5, The plan will include a discussion about Climate Change and the impacts and planning and monitoring that will be incorporated into the documents as it relates to global warming and runoff.

Objective 6. The Town is not a DAC, however there are pockets of the community that would qualify if they were a standalone community. The educational and outreach portion will the plan will seek to engage these groups for education and to become more involved in living and working in the community. The Public Works Department will build on the advances to the Hispanic community though their community outreach program.

4. **Does the project help to address Inyo-Mono Phase I regional objectives and Resource Management Strategies (see attachment below)? (5 points)**

   RESPONSE: This project will develop a Stormwater Management Master Plan that will integrate the stormwater system and environmental stewardship by identifying arrears where natural channels should be maintained, identifying potential pollutants and developing standards to implement those standards and objectives.

5. **Does the project help to fill planning gaps in the Inyo-Mono planning region? (5 points)**

   RESPONSE: This project will develop and implement the preparation of a Stormwater Master Management Plan for the Mammoth Lakes Basin. The plan will address flooding and stormwater quality.

6. **Is the budget reasonable for the scope of work? (10 points)**

   RESPONSE: See attached budget table. We have been working hard to reduce and streamline the scope of work while maintaining viable project that will be a guide the Town and region.

7. Discretionary points based on overall merit and importance of project to the planning region (up to 10 points)

   RESPONSE: A new chapter of the plan will be to develop a cost benefit relationship for flood control projects and water quality projects. This information is critical to evaluate future projects with the limited dollars available. The capital improvement part of the plan will work to identify projects that in particular will help to solve the Sierra Valley Site problems (much of this area is work force housing). Many of the houses in this area were constructed blow the streets and prone to localized flooding and erosion problems. A priority will be to identify projects that have high benefit for the cost.

(35 points available for Inyo-Mono IRWM regional priorities)

<u>DWR Priorities</u>

8. **Does the project proposal address current DWR priorities, *as set out in the PSP*?**
   a. **Does the project involve and/or benefit a DAC (must be demonstrated)? (5 points)**

   RESONSE: No.

   b. **Does the project involve and/or benefit a Tribe? (5 points)**

   RESPONSE: No.

   c. **Does project help to integrate stormwater resource plan requirements into the IRWM Plan as specified in California Water Code Section 10562 (see full text of the section below)? (5 points).**

   RESPONSE: Yes. This project will directly help to integrate stormwater resource plan of Section 10562. The Town is the only incorporated City and "Urban Pocket" in Mono County and will develop a plan that is consistent with the local basins and the Owens River Basin Plan with multiple benefits. The plan will meet the standards in Subsection (d) with emphasis to utilize natural channels and water drainage treatment opportunities that will reduce infrastructure needs and better management stormwater and stormwater quality. This project will lead to revision in the Municipal Code as a mechanism for long term for enforcement and public education.

   d. **Does the project address stormwater and/or flood management? (5 points)**

   RESPONSE: Yes this project is the development of a Stormwater Management Plan, which will address stormwater and flood management.

   e. **Does the project address salt and nutrient management planning? (5 points)**

   RESPONSE: The Town does not have significant agricultural component. The plan will incorporation Stormwater Best Management Practices that will address potential runoff from the two golf courses and commercial landscape areas in town and their applications of herbicides and fertilizers.

9. ***In the PSP*, DWR specifies that the Planning Grant must help the IRWM Group meet the Plan Standards as set out in the Prop. 84 Guidelines. Does the project help to meet the IRWM Plan Standards (below)? (5 points total)**

Table 2 – IRWM Plan Standards	
• Governance	• Data Management
• Region Description	• Finance
• Objectives	• Technical Analysis
• Resource Management Strategies (RMS)	• Relation to Local Water Planning
• Integration	• Relation to Local Land Use Planning
• Project Review Process	• Stakeholder Involvement
• Impact and Benefit	• Coordination
• Plan Performance and Monitoring	• Climate Change

RESPONSE: The new plan will work on ojectives for managing stormwater and use resource managnement strategies to reduce cost. The plan will integrate flood control, water qualtiy and groundwater recharge programs that will seek to quantify impacts and benefits. The plan will use GIS data base for the technical analyisi and monitoring performance measures. There will be stakeholder meetings to edjucate residents regarding envirnemtal stuardship and water quality.

10. Does the project help address IRWM program preferences *as set out in the PSP?* (0.5 point for each of the following, for a maximum of 7 points)

- Include regional projects or programs. Yes
- Effectively integrate water management programs and projects within hydrologic region. Yes
- Effectively resolve significant water- related conflicts within or between regions
- Contribute to attainment of one or more objectives of the CALFED Bay-Delta Program (not applicable to Inyo-Mono region)
- Address critical water supply or water quality needs of disadvantaged communities.
- Effectively integrate water management with land use planning. Yes
- Include actions designed to integrate the Stormwater Resource Plan. Yes
- Drought Preparedness. Yes
- Use and reuse water more efficiently
- Climate Change Response Actions. Yes
- Expand environmental stewardship. Yes
- Practice integrated flood management. Yes
- Protect surface and groundwater quality. Yes
- Improve tribal water and natural resources.
- Ensure equitable distribution of benefits.

(37 points available for DWR priorities)
72 Total points available

Schedule for Round 2 Planning Grant Application Process

December 16, 2011: Send R2PG evaluation criteria to R2PG project proponents for revising and updating project materials based on the criteria

December 23, 5:00 pm: Revised/updated R2PG project proposals due to Program Office

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January 6, 2012, 5:00 pm: Preliminary ranking from Group Members provided to Program Office via email

January 11: RWMG conference call meeting to decide preliminary ranking and recommend final ranking to boards

January 25: RWMG in-person meeting to decide final ranking

January 25 – application due date (likely late February or early March): preparation of application materials to be submitted to DWR

California Water Code Section 10562:

(a) A city, county, or special district, either individually or jointly, may develop a stormwater resource plan pursuant to this part.

(b) Stormwater resource plans shall:

(1) Be developed on a watershed basis.

(2) Provide for multiple benefit project design to maximize water supply, water quality, and environmental and other community benefits.

(3) Provide for community participation in plan development and implementation.

(4) Be consistent with, and assist in, compliance with total maximum daily load (TMDL) implementation plans and applicable national pollutant discharge elimination system (NPDES) permits.

(5) Be consistent with all applicable waste discharge permits.

(6) Be consistent with any applicable integrated regional water management plan.

(c) The proposed or adopted plan shall meet the standards outlined in this section. The plan need not be referred to as a "stormwater resource plan." Existing planning documents may be utilized as a functionally equivalent plan, including, but not limited to, watershed management plans, integrated resource plans, urban water management plans, or similar plans. If a planning document does not meet the standards of this section, a collection of local and regional plans may constitute a functional equivalent.

(d) Stormwater resource plans shall identify all of the following:

(1) Opportunities to augment local water supply through groundwater recharge or storage for beneficial reuse of stormwater.

(2) Opportunities for source control for both pollution and stormwater runoff volume, onsite and local infiltration, and reuse of stormwater.

(3) Projects to reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.

(4) Opportunities to develop or enhance habitat and open space through stormwater management, including wetlands, riverside habitats, parkways, and parks.

(5) Design criteria and best management practices to prevent stormwater pollution and increase effective stormwater management for new and upgraded infrastructure and residential, commercial, industrial, and public development. These design criteria and best management practices shall accomplish all of the following:

(A) Reduce effective impermeability within a watershed by creating permeable surfaces and directing stormwater to permeable surfaces, retention basins, cisterns, and other storage for beneficial reuse.

(B) Increase water storage for beneficial use through a variety of on-site storage techniques.

(C) Increase groundwater supplies through infiltration, where appropriate and feasible.

(D) Support low-impact development for new and upgraded infrastructure and development using low-impact techniques.

(6) Activities that generate or contribute to the pollution of stormwater, or that impair the effective beneficial use of stormwater.

(7) Projects and programs to ensure the effective implementation of the stormwater resource plan pursuant to this part and achieve multiple benefits.

(8) Ordinances or other mechanisms necessary to ensure the effective implementation of the stormwater resource plan pursuant to this part.

Inyo-Mono IRWM Phase I Objectives and Resource Management Strategies

Objective	Resource Management Strategies
1. Protect, conserve, optimize, and augment water supply	A. Improve water supply reliability B. Improve system flexibility and efficiency C. Support compliance with current and future state and federal water supply standards D. Address local water supply issues through various techniques, including, but not limited to: groundwater recharge projects, conjunctive use of water supplies, water recycling, water conservation, water transfers, and precipitation enhancement E. Protect and improve the quality and quantity of groundwater supplies F. Identify existing gaps in groundwater and surface water quantity data G. Monitor groundwater and surface water supply variability H. Optimize existing storage capacity I. Conserve and adapt water uses to future conditions J. Capture and manage runoff K. Incorporate and implement low-impact development design features, techniques, and practices to reduce water demand L. Support appropriate recreational activities

Objective	Resource Management Strategies
2. Protect, restore, and enhance water quality	A. Support compliance with current and future state and federal water quality standards B. Improve the quality of urban runoff, storm water, and wastewater C. Reduce erosion and sedimentation D. Protect public and aquatic ecosystem health E. Match water quality to water use F. Support appropriate recreational activities
3. Provide stewardship of our natural resources	A. Protect, restore, and enhance natural processes, habitats, and threatened and endangered species B. Protect ecosystems such as upland forests and meadows dependent on surface/shallow water supply C. Enhance recreational and educational opportunities D. Identify, develop, and implement efforts to better control invasive species E. Assess ecosystem health of watersheds in the region
4. Maintain and enhance water, wastewater, and power generation infrastructure efficiency and reliability	A. Systematically and strategically rehabilitate and replace aging water and wastewater delivery and treatment facilities in rural communities, including tribal lands B. Ensure fire protection capacity C. Improve energy efficiency of water systems and uses D. Promote use of water efficiency in power generating facilities
5. Address climate variability and reduce greenhouse gas emissions	A. Increase understanding of water related greenhouse gas emissions B. Manage and modify water systems to respond to increasing climate variability C. Use cleaner energy sources to move and treat water
6. Increase participation of small and disadvantaged communities in IRWM process	A. Engage regional communities in collaborative water and natural resource related efforts B. Provide assistance for tribal and DAC consultation, collaboration, and access to funding for water programs and projects

CALIFORNIA TROUT

KEEPER OF THE STREAMS

West Walker Restoration Plan

Project Synopsis:
The goal of this project is develop a restoration plan via the completion of an assessment of the riverine and riparian conditions associated with approximately three miles of the West Walker River located within the Antelope Valley-designated as an economically disadvantaged community. The Antelope Valley in Northern Mono County is home to roughly 15,000 acres of actively farmed land contributing significantly to local livelihoods. The West Walker River is also ecologically important to imperiled, native trout. However this same area has experienced significant damage from stormwater events that have in turn resulted in significant impacts, including loss of productive farmlands, from flooding of the Walker River. Most recently in 1997 a hundred year flood event occurred resulting in extensive losses of productive farmland and deleterious impacts to the Walker River ecosystem. Today, threats from stormwater and flood events remain and losses of active riparian farmlands occur annually. Better understanding of the historical and current geomorphological processes associated with the West Walker River along with assessing the current riparian habitat condition is the first step in developing a comprehensive restoration plan empathizing stormwater/flood management issues providing the basis for long-term management of this economically and ecologically important portion of the Inyo-Mono IRWM region. This project will pay particular attention to assessing approximately three miles of the lower West Walker River system with the intent of developing management recommendation to ameliorate threat to stream bank stabilization and in doing so, contribute positively to local livelihoods and local fisheries. In summary, this project responds to identified needs of a distinct watershed that focus on storm and flood threat mitigation in a DAC. Moreover, it responds to both newly identified planning gaps within the Inyo-Mono region as well as DWR storm/flood management priorities.

Responses to ranking criteria:

Inyo-Mono Priorities

1. Has the applicant demonstrated BY JANUARY 11, 2011, with significant confidence, that there is a minimum 25% match available? (This criterion will be used in the January 11 ranking discussion)

California Trout is committed to providing at least 25% of project expenses.

2. Has the applicant demonstrated clearly that the application includes only planning efforts and no implementation components? (This criterion will be used in the January 11 ranking discussion)

As noted in the project synopsis, this is purely a planning project that will result in short and long-term management recommendations. In order to complete this project research and analyses

will be conducted. While this project is 100% planning in nature, it is expected that the outcome of the project will result in project implementation recommendations.

3. Does the proposal clearly support the Inyo-Mono IRWM Planning Program? (5 points)
This project responds to identified and expressed needs relating to storm and flood management from stakeholders directly involved with the Inyo-Mono IRWM Planning Program. Such stakeholders include local residents living in Antelope Valley as well a local NGO involved with resource conservation and federal agency tasked with managing the West Walker River watershed. The project also responds to multiple objectives and resource management strategies that have been developed by members of the Inyo-Mono IRWM Program themselves (see below).

4. Does the project help to address Inyo-Mono Phase I regional objectives and Resource Management Strategies (see attachment below)? (5 points)
Although this is purely a planning project, it is expected that the results will address, in some degree, the following objectives and resource management strategies.

Objective	Resource Management Strategies
1. Protect, conserve, optimize, and augment water supply	A. Improve water supply reliability B. Conserve and adapt water uses to future conditions C. Support appropriate recreational activities
2. Protect, restore, and enhance water quality	A. Support compliance with current and future state and federal water quality standards B. Improve the quality of urban runoff, storm water, and wastewater C. Reduce erosion and sedimentation D. Protect public and aquatic ecosystem health E. Match water quality to water use F. Support appropriate recreational activities

Objective	Resource Management Strategies
3. Provide stewardship of our natural resources	A. Protect, restore, and enhance natural processes, habitats, and threatened and endangered species B. Protect ecosystems such as upland forests and meadows dependent on surface/shallow water supply C. Enhance recreational and educational opportunities D. Identify, develop, and implement efforts to better control invasive species *E.* Assess ecosystem health of watersheds in the region
4. Increase participation of small and disadvantaged communities in IRWM process	A. Engage regional communities in collaborative water and natural resource related efforts B. Provide assistance for tribal and DAC consultation, collaboration, and access to funding for water programs and projects

5. Does the project help to fill planning gaps in the Inyo-Mono planning region? (5 points)

The Phase I Inyo-Mono IRWM Plan did not identify stormwater/flood threat mitigation as a priority need. Nor was ecological stewardship/restoration a priority in the Round 1 Implementation Proposal. Since completing the Phase I Inyo-Mono IRWM Plan, and based on Group discussions and recent outreach efforts conducted by the Program Office, addressing watershed needs, flood and stormwater threat mitigation and management all have been identified as explicit needs for region. Given these recognized gaps in Round 1 planning and the nature of the project and focus on ecological restoration, flood and stormwater threat mitigation, this project does respond directly to filling planning gapes in the Inyo-Mono planning region.

6. Is the budget reasonable for the scope of work? (10 points)

The budget is based on site visits and discussions with consultants familiar with the Walker River and surrounding area and that are directly involved with the types of projects now being proposed. The proposed budget is thought to be conservative but adequate to achieve the project's intended goal (see proposed budget below). Primary tasks to be completed include:

- Developing a Scope of Work, administer and manage subcontract with consulting firm-Caltrout
- Establishing and execute contract to draft proposed restoration plan-Caltrout/consultant
- Outreach and engagement of Antelope Valley residents-Caltrout/Consultant

7. Discretionary points based on overall merit and importance of project to the planning region (up to 10 points)

This project will serve to address a region-wide need to develop flood & stormwater management planning and implementation efforts. This project will also contribute to the broader goal of developing resource plans that address a specific watershed level need yet also may have direct application to other watershed needs within the Inyo-Mono planning region. It will also serve to address ecosystem stewardship needs and in doing so, serve an economically disadvantaged community that is reliant upon the health of local natural resources for their livelihoods.

DWR Priorities:

1. Does the project proposal address current DWR priorities, *as set out in the PSP*?
    a. Does the project involve and/or benefit a DAC (must be demonstrated)? (5 points)

    Yes, the entirety of the project takes place within Antelope Valley, a recognized DAC per the 2000 census. Landowners residing in the Valley will be directly involved.

    b. Does the project involve and/or benefit a Tribe? (5 points)

    Although there is not a formally recognized tribe (?) in Antelope Valley, although there is a health clinic located in Walker that serves members of tribes in adjacent communities.

    c. Does project help to integrate stormwater resource plan requirements into the IRWM Plan as specified in California Water Code Section 10562 (see full text of the section below)? (5 points)

    Yes. Currently, stormwater planning is not adequately addressed in the Phase I Inyo-Mono IRWM Plan and therefore, completing this project will not only address a local need within the Antelope Valley, it will contribute to the broader needs of the region towards addressing this issue. Moreover, this project addresses many of the elements required per CA Water Code Section 10562 (including but not limited to many of Codes Sections B & C). Code Section A refers to a plan that is developed by cities, counties or special districts. It is anticipated and hoped that the findings of the proposed restoration plan will be adopted by relevant authorities. Given the results of the study are not available at this time it is difficult to state emphatically whether all of the Code will be addressed.

d. Does the project address stormwater and/or flood management? (5 points)

The primary goal of this project is to develop a restoration plan that will directly address threats from storm and flood events within the Antelope Valley.

e. Does the project address salt and nutrient management planning? (5 points)

This project does not directly address salt and nutrient planning. It may, depending on the results, respond to potential impacts from various land-use activities, notably grazing, that may or may not relate to nutrient loading.

8. *In the PSP*, DWR specifies that the Planning Grant must help the IRWM Group meet the Plan Standards as set out in the Prop. 84 Guidelines. Does the project help to meet the IRWM Plan Standards (below)? (5 points total)

Table 2 – IRWM Plan Standards	
• **Governance**	• **Data Management**
• **Region Description**	• **Finance**
• **Objectives**	• **Technical Analysis**
• **Resource Management Strategies (RMS)**	• **Relation to Local Water Planning**
• **Integration**	• **Relation to Local Land Use Planning**
• **Project Review Process**	• **Stakeholder Involvement**
• **Impact and Benefit**	• **Coordination**
• **Plan Performance and Monitoring**	• **Climate Change**

The project helps to meet the following IRWM Plan Standards:
Regional description, objectives, resource management strategies, integration, technical analysis, relation to local water planning, relation to local land use planning, stakeholder involvement, coordination, climate change.

9. Does the project help address IRWM program preferences *as set out in the PSP*? (0.5 point for each of the following, for a maximum of 7 points)
   - Include regional projects or programs-**Yes**
   - Effectively integrate water management programs and projects within hydrologic region- **Yes**
   - Effectively resolve significant water- related conflicts within or between regions- **No**
   - Contribute to attainment of one or more objectives of the CALFED Bay-Delta Program (not applicable to Inyo-Mono region)-**NA**
   - Address critical water supply or water quality needs of disadvantaged communities- **Yes**
   - Effectively integrate water management with land use planning- **Yes**

- Include actions designed to integrate the Stormwater Resource Plan-
- Drought Preparedness-**No**
- Use and reuse water more efficiently-**No**
- Climate Change Response Actions-**Yes**
- Expand environmental stewardship- **Yes**
- Practice integrated flood management- **Yes**
- Protect surface and groundwater quality-**Yes**
- Improve tribal water and natural resources-**No**
- Ensure equitable distribution of benefits- **Yes**

Proposed Budget:

Expense	Total	DWR Request	Caltrout
Salary	$10,000	$4,500	$5,500
Contract/consultants	$70,000	$60,000	$10,000
Travel	$1,000		$1,000
Miscl. supplies	$1,000	1000	0
Subtotal	$82,000		$16,500
Admin (10%)	$8,200	$2,300	$5,900
TOTAL	**$90,200**	**$67,800**	**$22,400**

Inyo Mono Integrated Regional Water Management Plan
Round 2 Planning Grant
Inyo County Public Works: Laws, Independence, and Lone Pine Leak Detection & Condition Assessment Project
Narrative

Inyo-Mono IRWM Regional Priorities

1. Has the applicant demonstrated BY JANUARY 11, 2011, with significant confidence, that there is a minimum 25% match available? (This criterion will be used in the January 11 ranking discussion).

   25% match will either be provided by Inyo County as in-kind labor by employees, or a consultant's charge.

2. Has the applicant demonstrated clearly that the application includes only planning efforts and no implementation components? (This criterion will be used in the January 11 ranking discussion).

   The project will create planning documents to be included in the Inyo Mono IRWM Plan and website as an excel spreadsheet or database of water main size, material, age, soil characteristics, acidity, etc. conforming to the American Water Works Association Research Foundation's (AWWARF) project # 4195 which is an adaptation of the United Kingdom Water Industry Research database. Further, the spreadsheet will be offered up for inclusion on the Inyo Mono website to make it available to the general public worldwide. The AWWARF spreadsheet adaptation is currently being formulated. Google search "U.S. Beta Testing of the UKWIR National Mains Failures Database" project #4195. The database is a recommendation of a USEPA funded research paper "Condition Assessment of Ferrous Water Transmission and Distribution Systems STATE OF TECHNOLOGY REVIEW REPORT" June 2009. The above document, pg 46, demonstrates that the UKWIR database is a valuable planning tool for the UK utilities and the American adaptation of the UKWIR database is expected to likewise be a valuable planning tool for the nation's water utilities. The spreadsheet on the Inyo Mono water website will be a valuable tool to other local small utilities and disadvantaged communities. If posted on the Inyo Mono Water website, it will likewise be available to any access worldwide. No other similar database is publicly available. The documents created as a result of this project will also be incorporated into Inyo County Water Master Plans for Independence, Lone Pine, and Laws, and will be provided to the custodian of the National Water Mains Condition database discussed above.

3. Does the proposal clearly support the Inyo-Mono IRWM Planning Program? (5 points)

- The Inyo-Mono IRWM Planning Program, as outlined on the website: "Provide focused assistance for disadvantaged communities, Native American Indian Tribes, and small water districts" is embodied by this project. This project provides assistance to three

disadvantaged water utilities in the small Owens Valley communities of Laws, Independence, and Lone Pine.

4. Does the project help to address Inyo-Mono Phase I regional objectives and Resource Management Strategies? (5 points) Leak detection and condition assessment achieves the following:

Objective	Resource Management Strategies
1. Protect, conserve, optimize, and augment water supply	A. Improve water supply reliability: More water provided to system. B. Improve system efficiency: Less water lost to ground, less electricity wasted. C. Support compliance with current and future state and federal water supply standards: Maximum 10% leakage. D. Address local water supply issues through various techniques, including, but not limited to: groundwater recharge projects, conjunctive use of water supplies, water recycling, water conservation, water transfers, and precipitation enhancement: Water conservation. E. Optimize existing storage capacity: Keep existing water in the system. F. Conserve and adapt water uses to future conditions: Leak detection is water conservation.
4. Maintain and enhance water, wastewater, and power generation infrastructure efficiency and reliability	A. Systematically and strategically rehabilitate and replace aging water and wastewater delivery and treatment facilities in rural communities, including tribal lands: Project will provide course of action to follow to implement this. B. Ensure fire protection capacity: More water in system means more water for fire protection. C. Improve energy efficiency of water systems and uses: Water conservation is energy efficiency
5. Address climate variability and reduce greenhouse gas emissions	A. Increase understanding of water related greenhouse gas emissions: Conserved water equates to less GHG emissions and impact on environment. B. Manage and modify water systems to respond to increasing climate variability: Conserved water supports understanding of climate variability. C. Use cleaner energy sources to move and treat water: At the margin, less water pumped can mean less

Objective	Resource Management Strategies
	water pumped at peak times of day, which reduces electric generation pollution.
6. Increase participation of small and disadvantaged communities in IRWM process	A. Engage regional communities in collaborative water and natural resource related efforts: The three water systems are regional- within 60 miles of each other. B. Provide assistance for tribal and DAC consultation, collaboration, and access to funding for water programs and projects: Provides assistance to 3 DAC's Lone Pine, Independence, and Laws.

5. Does the project help to fill planning gaps in the Inyo-Mono planning region? (5 points)

   The Inyo Mono planning region is silent with regard to specifically how small rural DAC's can be assisted by the IRWMP process. This project will directly benefit other utility's planning efforts in the region because a spreadsheet of comparable information is not currently available.

6. Is the budget reasonable for the scope of work? (10 points)

   The budget is reasonable for the acoustic leak correlation technology (Echologics LEAKFINDER and THICKNESSFINDER) expected to be used for this project. Acoustic Leak correlation costs $3.25 per foot of pipe evaluated for leaks and condition assessment for lengths of pipe from 5 miles to more than 10 miles of pipe evaluated. Less than 5 miles of pipe is evaluated at $3.50 per foot. This project contemplates evaluating up to 8-10 miles of the county's 18 miles of distribution system infrastructure within the three towns. There is also a $7,500 mobilization and pre engineering cost to move on to the project from Ontario, Canada (where the technology is located) to locations in the Owens Valley. The prior referenced USEPA funded document estimates that the cost for the technology is about 10% of the installed cost of pipe. The above figure of $3.25 per lineal foot of pipe investigated is far below the cost estimates for pipe replacement based upon Public Works prior project experience and escalating past prices for inflation. If 3 miles (15,840 lineal feet) of 6"(inch), 3 miles (15,840 lineal feet) of 8" (inch), 1 mile (5,280 lineal feet) of 10" (inch) and 1 mile (5,280 lineal feet) of 12" (inch) pipe are replaced, the average cost per foot of all above pipe replaced is $133 per lineal foot, which includes engineering costs. 10% of that cost is $13 per lineal foot. This project will cost approximately $4 per lineal foot, one third of the approximate 10% of installation costs. Note that this is for the expected technology, to be determined by a consultant. A consultant may determine that less costly technology is equally appropriate.

7. Discretionary points based on overall merit and importance of project to the planning region (up to 10 points)

The planning region, or the nation for that matter, currently does not have access to a database or spreadsheet of water main age, condition, soil type, acidity, leak history, etc. proposed by this project. Local soil types will be referenced to the USDA's "Soil Survey of Benton-Owens Valley Area", thus making it possible for a local utility, using the above soil report in conjunction with the database or spreadsheet available on the web, to compare a proposed pipeline path's soil type and characteristics with an existing pipeline with the same or similar soil characteristics listed in the database to estimate the performance of the pipeline over time. This project would make the results available to anyone on line, anywhere the world wide web can be accessed. The information will be a valuable Capital Improvement Plan planning tool to smaller Owens Valley utilities assisting with pipeline age, maintenance, and replacement expectations.

DWR Priorities

8. Does the project proposal address current DWR priorities, *as set out in the PSP*?
    a. Does the project involve and/or benefit a DAC (must be demonstrated)? (5 points) Yes, Laws, Independence, and Lone Pine have been demonstrated to be Disadvantaged communities.
    b. Does the project involve and/or benefit a Tribe? (5 points) No
    c. Does project help to integrate stormwater resource plan requirements into the IRWM Plan as specified in California Water Code Section 10562 (see full text of the section below)? (5 points) No
    d. Does the project address stormwater and/or flood management? (5 points) No
    e. Does the project address salt and nutrient management planning? (5 points) No
9. *In the PSP*, DWR specifies that the Planning Grant must help the IRWM Group meet the Plan Standards as set out in the Prop. 84 Guidelines. Does the project help to meet the IRWM Plan Standards (below)? (5 points total) Yes. This project follows or meets the plan standards as shown in Table 2, below.

Table 2 – IRWM Plan Standards	
• **Governance**	• **Data Management**
• **Region Description**	• **Finance**
• **Objectives**	• **Technical Analysis**
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• **Project Review Process**	• **Stakeholder Involvement**
• **Impact and Benefit**	• **Coordination**
• **Plan Performance and Monitoring**	• **Climate Change**

10. Does the project help address IRWM program preferences *as set out in the PSP*? (0.5 point for each of the following, for a maximum of 7 points)
    - Include regional projects or programs: Yes, Towns are regional

- Effectively integrate water management programs and projects within hydrologic region: The project integrates leak detection & resulting capital improvement plan to replace leaking pipes and achieve conservation of water, among other goals.
- Effectively resolve significant water- related conflicts within or between regions: A significant conflict within the three towns, which is not commonly recognized, is that there is a need for a rate increase to fund capital improvements and contingency funds among other necessary funds. The local populace doubts figures presented by Public Works relating to the need for a rate increase, system condition, and costs for replacement. This project will help address this conflict by independently determining the condition of the mains evaluated which will help establish a defensible Capital Improvement Program which also leads to a defensible rate increase.
- Contribute to attainment of one or more objectives of the CALFED Bay-Delta Program (not applicable to Inyo-Mono region)
- Address critical water supply or water quality needs of disadvantaged communities. Yes, establishment of condition assessment and leak detection is a critical water supply need for the three DAC's.
- Effectively integrate water management with land use planning: No
- Include actions designed to integrate the Stormwater Resource Plan: No
- Drought Preparedness: Yes, water conservation enhances Drought preparedness.
- Use and reuse water more efficiently: Yes, Water conservation is water use efficiency
- Climate Change Response Actions Yes, water conservation is a climate change response.
- Expand environmental stewardship: Yes, water conservation is environmental stewardship.
- Practice integrated flood management: No
- Protect surface and groundwater quality: No
- Improve tribal water and natural resources: No
- Ensure equitable distribution of benefits: Yes, enhances distribution of benefits to DAC's

Inyo-Mono INTEGRATED REGIONAL WATER MANAGEMENT PROGRAM

Round 2 Planning Grant Project Evaluation Criteria

Inyo-Mono IRWM Regional Priorities

1. Has the applicant demonstrated BY JANUARY 11, 2011, with significant confidence, that there is a minimum 25% match available? (This criterion will be used in the January 11 ranking discussion)
2. Has the applicant demonstrated clearly that the application includes only planning efforts and no implementation components? (This criterion will be used in the January 11 ranking discussion)
3. Does the proposal clearly support the Inyo-Mono IRWM Planning Program? (5 points)
4. Does the project help to address Inyo-Mono Phase I regional objectives and Resource Management Strategies (see attachment below)? (5 points)
5. Does the project help to fill planning gaps in the Inyo-Mono planning region? (5 points)
6. Is the budget reasonable for the scope of work? (10 points)
7. Discretionary points based on overall merit and importance of project to the planning region (up to 10 points)

(35 points available for Inyo-Mono IRWM regional priorities)

DWR Priorities

8. Does the project proposal address current DWR priorities, *as set out in the PSP*?
    a. Does the project involve and/or benefit a DAC (must be demonstrated)? (5 points)
    b. Does the project involve and/or benefit a Tribe? (5 points)
    c. Does project help to integrate stormwater resource plan requirements into the IRWM Plan as specified in California Water Code Section 10562 (see full text of the section below)? (5 points)
    d. Does the project address stormwater and/or flood management? (5 points)
    e. Does the project address salt and nutrient management planning? (5 points)
9. *In the PSP*, DWR specifies that the Planning Grant must help the IRWM Group meet the Plan Standards as set out in the Prop. 84 Guidelines. Does the project help to meet the IRWM Plan Standards (below)? (5 points total)

Table 2 – IRWM Plan Standards	
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• **Project Review Process**	• **Stakeholder Involvement**
• **Impact and Benefit**	• **Coordination**
• **Plan Performance and Monitoring**	• **Climate Change**

10. Does the project help address IRWM program preferences *as set out in the PSP*? (0.5 point for each of the following, for a maximum of 7 points)
    - Include regional projects or programs
    - Effectively integrate water management programs and projects within hydrologic region.
    - Effectively resolve significant water- related conflicts within or between regions
    - Contribute to attainment of one or more objectives of the CALFED Bay-Delta Program (not applicable to Inyo-Mono region)
    - Address critical water supply or water quality needs of disadvantaged communities.
    - Effectively integrate water management with land use planning
    - Include actions designed to integrate the Stormwater Resource Plan
    - Drought Preparedness
    - Use and reuse water more efficiently
    - Climate Change Response Actions
    - Expand environmental stewardship
    - Practice integrated flood management
    - Protect surface and groundwater quality
    - Improve tribal water and natural resources
    - Ensure equitable distribution of benefits

(37 points available for DWR priorities)
72 Total points available

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California Water Code Section 10562:

(a) A city, county, or special district, either individually or jointly, may develop a stormwater resource plan pursuant to this part.

(b) Stormwater resource plans shall:

(1) Be developed on a watershed basis.

(2) Provide for multiple benefit project design to maximize water supply, water quality, and environmental and other community benefits.

(3) Provide for community participation in plan development and implementation.

(4) Be consistent with, and assist in, compliance with total maximum daily load (TMDL) implementation plans and applicable national pollutant discharge elimination system (NPDES) permits.

(5) Be consistent with all applicable waste discharge permits.

(6) Be consistent with any applicable integrated regional water management plan.

(c) The proposed or adopted plan shall meet the standards outlined in this section. The plan need not be referred to as a "stormwater resource plan." Existing planning documents may be utilized as a functionally equivalent plan, including, but not limited to, watershed management plans, integrated resource plans, urban water management plans, or similar plans. If a planning document does not meet the standards of this section, a collection of local and regional plans may constitute a functional equivalent.

(d) Stormwater resource plans shall identify all of the following:

(1) Opportunities to augment local water supply through groundwater recharge or storage for beneficial reuse of stormwater.

(2) Opportunities for source control for both pollution and stormwater runoff volume, onsite and local infiltration, and reuse of stormwater.

(3) Projects to reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.

(4) Opportunities to develop or enhance habitat and open space through stormwater management, including wetlands, riverside habitats, parkways, and parks.

(5) Design criteria and best management practices to prevent stormwater pollution and increase effective stormwater management for new and upgraded infrastructure and residential, commercial, industrial, and public development. These design criteria and best management practices shall accomplish all of the following:

(A) Reduce effective impermeability within a watershed by creating permeable surfaces and directing stormwater to permeable surfaces, retention basins, cisterns, and other storage for beneficial reuse.

(B) Increase water storage for beneficial use through a variety of on-site storage techniques.

(C) Increase groundwater supplies through infiltration, where appropriate and feasible.

(D) Support low-impact development for new and upgraded infrastructure and development using low-impact techniques.

(6) Activities that generate or contribute to the pollution of stormwater, or that impair the effective beneficial use of stormwater.

(7) Projects and programs to ensure the effective implementation of the stormwater resource plan pursuant to this part and achieve multiple benefits.

(8) Ordinances or other mechanisms necessary to ensure the effective implementation of the stormwater resource plan pursuant to this part.

Inyo-Mono IRWM Phase I Objectives and Resource Management Strategies

Objective	Resource Management Strategies
1. Protect, conserve, optimize, and augment water supply	A. Improve water supply reliability B. Improve system flexibility and efficiency C. Support compliance with current and future state and federal water supply standards D. Address local water supply issues through various techniques, including, but not limited to: groundwater recharge projects, conjunctive use of water supplies, water recycling, water conservation, water transfers, and precipitation enhancement E. Protect and improve the quality and quantity of groundwater supplies F. Identify existing gaps in groundwater and surface water quantity data G. Monitor groundwater and surface water supply variability H. Optimize existing storage capacity I. Conserve and adapt water uses to future conditions J. Capture and manage runoff K. Incorporate and implement low-impact development design features, techniques, and practices to reduce water demand L. Support appropriate recreational activities
2. Protect, restore, and enhance water quality	A. Support compliance with current and future state and federal water quality standards B. Improve the quality of urban runoff, storm water, and wastewater C. Reduce erosion and sedimentation D. Protect public and aquatic ecosystem health E. Match water quality to water use F. Support appropriate recreational activities

Objective	Resource Management Strategies
3. Provide stewardship of our natural resources	A. Protect, restore, and enhance natural processes, habitats, and threatened and endangered species B. Protect ecosystems such as upland forests and meadows dependent on surface/shallow water supply C. Enhance recreational and educational opportunities D. Identify, develop, and implement efforts to better control invasive species E. Assess ecosystem health of watersheds in the region
4. Maintain and enhance water, wastewater, and power generation infrastructure efficiency and reliability	A. Systematically and strategically rehabilitate and replace aging water and wastewater delivery and treatment facilities in rural communities, including tribal lands B. Ensure fire protection capacity C. Improve energy efficiency of water systems and uses D. Promote use of water efficiency in power generating facilities
5. Address climate variability and reduce greenhouse gas emissions	A. Increase understanding of water related greenhouse gas emissions B. Manage and modify water systems to respond to increasing climate variability C. Use cleaner energy sources to move and treat water
6. Increase participation of small and disadvantaged communities in IRWM process	A. Engage regional communities in collaborative water and natural resource related efforts B. Provide assistance for tribal and DAC consultation, collaboration, and access to funding for water programs and projects

For Clerk's Use Only:
AGENDA NUMBER

17

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ☒ Departmental ☐ Correspondence Action ☐ Public Hearing

☐ Scheduled Time for ☐ Closed Session ☐ Informational

FROM: CLERK OF THE BOARD
By: Patricia Gunsolley, Assistant Clerk of the Board

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Approval of Minutes

DEPARTMENTAL RECOMMENDATION: - Request Board approve the minutes of the Board of Supervisors Meeting of January 3, 2012, as requested per draft provided.

SUMMARY DISCUSSION: - The Board is required to keep minutes of its proceedings. Once the Board has approved the minutes as requested the minutes will be made available to the public via the County's web page at www.inyocounty.us.

ALTERNATIVES: - Staff awaits your Board's changes and/or corrections.

OTHER AGENCY INVOLVEMENT: - n/a

FINANCING: n/a

APPROVALS	
BUDGET OFFICER:	BUDGET AMENDMENTS *(Must be reviewed and approved by Budget Officer prior to being approved by others, as needed, and submission to the Assistant Clerk of the Board.)*
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the Assistant Clerk of the Board.)* Approved: _____ Date_____
AUDITOR/CONTROLLER:	ACCOUNTING/FINANCE AND RELATED ITEMS (*Must be reviewed and approved by the auditor-controller prior to submission to the Assistant Clerk of the Board.)* Approved:_____ Date_____
PERSONNEL DIRECTOR:	PERSONNEL AND RELATED ITEMS *(Must be reviewed and approved by the director of personnel services prior to submission to the Assistant Clerk of the Board.)* Approved:_____ Date_____

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received)_____ Date:_____
(The Original plus 20 copies of this document are required)

From: Terney, Karen -FS [mailto:kterney@fs.fed.us]
Sent: Thursday, January 05, 2012 10:19 AM
To: Undisclosed recipients
Subject: Forest Service Seeks Nominations for Planning Rule FACA Committee

18

Applications to serve on a newly-formed advisory committee to guide management of our national forests and grasslands are now available. Members selected to serve on the National Advisory Committee for Implementation of the National Forest System Land Management Planning Rule will advise and give recommendations to the Secretary of Agriculture and the Chief of the U.S. Forest Service.

The 45-day nomination period closes Feb. 21, 2012. Additional details on the committee and the application form are available at the U.S Forest Service website or by calling 202-205-0830. Further information is also available in the Federal Register Notice calling for nominations. Note that the nomination period has since been extended to Feb. 21, 2012.)

The committee will be comprised of up to 21 members with diverse backgrounds, who represent the full range of public interests in management of the National Forest System lands and who represent geographically diverse locations and communities, within each of the following three categories of interests:

1. Up to seven members who represent one or more of the following:
    a. Represent the affected public at-large
    b. Hold State-elected office (or designee)
    c. Hold county or local elected office
    d. Represent American Indian Tribes
    e. Represent Youth

2. Up to seven members who represent one or more of the following:
    a. National, regional, or local environmental organizations
    b. Conservation organizations or watershed associations
    c. Dispersed recreation interests
    d. Archaeological or historical interests
    e. Scientific Community

3. Up to seven members who represent one or more of the following:
    a. Timber Industry
    b. Grazing or other land use permit holders or other private forest landowners
    c. Energy and mineral development
    d. Commercial or recreational hunting and fishing interests
    e. Developed outdoor recreation, off-highway vehicle users, or commercial recreation interests

The committee will provide advice and recommendations on issues such as planning rule directives for implementation, best practices, effective monitoring practices and ongoing collaboration efforts. The announcement of this committee builds on the Agency's efforts to develop a new Land Management Planning Rule for the National Forest System.

Sincerely,

/s/ Tony Tooke
Director, Ecosystem Management Coordination

Forwarded by:
Karen Terney
BASS Writing/Editing Services Manager
(202) 205 1732

For Clerk's Use Only:
AGENDA NUMBER
20-21

AGENDA REQUEST FORM
BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ☐ Departmental ☐ Correspondence Action ☐ Public Hearing

☐ Scheduled Time for X Closed Session ☐ Informational

FROM: COUNTY COUNSEL

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: ISSUES TO BE DISCUSSED IN CLOSED SESSION

DEPARTMENTAL RECOMMENDATION:

PERSONNEL [Pursuant to Government Code § 54957]. Public Employee Appointment - Title: Director Public Works.

CONFERENCE WITH LABOR NEGOTIATOR [Pursuant to Government Code § 54957.6].- Instructions to Negotiators re: Wages, salaries and benefits - Title: Director Public Works - Negotiator: As designated by the Board of Supervisors

CONFERENCE WITH LABOR NEGOTIATOR [Pursuant to Government Code § 54957.6]. - Instructions to Negotiators re: wages, salaries and benefits - Employee Organization: Law Enforcement Administrators' Association (LEAA) - Negotiators: CAO Kevin Carunchio and Labor Relations Administrator Sue Dishion.

CONFERENCE WITH LABOR NEGOTIATOR [Pursuant to Government Code § 54957.6]. - Instructions to Negotiators re: wages, salaries and benefits - Employee Organization: Inyo County Probation Peace Officers Association (ICPPOA) - Negotiators:CAO Kevin Carunchio and Labor Relations Administrator Sue Dishion.

APPROVALS

COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the board clerk.)* Approved: 1-11-12 Date YES

DEPARTMENT HEAD SIGNATURE:
(Not to be signed until all approvals are received) Date: 1-11-12
(The Original plus 20 copies of this document are required)

For Clerk's Use Only:
AGENDA NUMBER

22

AGENDA REQUEST FORM

BOARD OF SUPERVISORS
COUNTY OF INYO

☐ Consent ☐ Departmental ☐ Correspondence ☐ Public Hearing

☐ Scheduled Time for ☐ Closed Session ☒ Informational

FROM: Alisha McMurtrie, Treasurer-Tax Collector

FOR THE BOARD MEETING OF: January 17, 2012

SUBJECT: Treasury Status Report for the Quarter Ending December 31, 2011

DEPARTMENTAL RECOMMENDATION: Review Report and direct questions to the County Treasurer.

CAO RECOMMENDATION:

SUMMARY DISCUSSION: The Report is provided pursuant to the provisions of Sections 16481.2 and 53646(b) of the Government Code. The primary purposes of the Report are to disclose the following: the investments and deposits of the treasury; the cost basis and market values of investments; compliance to the County Treasury Investment Policy; The weighted average maturity of the investments; and, the projected ability of the Treasury to meet the expected expenditure requirements of the Treasury's pooled participants for the next six months.

ALTERNATIVES: N/A

OTHER AGENCY INVOLVEMENT: Pursuant to Section 16481.2(a) of the Government Code, which is optional, copies of quarterly reports are sent to members of the County Treasury Oversight Committee. Pursuant to Section 53646(g) of the Government Code, which is also optional, copies of the reports as of December 31st and June 30th are forwarded to the California Debt and Investment Advisory Commission. Copies of all quarterly Treasury reports are available to Treasury participants.

FINANCING: N/A

APPROVALS	
COUNTY COUNSEL:	AGREEMENTS, CONTRACTS AND ORDINANCES AND CLOSED SESSION AND RELATED ITEMS *(Must be reviewed and approved by county counsel prior to submission to the board clerk.)* N/A Approved: _____ Date_____
AUDITOR/CONTROLLER:	ACCOUNTING/FINANCE AND RELATED ITEMS (*Must be reviewed and approved by the auditor-controller prior to submission to the board clerk.)* N/A Approved: _____ Date_____
PERSONNEL DIRECTOR:	PERSONNEL AND RELATED ITEMS (Must be reviewed and approved by the director of personnel services prior to submission to the board clerk.) N/A Approved:_____ Date_____

DEPARTMENT HEAD SIGNATURE: Alisha McMurtrie Date: 1-9-2012
Alisha McMurtrie, Treasurer-Tax Collector

COUNTY OF INYO
TREASURER-TAX COLLECTOR
168 NORTH EDWARDS STREET
POST OFFICE DRAWER O
INDEPENDENCE, CA 93526-0614
(760) 878-0312 • (760) 878-0311 FAX

ALISHA McMURTRIE
TREASURER-TAX COLLECTOR

TO: Honorable Members of the Inyo County Board of Supervisors
FROM: Alisha McMurtrie, Treasurer-Tax Collector
SUBJECT: Report of the Status of the Inyo County Treasury as of: December 31, 2011
DATE: January 9, 2012

The following status report of the County Treasury as of December 31, 2011 is provided pursuant to the provisions of Sections 16481.2 and 53646(b) of the Government Code.

The attached copy of the "Treasurer's Daily Reconciliation" provides a breakdown of the dollar amount of the Treasury assets by depository for monetary assets and by issuer for securities.

The attached copy of the custody statement from Union Bank of California reflects, among other things, the following information regarding each security held: issuer, maturity date; CUSIP number; face amount; cost basis; and market value (calculated by Merrill Lynch).

The weighted average maturity of the investments of the Treasury was 822 days.

It is anticipated that the County Treasury will be able to meet the liquidity requirements of its pooled participants for the next six months.

The investment portfolio is in compliance with the Inyo County Treasury Investment Policy.

NOTES: Regarding Inyo County's monetary assets held outside the County Treasury:

- Various Inyo County Departments and treasury pool participants maintain and administer bank checking accounts outside the County Treasury.
- Inyo County's OPEB investment with PARS balance as of 10/31/2011 was $3,177,080.71.

C: Ms. Leslie L. Chapman, Inyo County Auditor-Controller
Mr. Art Maillet, Inyo County District Attorney
Mr. Bill Lutz, Inyo County Sheriff
Members of the Inyo County Treasury Oversight Committee

TREASURER'S DAILY RECONCILIATION
DATE: 12-30-11

AUDITOR'S BALANCES

Balance Forward - Cash in Treasury		**$111,276,176.73**
Plus: Auditor Adjustments Payroll		**$2,596.67**
Deposit Authorizations		**$546,023.67**
Less: Co. Checks Pd	**12/29/11**	**(128,286.86)**
Auditor JE# to adjust		
Outgoing Electronic Wires		**(781,183.26)** CO PR
		(1,202.00) NACHA
		(2,676.50) CASDU
		(262,398.83) CO PR Tx Fed
		(45,562.69) CO PR Tx St.
		(23,643.13) CO Misc. PR Wires
Ending "Claim on Cash in Treasury"		**$110,579,843.80**

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TREASURER'S BALANCE:

Cash on Hand:	Vault	**$350.00**
	Drawer	**$325.81**
Bank Deposits on Hand:		

BANK ACCOUNTS:

Union Bank - General Account.	**$4,224,312.75**
El Dorado - General Account	**$31,504.72**

INVESTMENTS;		**% Invested**	
Local Agency Investment Fund	**$37,000,000.00**	*Agency*	*Limit*
AIM Money Market	**$1,000,000.00**	*0.90%*	of 10.00%
UBS Money Market	**$2,000,000.00**	*1.81%*	of 10.00%
Federal Agencies	**$ 49,735,761.11**	*44.98%*	of 100.00%
Treasury Bill	**$0.00**	*0.00%*	of 100.00%
Commercial Paper	**$ 16,594,448.31**	*15.01%*	of 15.00%

TOTAL TREASURY BALANCE:	**$110,586,702.70**		
Difference: (Treasury SHORT or OVER)	$6,858.90		
Explanation of Difference:	Co PR Adj	($2,596.67)	
	Err Cks Pd	($354.43)	
NOTES	El D Ck 1591	$9,810.00 not cleared	
Investments Maturing Over 1 Year	**$ 39,747,750.00**	*35.94%*	of 35.00%

Prepared By: MP

Dec30'11.xlsAud Treas Daily Reconcil

Inyo County Treasurer's Report
Weighted Average Maturity

Maturity Date	# of Days to Maturity	$ Amount of Security
3/30/2012	2x90	$ 1,994,321.11
4/23/2012	2x114	$ 1,993,781.94
5/4/2012	3x114	$ 2,991,355.00
5/11/2012	2.65x132	$ 2,641,485.40
5/31/2012	152	$ 998,011.11
6/11/2012	5x163	$ 4,982,750.00
6/29/2012	5x181	$ 4,990,000.00
7/13/2012	195	$ 996,947.78
8/31/2012	244	$ 993,807.08
11/28/2012	4x333	$ 4,000,000.00
9/9/2013	5x618	$ 5,000,000.00
11/19/2013	4x689	$ 4,000,000.00
11/29/2013	2x699	$ 1,999,000.00
4/11/2014	2.5x832	$ 2,498,750.00
6/27/2014	5x1009	$ 5,000,000.00
12/14/2015	4x1444	$ 4,000,000.00
2/16/2016	3x1508	$ 3,000,000.00
2/16/2016	1.25x1508	$ 1,250,000.00
10/19/2016	4x1754	$ 4,000,000.00
10/27/2016	5x1762	$ 5,000,000.00
11/29/2016	4x1791	$ 4,000,000.00
	54,290	$ 66,330,209.42

Total = 822 Days Weighted Average Maturity
As of: December 31, 2011

Please note that this does not include checking account at UBOC, El Dorado, LAIF or UBS account.

*Days are determined at a per million rate.

UnionBank

Holdings - Reporting as of Trade Date
Account: 6736305280 - COUNTY OF INYO CU

As of: 30-Dec-2011

Pending Transactions Included

Asset Type	Asset Name	Maturity Date	CUSIP	Shares / Units	Cost Basis	Market Value	S&P Rating	Moody's Rating	Net Unrealized Gain/Loss	Annual Yield	Estimated Annual Income
Cash & Cash Equivalents	UBS FINANCE DC/P 3/30/12	30-Mar-2012	90262CCW5	2,000,000.0000	$1,994,321.11 USD	$1,997,320.00 USD			$2,998.89 USD	0.386%	$7,705.56 USD
Cash & Cash Equivalents	UBS FINANCE DELWDC/P 4/23/12	23-Apr-2012	90262CDP9	2,000,000.0000	$1,993,781.94 USD	$1,995,840.00 USD			$2,058.06 USD	0.615%	$12,268.06 USD
Cash & Cash Equivalents	HSBC FIN DC/P 5/04/12	04-May-2012	4042F0E49	3,000,000.0000	$2,991,355.00 USD	$2,992,200.00 USD			$845.00 USD	0.579%	$17,337.50 USD
Cash & Cash Equivalents	UBS FINANCE DC/P 5/11/12	11-May-2012	90262CEB9	2,650,000.0000	$2,641,485.40 USD	$2,642,739.00 USD			$1,253.60 USD	0.437%	$11,553.27 USD
Government Obligations	FNMA DISC NTS 5/31/12	31-May-2012	313588XN0	1,000,000.0000	$998,011.11 USD	$999,920.00 USD	N/A	N/A	$1,908.89 USD	0.202%	$2,022.13 USD
Cash & Cash Equivalents	HSBC FIN CORP DC/P 6/11/12	11-Jun-2012	4042F0FB2	5,000,000.0000	$4,982,750.00 USD	$4,982,100.00 USD			($650.00) USD	0.468%	$23,319.44 USD
Government Obligations	FNMA DISC NTS 6/29/12	29-Jun-2012	313588YT6	5,000,000.0000	$4,990,000.00 USD	$4,999,250.00 USD	N/A	N/A	$9,250.00 USD	0.203%	$10,138.89 USD
Cash & Cash Equivalents	UBS FINANCE DELWDC/P 7/13/12	13-Jul-2012	90262CDD6	1,000,000.0000	$996,947.78 USD	$995,550.00 USD			($1,397.78) USD	0.312%	$3,103.23 USD
Cash & Cash Equivalents	UBS FINANCE DEL DC/P 8/31/12	31-Aug-2012	90262CHX8	1,000,000.0000	$993,807.08 USD	$994,220.00 USD			$412.92 USD	0.852%	$8,465.98 USD
Government Obligations	FHLB BDS 0.250% 11/28/12	28-Nov-2012	313376H57	4,000,000.0000	$4,000,000.00 USD	$3,999,640.00 USD			($360.00) USD	0.250%	$10,000.00 USD
Government Obligations	FNMA NTS 1.050% 9/09/13	09-Sep-2013	3136FPEL7	5,000,000.0000	$5,000,000.00 USD	$5,043,600.00 USD	AA+	AAA	$43,600.00 USD	1.041%	$52,500.00 USD
Government Obligations	FNMA NTS 0.800% 11/19/13	19-Nov-2013	31398A5Z1	4,000,000.0000	$4,000,000.00 USD	$4,020,320.00 USD	AA+	AAA	$20,320.00 USD	0.796%	$32,000.00 USD
Government Obligations	FHLMC MTN 0.500% 11/29/13	29-Nov-2013	3134G26U1	2,000,000.0000	$1,999,000.00 USD	$1,998,040.00 USD	AA+	AAA	($960.00) USD	0.500%	$10,000.00 USD
Government Obligations	FHLMC MTN 1.000% 4/11/14	11-Apr-2014	3134G2QB1	2,500,000.0000	$2,498,750.00 USD	$2,500,275.00 USD	AA+	AAA	$1,525.00 USD	1.000%	$25,000.00 USD
Government Obligations	FFCB BDS 1.050% 6/27/14	27-Jun-2014	31331KQL7	5,000,000.0000	$5,000,000.00 USD	$5,009,150.00 USD			$9,150.00 USD	1.048%	$52,500.00 USD
Government Obligations	FFCB BDS 1.170% 12/14/15	14-Dec-2015	31331K2S8	4,000,000.0000	$4,000,000.00 USD	$4,003,720.00 USD			$3,720.00 USD	1.169%	$46,800.00 USD
Government Obligations	FFCB BDS 2.800% 2/16/16	16-Feb-2016	31331KCF5	3,000,000.0000	$3,000,000.00 USD	$3,008,670.00 USD			$8,670.00 USD	2.792%	$84,000.00 USD
Government Obligations	FHLB BDS 2.500% 2/16/16	16-Feb-2016	313372H49	1,250,000.0000	$1,250,000.00 USD	$1,253,575.00 USD			$3,575.00 USD	2.493%	$31,250.00 USD
Government Obligations	FHLMC NTS S/U 0.500% 10/19/16	19-Oct-2016	3134G2S45	4,000,000.0000	$4,000,000.00 USD	$4,000,360.00 USD			$360.00 USD	0.500%	$20,000.00 USD
Government Obligations	FHLMC NTS 1.600% 10/27/16	27-Oct-2016	3134G2Y22	5,000,000.0000	$5,000,000.00 USD	$5,004,350.00 USD	AA+	AAA	$4,350.00 USD	1.599%	$80,000.00 USD
Government Obligations	FNMA NTS 1.625% 11/29/16	29-Nov-2016	3136FTNM7	4,000,000.0000	$4,000,000.00 USD	$3,995,920.00 USD	AA+	AAA	($4,080.00) USD	1.627%	$65,000.00 USD
Subtotals											
Cash & Cash Equivalents					$16,594,448.31 USD	$16,599,969.00 USD			$5,520.69 USD		$83,753.04 USD

UnionBank

Holdings - Reporting as of Trade Date
Account: 6736305280 - COUNTY OF INYO CU

As of: 30-Dec-2011

Pending Transactions Included

Asset Type	Asset Name	Maturity Date	CUSIP	Shares / Units	Cost Basis	Market Value	S&P Rating	Moody's Rating	Net Unrealized Gain/Loss	Annual Yield	Estimated Annual Income
Government Obligations					$49,735,761.11 USD	$49,836,790.00 USD			$101,028.89 USD		$521,211.02 USD
Totals					$66,330,209.42 USD	$66,436,759.00 USD			$106,549.58 USD		$604,964.06 USD