

## **RULE 433. CONTROL OF PARTICULATE EMISSIONS AT OWENS LAKE**

Adopted: 04/13/2016

The purpose of this regulation is to effectuate a regulatory mechanism under the federal Clean Air Act to attain the National Ambient Air Quality Standards (“NAAQS”) and to implement the Stipulated Judgment between the Great Basin Unified Air Pollution Control District (“District”) and the City of Los Angeles (“City”) dated December 30, 2014 and entered by the Superior Court of the State of California, County of Sacramento. This regulation does not alter or supersede any provision in the Stipulated Judgment, nor does it relieve any party from full compliance with the requirements of the Stipulated Judgment. This regulation sets the basic requirements for the Best Available Control Measures (“BACM”) and defines the areal extent of these controls at Owens Lake, California required in order to meet the NAAQS. This regulation does not preclude the City or the District from implementing more stringent or additional mitigation pursuant to the Stipulated Judgment.

### **A. DEFINITIONS**

1. “BACM PM<sub>10</sub> Control Areas” are areas on the dried bed of Owens Lake at or below the Regulatory Shoreline elevation of 3,600 feet and at or above Owens Lake’s ordinary high water elevation of 3,553.55 feet on which BACM PM<sub>10</sub> Control Measures shall be implemented, and

BACM PM<sub>10</sub> Control Areas are:

- a. Areas, as shown on the map in Exhibit 1 – Dust Control Area Map, including:
    - i.* 29.8 square miles of the Owens Lake Bed with approved BACM PM<sub>10</sub> Control Measures (“2003 Dust Control Area”);
    - ii.* 13.2 square miles of the Owens Lake Bed with approved BACM PM<sub>10</sub> Control Measures, except for Eligible Cultural Resource Areas where PM<sub>10</sub> BACM selection and implementation dates will be deferred as set forth in Paragraph C.3. (“2006 Dust Control Area” and “Channel Area”);
    - iii.* 2.0 square miles of the Owens Lake Bed with approved BACM PM<sub>10</sub> Control Measures (“Phase 8 Area”);
    - iv.* 3.62 square miles of the Owens Lake Bed with approved BACM PM<sub>10</sub> Control Measures to be installed by December 31, 2017, except for Eligible Cultural Resource Areas, where PM<sub>10</sub> BACM selection and implementation dates will be deferred as set forth in Paragraph C.3. (“Phase 9/10 Area”); and
  - b. Additional areas as designated pursuant to Section C., “CONTINGENCY MEASURES” of this rule.
2. “BACM PM<sub>10</sub> Control Measures” are best available control measures designed to reduce PM<sub>10</sub> emissions to Control Efficiency (“CE”) levels specified below through compliance

with performance standards specified in Attachment A or in specific control measure definitions below. The following BACM PM<sub>10</sub> Control Measures are approved to be used.

- a. “BACM Shallow Flooding” means the application of water to the surface of the lake bed in accordance with the performance standards for shallow flooding in Attachment A, Section I - Performance Requirements for BACM Shallow Flooding. Water shall be applied in amounts and by means sufficient to meet a CE level of 99% or CE targets for Minimum Dust Control Efficiency Areas.
- b. “Tillage with BACM (Shallow Flood) Backup or TWB<sup>2</sup>” means the roughening of a soil surface using mechanical methods in accordance with the specifications in Attachment A, Section IV – Performance Requirements for Tillage with BACM Back-up, and to utilize BACM shallow flooding as a back-up control method in order to prevent NAAQS violations. BACM Shallow Flooding must be implemented in TWB<sup>2</sup> areas if the erosion threshold as defined in Paragraph A.2.h is exceeded. Water shall be applied in amounts and by means sufficient to meet the CE level of 99% or CE targets for Minimum Dust Control Efficiency areas.
- c. “Brine BACM” means the application of brine and the creation of wet and/or non-emissive salt deposits sufficient to meet the CE level of 99% as described in Attachment A, Section V – Performance Requirements for Brine BACM. BACM Shallow Flooding must be implemented in Brine BACM areas if the erosion threshold as defined in Paragraph A.2.h is exceeded.
- d. “BACM Managed Vegetation” means planting surfaces of the BACM PM<sub>10</sub> Control Areas with protective vegetation to meet the CE level of 99% by maintaining overall average vegetation cover of at least 37% for each contiguous Managed Vegetation area and an areal distribution based on vegetation cover thresholds and grid size.
- e. “BACM Gravel Blanket” means the application of a layer of gravel sufficient to meet the CE level of 100% by covering the control area with
  - a layer of gravel at least four inches thick with gravel screened to a size greater than ½ inch in diameter, or
  - a layer of gravel at least two inches thick with gravel screened to ½ inch in diameter underlain with a permanent permeable geotextile fabric.
- f. “Dynamic Water Management or DWM” is a BACM Shallow Flooding operational modification that allows delayed start dates and/or earlier end dates required for shallow flooding in specific areas that have historically had low PM<sub>10</sub> emissions within the modified time periods. The truncated dust control periods allows for water savings while achieving the required CE level. Areas eligible for the DWM program and their modified start and/or end dates for shallow flooding are identified in

Attachment A, Section VI – Performance Requirements for Dynamic Water Management. If any DWM area becomes susceptible to wind erosion outside of the modified dust control period the area will be required to be flooded to meet the required CE for that area. BACM Shallow Flooding must be implemented in DWM areas if the erosion threshold as defined in Paragraph A.2.h is exceeded.

- g. “Minimum Dust Control Efficiency or MDCE” BACM is a dust control measure for which the control efficiency target is adjusted to match the required control level based on air quality modeling for the 2006 dust control areas as shown on the map in Exhibit 2 – Dust Control Efficiency Requirements. The control efficiency targets may be less than 99%, but the level of control in all areas is intended to prevent exceedances of the NAAQS. MDCE BACM includes:
  - i. Shallow flood areas where the wetness cover is adjusted following the curve in Exhibit 3 - Shallow Flood Control Efficiency and Wetness Cover Curve,
  - ii. Channel Area - a state-regulated wetland area as shown in Exhibits 1 and 2 where vegetation cover is enhanced by irrigation and seeding with native plants in a manner sufficient to prevent windblown dust from causing exceedances of the NAAQS, and
  - iii. Sand Fence Area – an area as shown in Exhibits 1 and 2 located in area T1A-1 where sand fences, vegetation and natural water runoff combine to provide sufficient protection to prevent windblown dust from causing exceedances of the NAAQS.
- h. “Erosion Threshold” is applicable to TWB<sup>2</sup>, DWM, and Brine BACM to trigger BACM Shallow Flooding which must be implemented to comply with the shallow flood CE target for that area. The erosion threshold is determined from sand flux measurements or the Induced Particulate Erosion Test (IPET) test method as described in Attachment A, Paragraphs IV.C.2 and IV.C.4. BACM Shallow Flooding must be implemented in TWB<sup>2</sup>, DWM or Brine BACM areas if any of the following thresholds are exceeded as determined using the methods described in Attachment A:
  - i. Sand flux measured at 15 cm above the surface exceeds 5.0 grams per square centimeter per day on DWM or Brine BACM areas or 1.0 gram per square centimeter per day on TWB<sup>2</sup> areas, or
  - ii. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height.
- i. “Approved BACM” includes the control measures specified above and other measures approved by the APCO and the US Environmental Protection Agency as equivalent to these methods.

3. “Eligible Cultural Resource Area or ECR Area” is an area or areas where dust control measures will be implemented on a deferred schedule due to the presence of significant cultural resources that make the areas eligible for listing under the California Register of Historic Resources.

## B. REQUIREMENTS

1. For the 2003 Dust Control Area the City shall continuously operate and maintain any mix of approved BACM PM<sub>10</sub> Control Measures as defined above in Section A to meet the 99% efficient CE level. Selection of the type and location of BACM PM<sub>10</sub> Control Measures within the area is solely the responsibility of the City.
2. For the 2006 Dust Control Area the City shall continuously operate and maintain approved BACM PM<sub>10</sub> Control Measures defined above in Section A to meet the CE target specified in Exhibit 2, except for ECR Areas where BACM PM<sub>10</sub> Control Measure selection and implementation dates will be deferred as set forth in Paragraph C.3., and any areas of BACM Managed Vegetation, for which the City shall comply with the minimum 37% average vegetation cover target and areal distribution requirements by December 31, 2017.
3. For the Phase 8 Area consisting of 2.0 square miles the City shall continue to operate and maintain BACM Gravel Blanket.
4. For the Phase 9/10 Project Area consisting of 3.62 square miles the City shall select and install BACM PM<sub>10</sub> Control Measures by December 31, 2017, except for ECR Areas, where PM<sub>10</sub> BACM selection and implementation dates will be deferred as set forth in Paragraph C.3.
5. In areas containing infrastructure capable of achieving and maintaining compliant BACM Shallow Flooding the City may implement TWB<sup>2</sup>, Brine Shallow Flooding or Dynamic Water Management as alternatives to BACM Shallow Flooding or MDCE BACM shallow flooding.

## C. CONTINGENCY MEASURES

1. At least once each calendar year, the District shall determine whether additional areas of the lake bed require BACM PM<sub>10</sub> Control Measures in order to attain or maintain the PM<sub>10</sub> NAAQS.
2. If the District has not demonstrated attainment with the PM<sub>10</sub> NAAQS on or before December 31, 2017, or has not met reasonable further progress milestones, the District shall order the City to apply one or more BACM PM<sub>10</sub> Control Measures as set forth in

Paragraphs A.2 and C.4 on those areas of the Owens Lake bed that cause or contribute to exceedances of the PM<sub>10</sub> NAAQS.

3. If monitoring and/or modeling demonstrates BACM PM<sub>10</sub> Control Measures are needed in an ECR Area(s) to attain or maintain the PM<sub>10</sub> NAAQS after BACM PM<sub>10</sub> Control Measures are implemented in adjacent areas, the District shall order the City to select and implement BACM PM<sub>10</sub> Control Measures set forth in Paragraph A.2.
4. The District may order the City to implement, operate and maintain a total of up to 53.4 square miles of waterless or water-neutral BACM PM<sub>10</sub> Control Measures on the Owens Lake bed below the Regulatory Shoreline (elev. 3,600 feet) and above the ordinary high water level of Owens Lake (elev. 3,553.55 feet).
5. As expeditiously as practicable and not more than three years after any such order for additional BACM PM<sub>10</sub> Control Measures, the City shall install, operate and maintain BACM PM<sub>10</sub> Control Measures that achieve a control efficiency of 99%. If BACM Managed Vegetation is chosen up to two additional years for vegetation growth is allowed to achieve the 37% vegetation cover requirement.

EXHIBIT 1 – Dust Control Area Map

EXHIBIT 2 – Dust Control Efficiency Requirements

EXHIBIT 3 – Shallow Flood Control Efficiency and Wetness Cover Curve

ATTACHMENT A – Performance Requirements for BACM

**Rule 433 – Attachment A**  
**Performance Requirements for BACM**

I. BACM Shallow Flooding

- A. The “BACM Shallow Flooding” PM<sub>10</sub> control measure will apply water to the surface of those areas of the lake bed where shallow flooding is used as a PM<sub>10</sub> control measure. Water shall be applied in amounts and by means sufficient to achieve the performance standards set forth in Paragraphs I.B and I.C of this attachment. The dates by which BACM Shallow Flooding areas are to comply with these performance standards may be modified by the Dynamic Water Management provisions set forth in Rule 433.A.2.f and Paragraph VI.B.
- B. For all BACM Shallow Flooding areas except those within the 2006 DCA:
1. At least 75 percent of each square mile designated as BACM Shallow Flooding areas shall continuously consist of standing water or surface-saturated soil, substantially evenly distributed for the period commencing on October 16 of each year, and ending on May 15 of the next year. For these BACM Shallow Flood dust control areas, 75 percent of each entire contiguous area shall consist of substantially evenly distributed standing water or surface- saturated soil.
  2. Beginning May 16 and through May 31 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 70 percent.
  3. Beginning June 1 and through June 15 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 65 percent.
  4. Beginning June 16 and through June 30 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 60 percent.
- C. For BACM Shallow Flooding areas within the 12.7 square-mile 2006 DCA:
1. The percentage of each area that must have substantially evenly distributed standing water or surface-saturated soil shall be based on the Shallow Flood Control Efficiency Curve (Exhibit 3) to achieve the control efficiency levels in the Minimum Dust Control Efficiency (MDCE) Map (Exhibit 2).
  2. For only those BACM Shallow Flooding areas with control efficiencies of 99 percent or more:
    - a. Beginning May 16 and through May 31 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 70 percent.

- b. Beginning June 1 and through June 15 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 65 percent.
- c. Beginning June 16 and through June 30 of every year, shallow flooding areal wetness cover may be reduced to a minimum of 60 percent.

## II. BACM Managed Vegetation

The “BACM Managed Vegetation” PM<sub>10</sub> control measure requires planting surfaces of the BACM PM<sub>10</sub> control areas with protective vegetation to meet the control efficiency level of 99% by maintaining an overall average vegetation cover of 37% for each contiguous managed vegetation area.

## III. BACM Gravel Blanket

The BACM Gravel Blanket” PM<sub>10</sub> control measure requires the application of a layer of gravel sufficient to meet the control efficiency level of 100% by one of the following means:

- covering 100% of the control area with a layer of gravel at least four inches thick with gravel screened to a size greater than ½ inch in diameter, or
- covering 100% of the control area with a layer of gravel at least two inches thick with gravel screened to ½ inch in diameter underlain with a permanent permeable geotextile fabric.

## IV. Tillage with BACM (Shallow Flood) Backup (or TWB<sup>2</sup>)

A. The City of Los Angeles (“City”) may implement or transition BACM Shallow Flood areas to “Tillage with BACM (Shallow Flood) Back-up (TWB<sup>2</sup>),” which shall consist of (1) soil tilling within all or portions of BACM Shallow Flood PM<sub>10</sub> control areas (TWB<sup>2</sup> Areas), and (2) the installation of all necessary shallow flood infrastructure so that the TWB<sup>2</sup> Areas can be shallow-flooded if the erosion threshold is exceeded or the performance criteria are not met.

### B. Construction of TWB<sup>2</sup> Areas

1. Tillage shall create rows and furrows in roughly east to west directions in order to create maximum surface roughness for winds from the north and south. Additional roughness to protect surfaces from west winds shall be created in tilled areas

sufficient to prevent emissions from east and west winds.

2. The tilled surfaces will also be armored with soil clods of 1/2 inch diameter or larger covering 60 percent or more of the tilled surface.
3. TWB<sup>2</sup> areas shall be constructed with ridge heights (RH) averaged on 40-acre blocks at or above 1.25 feet (furrow depth to ridge top difference at least 2.5 feet) and row spacing (RS) sufficient to provide a ratio of the row spacing to ridge height (RS/RH) below 10, e.g. distance between rows is 12.5 feet with average ridge height greater than 1.25 feet.

### C. Monitoring and Maintenance

#### 1. Surface Roughness

- a. Lidar, aerial photography or other field measurement methods with equivalent accuracies will be used by the City to measure RS/RH ratio and ridge height. Roughness measurements will be made in the north-to-south direction --- the direction of the primary dust producing winds. Roughness measurements may also be made in other directions. Roughness measurements will be reported to the APCO within 30 days of measurement.
- b. The RS/RH ratio and ridge height measurements will be made at 6 month, or more frequent, intervals. Inverse roughness and ridge height for a TwB<sup>2</sup> Area will be tracked and plotted as a function of time. Where feasible, field measurements may also be taken to confirm Lidar or other remotely sensed results. The City will conduct roughness measurements at least once every 6 months and report the measurements within 30 days to the APCO. The District reserves the right to conduct its own roughness measurements at any time.
- c. Assuming that degradation of the tilled ridges may occur over time, tillage maintenance will be performed by the City if the average RS/RH roughness ratio is between 10.1 and 12.0 or if the average ridge height is less than 1.1 feet in a tilled area.
- d. The City shall re-flood a TWB<sup>2</sup> area to comply with the required BACM Shallow Flood control efficiency for the area if the RS/RH ratio is greater than 12.0 (12/1) or the ridge height falls below 1.0 feet for any defined 40-acre averaging area.
- e. The City shall measure clod coverage using the point-intercept method (U.S. Bureau of Land Management, Sampling Vegetation Attributes, Method G,



Technical Reference BLM/RS/ST-96/002+1730) or other field measurement methods with equivalent accuracy. Clod cover will be measured concurrently with surface roughness at least once every 6 months and reported to the APCO within 30 days of measurement.

## 2. Sand Flux

- a. The City shall monitor each TWB<sup>2</sup> area with at least four Sensits and Cox sand catchers (CSCs) with inlets set at 15 cm above untilled surfaces (circular pads with 3 m radius) in the general northern, southern, eastern and western portions of a tillage. In TWB<sup>2</sup> areas greater than 320 acres the City shall install one Sensit and CSC pair per 80 acres.
- b. The City will pair CSCs with Sensits, radio equipment and dataloggers programmed to record 5-minute sand motion data. All Sensit data will be reported daily to the District. Sand motion data from the CSCs and Sensits will be processed to track sand flux at each site.
- c. All sand flux monitoring equipment will be installed prior to the start of tillage activities.
- d. High sand flux values recorded during maintenance activities or from non-tillage sand flux sources shall be excluded from the sand flux data. Maintenance activities and non-tillage sand flux sources may include, but are not limited to, rain-splatters, bugs, adjacent grading and road construction activities, as well as vehicle traffic. Sensits should be placed so as to minimize impacts from non-tillage sand flux sources.
- e. When (other than during maintenance activities taking place in the “tillage area” which is defined as the tilled portion of the TWB<sup>2</sup> area) the sand flux exceeds 0.50 g/cm<sup>2</sup>/day, the City will perform maintenance in the tillage area, which may include surface wetting, re-establishment of the surface roughness, or full or partial reflooding of a TWB<sup>2</sup>.

## 3. PM<sub>10</sub> Monitoring

- a. Each TWB<sup>2</sup> area will be assigned upwind and downwind PM<sub>10</sub> monitors (not necessarily at the TwB<sup>2</sup> Area boundary) to monitor PM<sub>10</sub> emissions from the tillage area. For a given wind direction, the downwind monitors shall be within

22 degrees ( $\pm 11.5^\circ$ ) of the upwind monitors. Upwind/downwind monitor assignments will be requested by the City and approved by the APCO. Existing monitors operated by the District may be used as upwind/downwind monitors. Additional EPA reference and equivalent method PM<sub>10</sub> monitors (40 CFR Part 53) shall be operated by the City, unless mutually agreed otherwise.

- b. If a monitor is operated by the City, its operation and maintenance must follow District procedures and data collection must be incorporated into the District communications network. The District reserves the right to audit monitors and monitoring data collected by the City. The District also reserves the right to install and operate or require the City to install and operate additional PM<sub>10</sub> monitors to adequately monitor the PM<sub>10</sub> emissions coming from tilled areas.
  - c. All PM<sub>10</sub> monitoring equipment will be in place as soon as practicable as shallow flood areas dry, but no later than the start of tillage activities.
  - d. Impacts caused by maintenance activities and non-tillage sources shall be excluded from the PM<sub>10</sub> data. Maintenance activities and non-tillage PM<sub>10</sub> sources may include, but are not limited to, adjacent grading and road construction activities, as well as vehicle traffic. PM<sub>10</sub> monitors should be placed so as to minimize impacts from non-tillage sources.
  - e. When the daily downwind to upwind PM<sub>10</sub> concentration difference for any dust event (other than during maintenance activities in the tillage area) exceeds 50  $\mu\text{g}/\text{m}^3$  and there is no evidence to show that the additional downwind PM<sub>10</sub> did not come from the TWB<sup>2</sup> Area, maintenance will be performed in the tillage area.
4. Induced Particulate Erosion Test
- a. The Induced Particulate Erosion Test (IPET) method will be used to determine if tilled area surfaces are starting to become emissive. The IPET method uses a small radio-controlled helicopter-type craft (Radio-Controlled Wind Induction Device or RCWInD) to create wind on the surface. Each RCWInD craft shall be pre-tested to determine the test height above the surface ( $H_t$ ) at which the craft creates a target maximum horizontal wind speed (TWS) measured at 1 centimeter ( $U_{0.01}$ ) above a flat surface equal to 11.3 meters per second (m/s). If the payload on a craft is changed, e.g. a different camera is used, then  $H_t$  must be re-

determined for the new payload since it will affect the amount of thrust needed to keep the RCWInD aloft.

- b. Testing to determine  $H_t$  and TWS will be done on a smooth flat surface, e.g. concrete or asphalt pavement or plywood test platform with calm ambient winds ( $< 2$  m/s).  $H_t$  is measured from the bottom of the rotor blade to the surface. The maximum wind speed for any flight height is taken at a height one centimeter above the surface at a point that is one rotor blade length away from the point beneath the center of the fastest rotor blade taken on a line extending outward from the rotor arm. The wind speed measurement is taken with a pitot tube pointing toward the center of the rotor blade. The RCWInD must be flown in a stationary position to get a sustained wind speed measurement.
  - c. When the craft is flown over a ridged surface  $H_t$  is measured from the bottom of the craft's rotor blades to the highest surface projection anywhere directly below the craft.
  - d. Three erosion alert levels are set using the IPET method: 1) an early warning of possible clod and surface stability deterioration, 2) a warning level to alert the City of a potential breakdown of the surface stability and to advise voluntary maintenance efforts, and 3) a mitigation action level to require re-tilling and/or re-flooding of all or part of a  $TWB^2$ , DWM or Brine BACM Area.
  - e. The IPET method will be used to determine erosion alert levels as follows:
    - Level 1 – An erosion early warning is indicated when any visible dust is observed to be emitted from a surface or particles are dislodged when the RCWInD is flown at a height below one half of  $H_t$ . Voluntary mitigation may be appropriate to prevent further surface degradation.
    - Level 2 – An erosion warning is indicated when any visible dust is observed to be emitted from a surface when the RCWInD is flown at a height below  $H_t$  and above one half of  $H_t$ . Voluntary mitigation is advised to prevent further surface degradation.
    - Level 3 – Mitigation action is required if visible dust is observed to be emitted from a surface when the RCWInD is flown at a height of  $H_t$  or higher.
- D. The City shall re-flood  $TWB^2$  areas to comply with the BACM Shallow Flood control

efficiency target for that area, if either of the following erosion thresholds are exceeded as determined using the sand flux and IPET measurements described in Paragraphs IV.C.2 and IV.C.4.

1. Sand flux measured at 15 cm above the surface exceeds 1.0 gram per square centimeter per day, or
2. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height,  $H_t$ .

## V. Brine BACM

A. Stable surfaces for Brine BACM shall be defined as consisting of standing water, evaporite salt deposit, and capillary brine salt crust as follows:

1. Water: Standing water or hydrologically saturated surface as defined by BACM Shallow Flooding, regardless of salinity level.
2. Evaporite Salt Deposit: A crystalline deposit of salt minerals precipitated on the surface of the lakebed from evaporation of Owens Lake brine. The evaporite salt deposit does not include the development of salt crust by upward capillary movement of saline fluids through the soil column. The evaporite salt deposit must have an average thickness of 1.5 centimeters or greater and may be either wet or dry.
3. Capillary Brine Salt Crust: A crust enriched in salt minerals formed at the soil surface by upward capillary movement of water through the soil. The capillary brine crust typically consists of a mix of salt minerals and soil particles in various proportions, and must meet the following three conditions:
  - a. The capillary brine salt crust within a Brine BACM area must have an average thickness of 10 centimeters or greater and may be either wet or dry,
  - b. a capillary brine salt crust must be accompanied by either water and/or an evaporite salt deposit, and
  - c. the proportion of qualifying capillary brine crust within a Brine BACM area cannot exceed one-third of the required total compliant cover within a Brine BACM area.

B. Each Brine BACM area shall be operated such that the total areal extent of the surface cover of the qualifying surfaces are maintained such that they meet or exceed those as

defined by the Shallow Flooding Control Efficiency Curve in Exhibit 3. The combined mosaic of stable Brine BACM surfaces shall cover the entire dust control area.

- C. Brine BACM can be used by the City of Los Angeles (City) throughout the Owens Lake bed where backup BACM Shallow Flood infrastructure exists and can be implemented, as set forth in this protocol, to ensure that Brine BACM areas do not cause or contribute to exceedance of the NAAQS for PM<sub>10</sub>.
- D. The boundaries for each Brine BACM area will be pre-defined by the City prior to implementation. Each Brine BACM area will be monitored separately to determine compliance with required surface cover conditions.
- E. The City will monitor each Brine BACM area with at least one sand flux monitor (SFM) site instrumented with paired Cox Sand Catchers (CSCs) and Sensits with inlets positioned 15 cm above the surface, radio equipment, and dataloggers programmed to record 5-minute sand motion data. SFM sites will primarily be located in portions of Brine BACM areas covered with a capillary crust. All Sensit data will be reported daily to the District. Sand motion data from the CSCs and Sensits will be processed to track sand flux at each site.
- F. Brine BACM areas will be monitored using the IPET method following the procedures used for Tillage with BACM Back-up areas in Paragraph IV.C.4.
- G. The City shall re-flood Brine BACM areas to comply with the BACM Shallow Flood control efficiency target for that area, if either of the following erosion thresholds are exceeded as determined using the sand flux and IPET measurements described in Paragraphs IV.C.2 and IV.C.4.
  - 1. Sand flux measured at 15 cm above the surface exceeds 5.0 grams per square centimeter per day, or
  - 2. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height,  $H_t$ .

## VI. Dynamic Water Management

- A. Areas that are eligible for Dynamic Water Management (DWM) must meet the following sand flux history criteria:
  - 1. 5 years or more of sand flux data from before dust control implementation, and

2. The frequency of significant sand flux ( $\geq 5$  g/cm<sup>2</sup>/day) taking place outside of the modified shallow flood dust control period did not occur in more than one calendar year over any continuous six year period.
- B. The modified dust seasons for DWM have three different start dates in the beginning of the season that reflect the delayed start of source area activity across the lakebed. The modified start dates are applicable to certain dust control areas based on the sand flux history as evaluated in Paragraph VI.A and the method of shallow flooding using conventional flooding or sprinkler irrigation.
1. For areas shallow flooded by methods other than sprinkler irrigation, the standard and modified dust control periods are:  
**Standard Dust Season**  
October 16 to June 30 (with ramping of 99% control areas after May 15)  
**Modified Dust Seasons for Dynamic Water Management**  
October 16 – April 30  
December 1 – April 30  
January 16 – April 30
  2. For eligible areas that are shallow flooded with sprinkler irrigation, the modified DWM seasons shall be adjusted to provide water two weeks earlier in the beginning of the dust season to simulate ramp up as applied in conventional BACM Shallow Flood areas and one month later at the end of the dust season due to the lack of wetness during the dry down period with conventional BACM Shallow Flood areas. The adjustments to the DWM seasons for sprinkler irrigated shallow flooding areas are provided below.  
**Modified Dust Seasons Adjusted for Sprinkler Irrigated Shallow Flooding Areas**  
October 16 – May 31  
November 16 – May 31  
January 1 – May 31
  3. In areas approved for DWM, the City of Los Angeles (City) shall meet the shallow flood control efficiency and wetness targets indicated in Exhibits 2 and 3 by or before the applicable start dates in Paragraph VI.B and water may be shut off with no spring ramping at the end of the modified season.
- C. Each DWM area will be instrumented by the City with sand flux monitoring (SFM) sites

using paired Sensits and Cox Sand Catchers (CSCs) during the modified start and end periods. The locations of SFM sites shall be determined by the City in coordination with the District.

1. The number of SFM sites at the modified start of the dust season will be proportional to the areal extent of the DWM area. All DWM areas will require at least one SFM site however; the APCO may require proportionally more SFM sites for DWM areas greater than 320 acres such that there is approximately one SFM site per 160 acres of DWM area.
2. During the modified end period of the dust season, the LADWP shall install SFM sites incrementally in stages as a DWM area dries. The number of SFM sites is provided in Table 1 below.

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

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

3. The City will pair CSCs with Sensits with inlets positioned at 15 cm above the surface, radio equipment and dataloggers programmed to record 5-minute sand motion data. All Sensit data will be reported daily to the District. Sand motion data from the CSCs and Sensits will be processed to track sand flux at each site.
4. During the modified start of the dust season all sand flux monitoring equipment will be placed by the City no later than October 16. During the modified end of the dust season all SFM sites will be placed by the City within 7 calendar days of reaching each drying stage. The City shall inform the District of all SFM site installations within 7 days of installation.
5. SFM sites installed for monitoring in the modified beginning dust season may be removed from a DWM area once the modified dust season has started for each DWM area or once the site location is endanger of getting flooded. The City shall inform the District of all SFM site removals within 7 calendar days of their removal

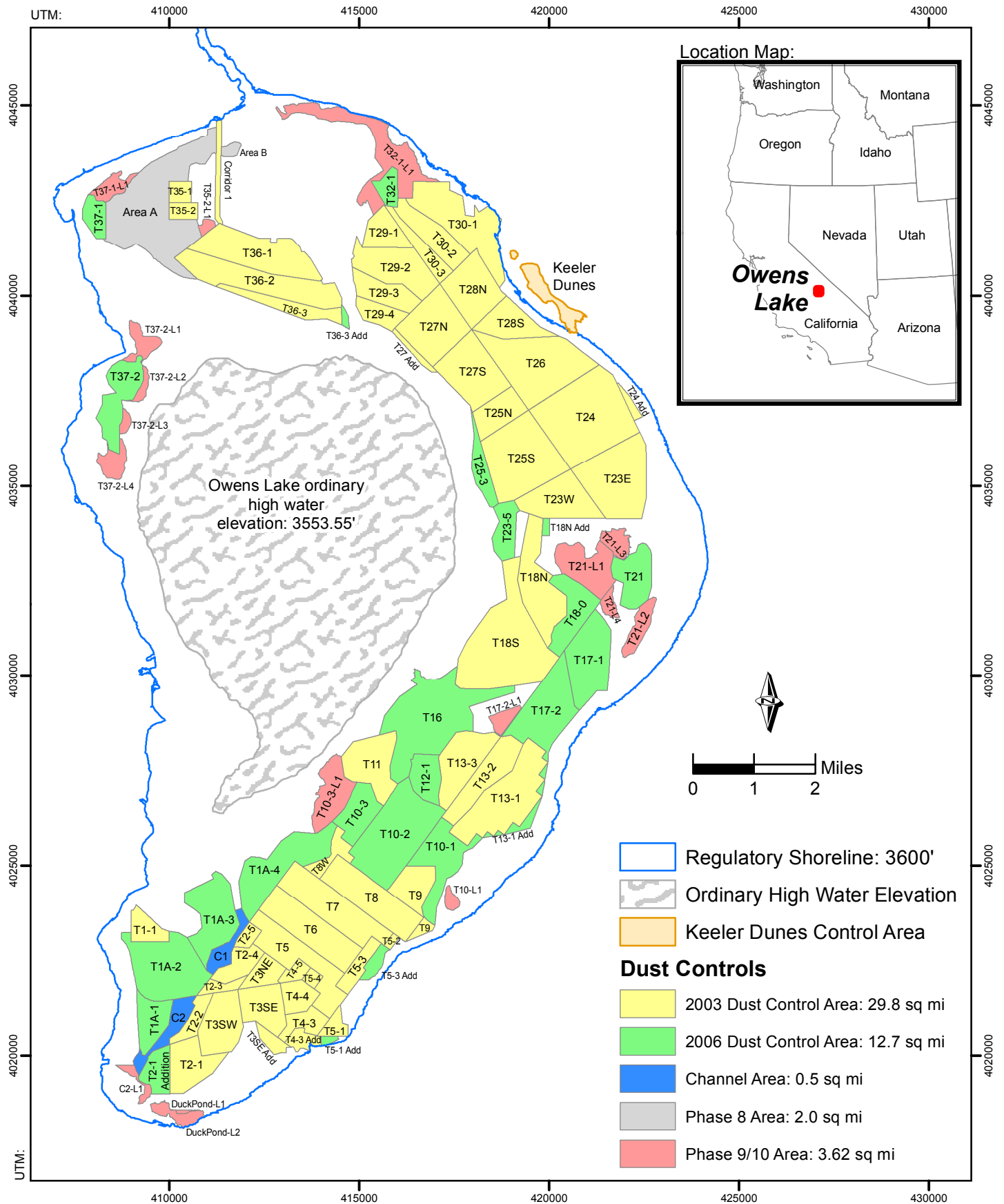
date. SFM sites installed for monitoring of the modified end of the dust season may be removed from a DWM area after June 30.

- D. DWM areas will be monitored using the IPET method following the procedures used for Tillage with BACM Back-up areas in Paragraph IV.C.4.
- E. The City shall re-flood a DWM area or sub-area as indicated by the available information to comply with the BACM Shallow Flood control efficiency target for that area, if either of the following erosion thresholds are exceeded as determined using the sand flux and IPET measurements described in Paragraphs IV.C.2 and IV.C.4.
  - 1. Sand flux measured at 15 cm above the surface exceeds 5.0 grams per square centimeter per day, or
  - 2. Induced Particulate Erosion Test method shows visible dust emissions when operated at the reference test height,  $H_t$ .
- F. If any DWM area exceeds either erosion threshold in Paragraph VI.E in more than one calendar year over any continuous six-year period, that area will revert to the standard BACM Shallow Flood dust season as shown in Paragraph VI.B.1 since the area will no longer meet the DWM criteria in Paragraph VI.A.



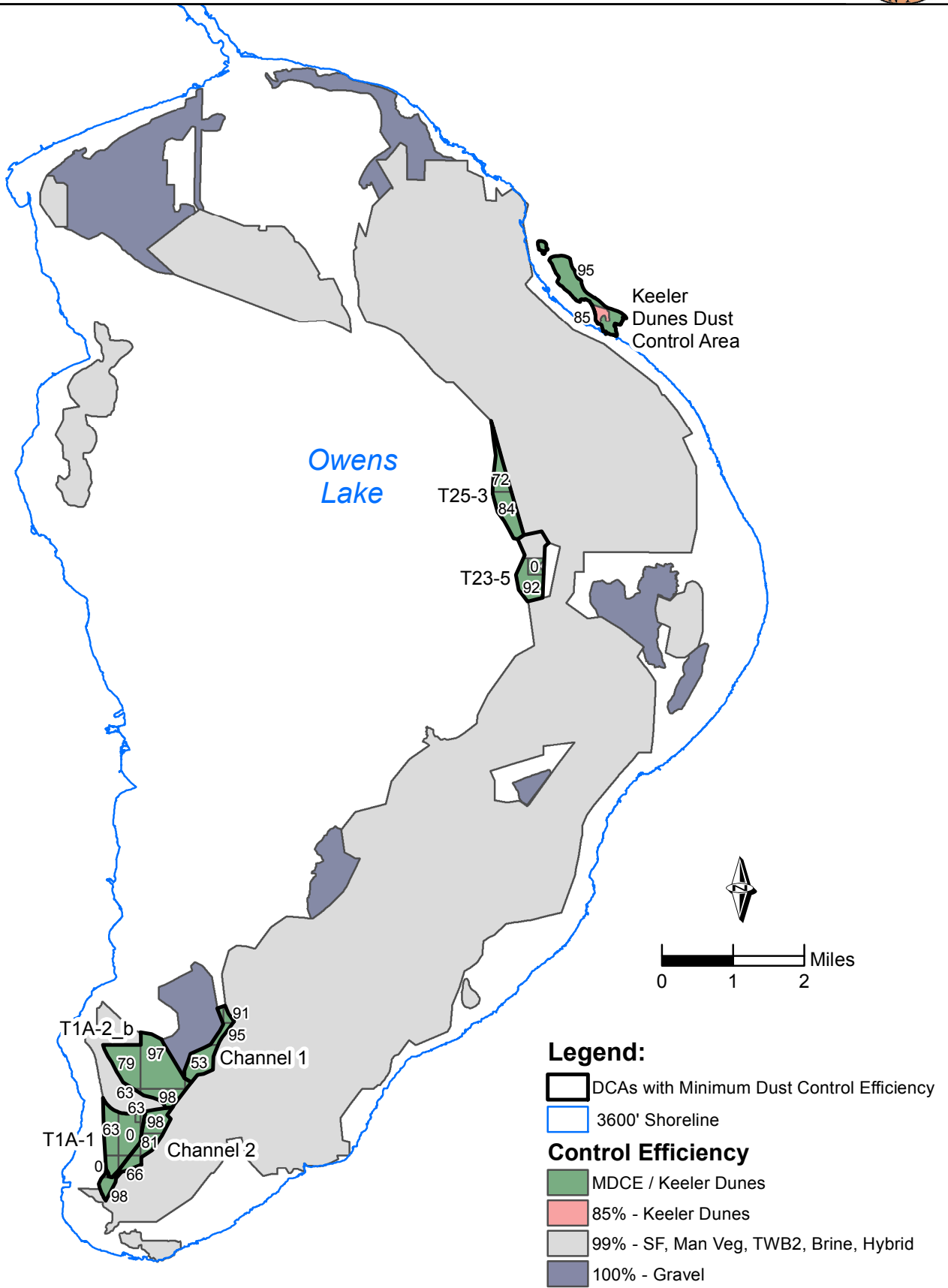


# Exhibit 1 - PM10 Dust Control Areas





# Exhibit 2 - Dust Control Efficiency Map



# Exhibit 3 - Shallow Flood control efficiency curve

