NOTES | 2/16/11

Joint Habitat & Dust Control Work Group Meeting

Important Dates

3/7/2011, 10:00-12:00, conference call to ask questions about the habitat suitability index
3/15/2011, Science Panel morning site visit and afternoon meeting

Next Steps

All	Conference Call to ask questions about the habitat suitability index 3/7/2011 at 10:00
Jeff & Margot	Document the habitat suitability index methodology
Andrea	Initiate literature review on open water and bird use to address questions on the **open water guild**
Margot	Incorporate as many changes as possible into draft master plan so it can be shared with science panel by 3/1
Brian	Organize the science panel. Share the entire draft master plan with them
DWP Staff	Begin identifying water efficient habitat enhancement management actions that can be accomplished in the near term (i.e. in a "few" cells)

Meeting Overview

The work groups met to understand the habitat suitability index, model, and analytical results. A key concept is "value-acres." Value-acres are quantified by multiplying habitat indices and acres. This yields a *qualitative quantity*. In other words, value-acres combine the habitat **value** of land with the physical **acres** associated with land on the lakebed. The group is moving forward with an independent scientific peer review of the habitat suitability index in March. The Agency Forum and Planning Committee will review it over the next month. The group recommended that for the purposes of marketing, the Master Plan is creating the **Owens Lakebed Conservation Area (OLCA).**

Method--How did the Owens Lakebed Master Plan Develop a Habitat Suitability Index

1. Habitat Work Group agreed on target guilds
2. Work Group identified variables that best describe habitat for the 4 guilds
3. Planning Committee identified the need to define the habitat baseline
4. Work Group identified the need for an index to define the baseline. Habitat Suitability Index combines literature review with local field observations.
5. Now—making sure everyone understands the index
6. After today—science panel conduct a peer review to refine the Habitat Suitability Index
7. Into the future, ongoing refinement of the model throughout plan implementation, monitoring and adaptive management.

Challenge—Address Multiple Objectives for the Master Plan

The master plan concept or map must address multiple objectives. Any proposal for the habitat area must consider and manage all of these objectives. These include:

- Dust control
- Public trust (habitat, access and view shed)
- Water conservation
- Cultural resources
- Economic development
- Etc.

Tentative Proposal Emerging from this Meeting

1. The method is the Habitat Suitability Index, subject to independent science review
2. Value Acres with Habitat Suitability Index equals the Baseline
    - Need to address questions and concerns about open water value
    - All work group members need more time to review and think about this
3. Manage the lakebed to enhance habitat while achieving multiple objectives maintaining or increasing baseline value acres. (Note: The Master Plan will include clear process recommendations and management actions.)

One significant change is that the conservation area would not consist of a "core area" circled on the map. Rather the conservation area would consist of a value that could shift. That being said, the lakebed is a complicated managed system, the lakebed value-acres will not shift substantially in the short term. Stakeholders will only agree with this concept as long as final Master Plan agreement provides the resources and implementation plan to ensure that the value-acres will be sustained and enhanced. If the agreement is not reached regarding these resources, then stakeholders will want to revisit this agreement.

Open Water Guild Value-Acres

Questions emerged with regards to whether the Open Water value-acres (as part of the baseline) are higher than necessary to support the amount of bird use. This question emerged because so much of the lakebed is covered with shallow flood. Since one Master Plan goal is water conservation and since the master plan would have to maintain or enhance the baseline, these questions should be further explored.

Key Questions for Exploration

- Are there more open water value-acres than needed to support bird use?
- Is there a minimum amount (and how to create it) of open water required to support the baseline bird use?

Ways to Explore the Answer to these Questions

- Science panel
- Literature review (Andrea will start)

Water Conservation

One discussion point is how will water conservation be achieved. There are options that will be explored as part of the Master Plan.

- Habitat enhancement with water savings included in plan implementation
- Reduce water use in dust control areas with low habitat suitability index values
- Move forward testing and approval for new BACM (some of these have habitat benefits)

Science Panel

Purpose: To evaluate the habitat suitability index and make recommendations, if necessary, to refine and or improve it.

Science Review Steps

- 3/1: Share information about the master plan with the scientists. Make sure that multiple objectives and goals are clear.
- 3/15 morning: Conduct site visit (Mike, Jeff, Brian, Tammy, Great Basin rep, Margot, Jason & Bill)
- 3/15 afternoon: Hold meeting with scientists to present the habitat suitability index
- Scientists craft draft written reports
- April or May: Scientists participate in panel discussion with the habitat work group and planning committee. During the panel discussion, planning committee members can ask questions of the scientists
- Scientists submit final written reports

Questions for the Scientists

The work group generated questions that they might want to ask the scientists. Members would ask these and other questions during the panel discussion in April or May.

- What is the utility of the value-acres as a baseline?
- What are the challenges of using the value-acres?
- How do rated acres compare? Does 20 acres with an index of 1 equal 40 acres with an index of 0.5?
- What are we missing on the open water? What parameters might we consider?
- What parameters, if any, are missing on the 4 guilds?
- What are your recommendations for validation and ground "truthing"? Is what we've done sufficient?
- What are your recommendations for long-term monitoring
- How to integrate external environmental factors: climate change, disease, etc.?
- Any other experts who might add or be knowledgeable?

Owens Lakebed Conservation Area (OLCA)

At the last Planning Committee meeting, members expressed concern about the terminology to describe the project area. Members were grappling with terms such as refuge and preserve and wondered what legal connotation these terms might have. Tammy Branston investigated possible terms. The only

options available that did not trigger state or federal laws were OL Natural Resource Area (OLNRA), OL Conservation Area (OLCA) and OL Natural Resource Conservation Area (OLNRCA). The group recommended that for the purposes of marketing, the Master Plan is creating the Owens Lakebed Conservation Area. (However, the Agency Forum the week after this meeting announced that this has federal connotations so the planning committee will have to consider again.)

Participants
Tammy Branston
Gene Coufal
Grace Holder
Debbie House
Andrea Jones
Steve McLaughlin
Jeff Nordin
Mike Prather
Pete Pumphrey
Brian Tillemans
Bill VanWagoner

Technical Consultants
John Dickey
Margot Griswold
Facilitator Gina Bartlett

4.0 DUST CONTROL

This section describes the regulatory history of dust control in the planning area, current dust control management and operations, the process for approval of a new Best Available Control Measures (BACM), and a variety of new and modified BACM. The proposed BACM include new measures to be tested and approved, combinations of existing measures to achieve habitat or water efficiency, modifications of existing measures to be tested, and immediate response measures. This section represents the "actions" associated with dust control, and it also describes the dust control zones, prioritization for implementation, and a summary of the public trust value.

4.1 Regulatory Background for Dust Control

On July 1, 1987, the USEPA revised the NAAQS, replacing TSP with PM_{10}, a new indicator for particulate matter (dust). The intent of this health-based standard for particulate matter is to prevent airborne concentrations of suspended particles that are injurious to human health. At the same time, the USEPA set forth regulations for implementing the revised NAAQS and the policy for developing SIPs and supporting control strategies.

The USEPA designated the southern OVPA as one of the areas in the nation that violated the new PM_{10} NAAQS. Subsequent air quality monitoring by the District has shown that the Owens Lakebed is the major source of PM_{10} emissions contributing to air quality violations in the OVPA. Extremely high PM_{10} concentrations—over 12,000 micrograms per cubic meter ($\mu g/m^3$), or more than 80 times the standard—have been verified downwind of the Owens Lakebed before any dust control was implemented. The lakebed is considered an anthropogenic (human-caused) source of PM_{10} because historic withdrawals of water for irrigation and diversion of water to the Los Angeles Aqueduct left Owens Lake virtually dry by 1930 (Sapphos 2008a).

As a result of a SIP prepared by the District and approved by the USEPA in 1998, 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 Revised SIP (District, 2003) control strategy requires using Shallow Flood, Managed Vegetation, and/or Gravel to accomplish PM_{10} emission reductions on 29.8 square miles of the Owens Lakebed. By December 31, 2006, the City had met their deadline by implementing dust control measures on those 29.8 square miles.

In addition to requiring the LADWP to construct and operate 29.8 square miles of dust controls, the 2003 SIP also contains provisions requiring the District to continue to monitor air pollution

emissions from the lakebed and identify any additional areas that may require PM_{10} controls in order to meet the standards. According to the provision for the supplemental control requirement, the 2003 SIP sets forth detailed procedures and protocols to determine whether additional areas require control. The Air Pollution Control Officer (APCO) is required to make an annual determination of the necessity for supplemental control, and direct the 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 at the Owens Lakebed beyond the 29.8 square miles identified in the 2003 SIP, a Settlement Agreement was approved by the District and the 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, and 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 Clean Air Act Amendments. As a result of this finding, the Owens Valley 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, which was to be submitted to the USEPA by December 31, 2007. 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 2008 Revised SIP includes an updated analysis of the particulate matter air pollution problem in the Owens Valley and a revised control strategy to bring the area into attainment with the federal air quality standard for particulate matter as soon as practicable. The 2008 SIP also incorporates provisions of the 2006 Settlement Agreement between the District and the LADWP (District 2008). Implementation of all dust control measures on the lakebed is subject to appropriate analysis under the California Environmental Quality Act (CEQA) and permitting and approvals by other responsible agencies.

4.2 Current Dust Control Management and Operations

The LADWP has been constructing dust control measures on the Owens Lakebed since 2000. The following sections provide details on BACM, control efficiencies for current dust control, and the process for approval of a new BACM.

4.2.1 Approved BACM

Owens Lakebed BACM are defined as those methods of PM_{10} abatement that are effective in reducing the PM_{10} emissions from the surface of the playa. From 1980 to 2000, the District and other researchers pursued a research and testing program to develop PM_{10} control measures that are effective in the Owens Lake playa environment. The District, in cooperation with the LADWP, developed three dust control measures that have been approved for use on the lakebed and have been designated as BACM by the District. These measures include Shallow Flood, Managed Vegetation, and Gravel. A process for further, cooperative modification and development of BACM was added to the 2003 SIP, and retained in the 2008 SIP. This process to date has accommodated two BACM tests and no modifications or additions to the three BACM measures contained in the 1998 SIP. The 2006 Settlement Agreement 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 was not accepted by the Commission.

Currently, Shallow Flood is being used on approximately 25.9 square miles, Managed Vegetation on 3.7 square miles, and Gravel on 0.14 square miles. As part of Phase VII, dust control measures were designated to be implemented on an additional 13.2 square miles of the lakebed by the end of 2010. The additional 13.2 square miles were designated to consist of 9.2 square miles of Shallow Flood, 0.5 square miles of channel area enhancement, and 3.5 square miles of Moat and Row. Since Moat and Row ultimately was not accepted by the Commission, this designated area must now be controlled with one of the three BACM while balancing water conservation. Phase VIII consists of an additional 1.9 square miles designated as Gravel.

4.2.1.1 Shallow Flood

The Shallow Flood dust control method consists of applying water to areas of dust emissions. 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% of the land surface. A significant, additional area of Shallow Flood is “Pond Shallow Flood”, comprised of dust control cells that are one relatively continuous pond. 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. 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 2011, 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 occupies 3.3 square miles and consists of subsurface drip irrigated fields of native saltgrass (*Distichlis spicata*) provided with subsurface drainage, which creates soil conditions suitable for plant growth, while requiring a minimum of applied water. 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. Drains installed near naturally occurring wetlands are managed to avoid significant groundwater drawdown or loss of surface water extent in the adjacent wetland areas.

4.2.1.3 Gravel

The Gravel dust control method consists of installing a four-inch layer of coarse gravel screened to greater than ½-inch in diameter on the surface of the Owens lakebed playa. The gravel is placed on a permeable geotextile fabric for stability. The source of the gravel is from local production mines located in the surrounding areas off the lakebed.

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% PM_{10} control Minimum Dust Control Efficiencies (MDCE). The 99% 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% wetted surface, Managed Vegetation was required to be maintained at 50% 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% coverage with a 4-inch layer of gravel.

However, not all the additional emissive areas mandated under the 2008 SIP require 99% 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% to over 99%. 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 MDCEs based on modeling results (District 2008).

Another outcome of the 2006 Settlement Agreement reduced the efficiency specification for existing Managed Vegetation site. The performance specification was altered to reflect the vegetation cover on the 3.3-square-mile site when it was substantially non-emissive. The 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 a pending BACM proposal to the District, any new Managed Vegetation constructed in the future would have a similar performance specification.

4.2.3 Approval Process for New BACM

Development of additional control strategies not mandated by the 2008 SIP is at the discretion of LADWP. However, approval of the results and implementing changes to the SIP is the responsibility of the District. As such, specific protocols for the tests are developed by LADWP and submitted to the District for review and approval, before actual studies are initiated. The approval process for new BACM is summarized in the following steps:

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),
3. Environmental review of BACM (CEQA)and approval of dust control measures as consistent with public trust by the Commission (in the form of a land lease), and
4. Implementation of the dust control measures on the lakebed.

4.3 Dust Control Strategies

The following section defines potential methods to control dust considering water efficiency and wildlife habitat. These measures would need testing and/or approval to become BACM, as outlined above in Section 4.2.3.

In general, development of a greater diversity of BACM choices will be beneficial. However, for the multiple objectives of this Master Plan to be achieved, BACM with certain combinations of requirements and features are most urgently needed. At the time of this writing, these most urgent needs appear to be the following:

- BACM that provides high Habitat Suitability Indices per unit water applied, and that conforms to other regulatory requirements (dust control effectiveness, permitable and acceptable to the Commission), while being both constructable and operable for an acceptable cost. This BACM would likely be applied in some areas immediately and then expanded to the extent beneficial to the achievement of Master Plan goals. Examples of related BACM concepts can be found in the following sections:

  - Tillage (for habitat) with Pulse Flooding
  - Modified Shallow Flood, with Efficiency Enhancements Coupled with Habitat Enhancements
  - Dryer, Sparser, Vegetated or Graveled Shallow Flood
  - Modified Managed Vegetation
- Waterless or very water efficient BACM for use in areas where habitat enhancement is not a main focus. This BACM will likely require the type of testing currently planned for the T-12 area. Examples of related BACM concepts can be found in the following sections:
  - Shallow Flooding with Brine
  - Managed Salt Flat
  - Tillage (for dust control) with Irrigation as Needed
  - Solar with Gravel and Other Potential Solar
  - Soil Binders
  - Modified Gravel
- All BACM approaches listed above have a common inconvenience: substantial time is required after a new dust source is identified, and before dust control can be implemented. During this time, source areas often expand, produce tons of air pollution, and become much more costly to control. An approach to alleviating this problem is described in one section:
  - Proactive Immediate Response Dust Control Measures

4.3.1 New BACM for Testing and Approval

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 be sought to achieve greater operational flexibility and efficiency, promote habitat and water conservation, or have aesthetic and recreation benefits 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 to the SIP and become admissible for use on Owens Lake.

To date, practically all Owens Lake dust control has been implemented by LADWP. For a dust control approach to merit construction and operation by LADWP, it must compare favorably with available alternatives in terms of ability to obtain leases and permits, effectiveness, cost

(labor, power, water) of operation, and ability to reliably comply with the SIP and other permits and agreements (such as might result from a Master Plan).

Several potential BACM that, at the time of this writing, appear to merit development, are described in this section.

4.3.1.1 Shallow Flooding with Brine

The surface is flooded or saturated with Owens Lakebed brines and control is achieved as per "traditional" Shallow Flooding – by keeping it wet. High salt concentration water (brine) deployed into Shallow Flooded areas would lower the evaporation rate, potentially reducing the amount of water necessary to achieve dust control. The brine used in Shallow Flooding 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 Flooding areas that use fresh water. A possible challenge for Shallow Flooding with brine is managing salt crust that might form within the wetted areas. This feature could be non-compliant on the satellite because it is too dry. From a dust control standpoint, brine flooding is a BACM provided the water cover meets that required; however, environmental work and technical feasibility testing will be necessary for compliance and implementation associated with the dryer conditions. The measure would create minimal habitat value although lakebed-wide salt management would contribute to habitat overall.

4.3.1.2 Managed Salt Flat

Another 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. The measure would create minimal habitat value although lakebed-wide salt management would contribute to habitat overall.

4.3.1.3 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. Tillage would be non-linear to enhance aesthetics.

Soil tillage has been used for temporary control of dust sources on the lakebed in the past and, as of December 2010, 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 challenge for tillage methods of dust control on the Owens Lakebed is the very high control efficiencies (~99 percent) required to meet the air quality standards.

This measure would provide some habitat value.

4.3.1.4 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 created isolated, elongated islands that were 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 would be non-linear to enhance aesthetics.

This measure would provide habitat value: the Owens Lakebed Master Plan habitat work group recommended this measure for testing.

4.3.1.5 Solar with Gravel and Other Potential Solar

A wide variety of solar panel layouts have been and will continue to be examined for cost effectiveness, operability, dust control effectiveness, etc. 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. This measure would provide minimal habitat value.

4.3.1.6 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 chemistries. 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, 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 both 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.

As with any dust control activity, multiple agencies must be consulted and informed when testing and developing dust control with soil binders. The administrative and technical processes to develop these materials for use on the playa are summarized in Table 4-1. The approximate chronology of these two processes proceeds from the top of the table toward the bottom; steps that happen concurrently are shown adjacent to one another.

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

Administrative Process	Technical Process[1]
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. (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, and the District on results of small scale pilot testing before a larger-scale pilot testing. (LADWP, the Commission, CDFG, RWQCB, 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 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)

4.3.2 BACM Combined to Achieve Habitat or Water Efficiency

Combining these BACM would require no further testing. The principles of control with Gravel, Shallow Flooding, and Managed Vegetation, as they have been accepted by the District, can in some cases be employed in combination to control dust. 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. An example would be to combine Shallow Flooding with Managed Vegetation and/or Gravel such that habitat values are increased while maintaining non-emissive conditions (i.e., area still meets the 75% coverage requirements).

4.3.2.1 Modified Shallow Flood, with Efficiency Enhancements Coupled with 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 mile. None of the existing BACM allow for this condition, with the exception of the dry portions of Shallow Flooded 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.

4.3.3 Modified BACM that Require Compliance Testing

Modifying an approved BACM or combining two or more BACM that individually would not comply with performance specifications would be tested for compliance.

4.3.3.1 Dryer, Sparser, Vegetated or Graveled Shallow Flood

The goal of this measure is to lower the water usage within an area by reducing the extent of water cover and making dry areas larger than that allowed currently for Shallow Flooding (25% of the area). The dry areas may be manipulated: some might be vegetated, others graveled, and some left as playa. This measure would provide productive habitat.

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. Over time, these sediments reduce reservoir capacity through displacement and infilling of the reservoir basin. 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. These types of soils or sediments could increase wildlife benefit by changing saline distribution, changing micro-level topography or enhancing the ability to produce vegetation. The particle

size characteristics as well as the chemistry of the material from the reservoir are important factors in the use of this material on the lakebed.

4.3.3.2 Modified Gravel

Gravel less than the 4-inch blanket would be tested.

4.3.3.3 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. Habitat value in the current Managed Vegetation area is relatively low due to the low plant diversity present. These habitat values could be enhanced while maintaining dust control requirements by diversification of the plant community 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. This measure would provide productive habitat.

As alternative plant communities are established and monitored on the playa, plant cover levels 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 cover levels currently specified for Managed Vegetation while maintaining dust control effectiveness. Sparser stands of more drought-tolerant species should also require less irrigation.

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 Flooding 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 Flooding compliance. Therefore, these areas may be operated below the wetness levels required for Shallow Flooding 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.

4.3.4 Proactive Immediate Response Dust Control Measures

Proactive control is envisioned for areas that are not currently controlled or identified for future dust control, but that emerge as an emissive concern. Approval of the Master Plan would provide approval for Immediate Response Measures.

Emissive areas sometimes begin as small areas of mobile sand and wind-damaged salt crust and then expand significantly to a larger area. It is envisioned that the measures discussed in this section would be deployed quickly in such source areas to control the emissions that occur and to prevent the dust source area from expanding. A key requirement for this approach to be successful is to establish a process that can immediately grant LADWP access to the dust source area and authorization for implementation of proactive dust control measures anywhere on the playa that they might occur. Areas could be "pre-cleared" for impacts to cultural and wildlife resources and "pre-approved" for a number of possible temporary measures.

4.3.4.1 Immediate Response Stabilization Measures

Approaches to rapidly stabilizing these areas of concern to reduce or avoid emissions and expansion would need to be quick to curtail mobile sand, but would not need to be BACM. An area requiring immediate response stabilization would be less than or equal to 0.5 square miles. Immediate response stabilization measures would include:

- Sand fences (need the Commission's input on definition)
- Irrigation (surface, sprinkler or drip)
- Flooding the area (either with or without construction of new berms)
- Tillage
- Gravel applied to the area
- Brine applied to the area
- Approved soil binders

4.3.4.2 Protocol for Use

A protocol for rapid response would include the following elements:

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 approved measure.
3. LADWP implements 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.

4.4 Criteria for New Strategies

The criteria for new dust control strategies reflect the goals and objectives of the Master Plan. These criteria, along with the many existing dust control activities, helped to prioritize the timeframe for implementation. The criteria are:

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

4.5 Timeframe for Implementation

Under development.

1.1 Public Access and Recreation

Public access and recreation are elements of the Master Plan because they are currently recognized by the Commission as public trust resources at the lakebed. This section provides a summary of existing public access infrastructure and educational and recreational opportunities. It also describes objectives and actions for future public access and recreation on the playa, public access management areas, and prioritization for implementation of actions.

1.1.1 Existing Setting

1.1.1.1 Public Access Infrastructure

Four entry roads provide public access to the Owens Lakebed. Two roads are off of Highway 395: Brady Highway and Willow Dip/Lake Minerals Road. A third road, Sulfate Road, is off of Highway 136. The fourth road, currently unnamed, is off of Highway 190 and it leads to Dirty Socks Yard. Figure 6-1 shows the four entry roads.

Brady Highway is the mainline access road that traverses the entire dust control area. It is a gravel road maintained in good condition and it is wide enough for two cars to pass carefully. Smaller side roads provide access to the entire dust control area 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 area use the access roads seven days a week.

Dust control area roads are posted with informational signs about the dust control area, its operations, and the general requirements to protect resources on the lakebed. The signage includes contact information for LADWP lakebed operations. The signage also states the requirements for safety training to enter the dust control area, including training to avoid impacts to cultural resources and western snowy plover nests and broods.

1.1.1.2 Existing Educational Opportunities

Owens Lakebed has many important historic, cultural, and wildlife values, but educational opportunities are limited. The only opportunity for education on the lakebed is the tours conducted by LADWP. The LADWP conducts informational tours of the dust control area for various interest groups on an "as requested" basis.

The closest interpretive site to the lakebed is the Eastern Sierra Interagency Visitor Center (IAVC) on Highway 395 at Highway 136, a mile south of the town of Lone Pine. 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, including only a few information panels, mainly concerning the dust control project.

1.1.1.3 Existing Recreation Opportunities

The primary recreational activities at the lakebed are hunting and wildlife viewing. Unregulated off-road vehicle activity also occurs on the lakebed, but information regarding frequency is very limited. There is no fishing within the planning area because no resources exist for suitable species.

HUNTING

Based on wildlife found at the lakebed, hunting within the planning area is mainly for ducks. Duck hunting season is from November through January. It is assumed that most people hunt mainly Friday through Sunday, in groups of two to six hunters. Using these assumptions, it is estimated that there are annually 288–432 person-days of use for hunting on the lakebed (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.

Hunters generally hunt where the ducks are in the highest numbers and where access is possible. Hunting within the dust control area occurs most heavily in the northern Shallow Flood areas on either side of the delta (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 area at T-18 and in the southwest dust control area in T1 and T2-1 (J. Olin, personal communication). These hunting areas correspond generally with the results of biological monitoring for locations of high numbers of waterbirds reported in the Owens Lake Habitat Management Plan (LADWP 2010).

WILDLIFE VIEWING

The Eastern Sierra Audubon leads birding tours on the lakebed 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 all birds in the dust control area on the lakebed.

1.1.2 Master Plan Objectives and Actions

The Master Plan objectives and actions were developed to enhance public access and recreation at the lakebed. Specifically, the objectives and actions aim to draw visitors to specific areas of the lakebed for passive recreation and to provide interpretive education about the lakebed. Existing hunting and wildlife viewing activities will continue under the Master Plan.. New recreational activities may include a scenic loop or a hiking trail. Educational topics will include wildlife habitat, cultural resources, water conservation, dust control projects, and economic and renewable energy development opportunities. All actions will 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.

The primary action to enhance public access and recreation is development and implementation of an Owens Lakebed Interpretive/Education Plan (Interpretive Plan). The Interpretive Plan will include the following elements:

- **Develop and design an interactive visitor-based website.** The website will include, but not be limited to, a history of the Owens Lakebed and information about dust control, wildlife habitat, and public access and recreation. This website will also be interactive and include web-based mapping, where 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 could link to other sites, including: local weather, regional cities and counties, the LADWP, the District, the Commission, and the Eastern Sierra Audubon Society.

- **Partner with the Interagency Visitor Center (IAVC).** The IAVC, which is located northwest of the lakebed, will provide a clearinghouse for Owens Lakebed information and interpretive materials. The Master Plan Implementing Entities will partner with the IAVC to increase the availability of lakebed materials at the facility. In the short term, the IAVC staff will distribute brochures and maps of the lakebed. In the long-term and with funding, the IAVC staff could provide interpretive talks, lead guided tours, and promote use of any new recreational opportunities at the lakebed (i.e., scenic loop, hiking trail).

  With funding, interpretive elements at the IAVC will include the design and installation of informational panels inside or outside of the existing building. 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, or staffing. The proximity of the lakebed to the IAVC and the depth of history at the lakebed make it an ideal theme. The partners (i.e., Implementing Entities and IAVC) would collaborate to design an Owens Lakebed Wing at the IAVC. Interpretive materials and displays would focus on wildlife habitat, cultural resources protection, effective dust control, water conservation, and economic and renewable energy development opportunities.

  Development of an Owens Lakebed Wing would require securing funding for planning, design, and construction of the expansion, as well as long-term staffing and operation.

- **Plan and design an Owens Lakebed scenic loop.** The centerpiece of the first phase of the plan, the Owens Lakebed scenic loop, is a ring of Highways (395, 136, and 190) that will provide a self-guided tour around the lakebed. The scenic loop will be developed for motorized and non-motorized vehicles (i.e., bicycles). Various viewpoints exist along the proposed scenic loop, such as Cartago Springs, Cottonwood Marsh, and an unnamed pullout one to two miles south of Boulder Creek (off Highway 395) that shows an eastern view of the lake and its historic shoreline. Turnouts will be created near Swansea and Dirty Socks,

Comment [MSOffice1]: Note: Master Plan Implementing Entities under development.

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.

- **Develop and prioritize interpretive projects on/around the Owens Lakebed** (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts, etc.). These interpretive projects will be developed upon writing the Interpretive Plan because they are tied to desired experiences and will have an interpretive component. Some conceptual ideas include, but are not limited to: (1) a viewing platform near designated habitat areas for wildlife viewing, (2) a boardwalk at Cartago Springs Wildlife Area to provide access through spring/meadow habitat and 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 lakebed.

  Other projects may be developed based on the future management of the lakebed and implementation of the Master Plan. Not all entry points to the lakebed will necessarily have planned improvements as it may be more appropriate to leave some to self-discovery. Some locations will lend themselves more to certain functions and enhancements than others. Specific areas for development will be determined upon writing the Interpretive Plan. Following development of projects under the Interpretive Plan, the projects will be prioritized, applicable permissions/approvals will be received, and funding will be secured.

- **Generate protocol for organized tours.** Organized tours of the Owens Lakebed are currently conducted by the LADWP and Eastern Sierra Audubon. The Interpretive Plan will establish a protocol for handling organized tours. 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 the Owens Lakebed, if feasible. These brochures would be available online and at the IAVC. All guidelines and materials with respect to tours will be in compliance with applicable regulations, including cultural resource protection, dust mitigation efforts, and habitat protection. As a best practice, tour organizers would notify cultural resource monitors about any planned tours outside of dust control areas.

Objectives and actions to enhance public access and recreation include:

OBJ-PA-1: Develop the Owens Lakebed Interpretive Plan. The Interpretive Plan will provide guidelines and specific projects for implementation. Educational themes in the Interpretive Plan may include wildlife habitat, cultural resources, water conservation, dust control projects, and economic and renewable energy development opportunities. A complete Interpretive Plan may take a few years to complete. Development and implementation of the Interpretive Plan will be conducted in a phased approach according to the priorities that are deemed most critical or otherwise able to be implemented expeditiously.

ACT-PA-1: Develop the Owens Lakebed Interpretive Plan, including the following:

- Develop and design an interactive visitor-based website for the Owens Lakebed
- Partner with the Interagency Visitor Center (IAVC).
- Plan and design the Owens Lakebed scenic loop
- Develop and prioritize interpretive projects on/around the Owens Lakebed (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts, etc.)
- Generate protocol for organized tours
- Generate protocol for hunting
- Plan and design a two-mile hiking trail
- Partner with the IAVC on the planning and design of an IAVC Owens Lakebed Wing
- Secure funding for planning, design, and implementation of the IAVC Owens Lakebed Wing

ACT-PA-2: Implement Phase 1 of the Owens Lakebed Interpretive Plan, including the following:

- Activate interactive visitor-based website for the Owens Lakebed
- Designate the Owens Lakebed scenic loop with pullouts, signage, and interpretive materials, where appropriate
- Develop interpretive talk on Owens Lakebed and train IAVC staff accordingly
- Design panels/displays on Owens Lakebed in/or outside of current building
- Open two-mile hiking trail in designated area
- Begin implementing additional interpretive projects (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts, etc.) that are priority or funded, if possible

ACT-PA-3: Implement Phase 2 of the Owens Lakebed Interpretive Plan, including the following:

- Construct the IAVC Owens Lakebed Wing and associated exhibits
- Continue implementing additional interpretive projects on/around the lakebed (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts, etc.), as needed

ACT-PA-4: Implement Phase 3 of the Owens Lakebed Interpretive Plan, including the following:

- Bring the IAVC Owens Lakebed Wing into full operation and add additional staff at the IAVC, if necessary
- Continue implementing additional interpretive projects on/around the lakebed (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts, etc.) if needed

- Explore endurance trail in or around the lakebed

1.1.3 Public Access Management Areas

Current and future public access points to the Owens Lakebed are expected to be largely the same, as no new points of entry are being proposed at this time. Upgrading access points will likely occur to enhance visitors' experiences and to direct visitors to informational kiosks or more formal facilities such as trails, viewpoints, or boardwalks. Points of entry to the Owens Lakebed will be easily identifiable and will have signage present where appropriate. Pullouts may be formalized along highways or other roadways, where suitable, to showcase a scenic viewshed or to provide interpretive signage or kiosks. 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 lakebed. Boardwalks may be incorporated on the lakebed near dust control or habitat areas, if feasible. As previously stated, all measures to enhance public access will be implemented in harmony with existing resources and facilities, will protect public and worker safety, and will be in accordance with applicable regulations, including cultural resources protection.

1.1.4 Prioritization for Implementation

Projects will be implemented in phases following appropriate CEQA review and adoption of the Owens Lakebed Master Plan, and granting of a lease for water-efficient dust control methods. The focus during the first phase is to bolster the educational/interpretive component of the lakebed while keeping most users on its perimeter. The next two phases of implementation includes projects on/around the lakebed that enhance users' experiences and bring them onto the lakebed to recreate. All projects are subject to funding availability and necessary agency/landowner approvals. These projects are summarized in Table PA-1.

TABLE PA 1- PROPOSED IMPLEMENTATION SCHEDULE OF THE OWENS LAKEBED INTERPRETIVE PLAN

Phase 1	Develop Owens Lakebed Interpretive Plan for Phased Implementation	
		Develop and design an interactive visitor-based website for the Owens Lakebed
		Partner with the Interagency Visitor Center (IAVC) a) Develop interpretive talk that staff would conduct for visitors b) Develop initial panels c) Plan, design, and secure funding for an Owens Lakebed Wing at the IAVC
		Plan and design the Owens Lakebed scenic loop including: a) brochures for self-guided tour (to be disseminated at IAVC) b) signage c) kiosks
		Plan and design a two-mile hiking trail
		Develop and prioritize interpretive projects on/around lakebed (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts, etc.)
		Generate protocol for organized tours
	Implement Phase 1 of the Owens Lakebed Interpretive Plan	
		Activate interactive visitor-based website for the Owens Lakebed

		Designate the Owens Lake scenic loop with pullouts and appropriate interpretive materials, where necessary
		Begin implementing additional interpretive projects (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts, etc.) that are priority or funded, if possible
		Stock brochures at IAVC and begin IAVC interpretive talks
Phase 2	Implement Phase 2 of the Owens Lakebed Interpretive Plan	
		Install initial displays/panels at IAVC
		Two-mile hiking trail operational
		Construct the IAVC Owens Lakebed Wing and associated exhibits
		Continue implementing additional interpretive projects on/around lakebed (i.e., trails, guided tours, viewing platforms, boardwalks, kiosks, pullouts, etc.), as needed
Phase 3	Implement Phase 3 of the Owens Lakebed Interpretive Plan	
		Bring the IAVC Owens Lakebed Wing into full operation and add staff as necessary
		Continue implementing additional interpretive projects on/around lakebed (i.e., trails, viewing platforms, boardwalks, kiosks, pullouts etc.), if needed
	Explore endurance trail in or around lakebed	