

Great Basin Unified Air Pollution Control District

2011-2012 Fiscal Year SB 270 Budget and Assessment

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**2011-12 Fiscal Year
SB 270 Budget and Assessment**

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Budget and Assessment Summary

Introduction

The annual SB 270 assessment is the Great Basin Unified Air Pollution Control District's estimate of the reasonable cost of maintaining the level of effort necessary to address violations of state and federal air quality standards due to water-gathering activities by the City of Los Angeles (City) within the District's boundaries (Inyo, Mono and Alpine Counties). The assessment is a reasonable fee as provided for in Section 42316 of the California Health and Safety Code. The fee funds the cost of monitoring air quality affected by the City's water-gathering activities, the development of air quality plans, monitoring the City's implementation of control measures, enforcing control measure performance, and control measure research. The assessment includes the costs associated with all District employees working on SB 270 matters, general recurring operating costs, the cost of enforcing air quality requirements, long-term or ongoing project costs, funding for dust source research and consulting (professional services) and material/equipment costs. For 2011-12 the assessment continues to include costs for equipment and consulting associated with the implementation of the Settlement Agreement entered into with the City of Los Angeles in December 2006 pertaining to supplemental dust control measures at Owens Lake (Settlement Agreement) and the resulting 2008 SIP¹ and EIR² that were adopted on February 1, 2008.

Assessment

The assessment includes the total cost of all District employees, operating costs (rent, utilities, insurance, supplies, travel and professional services associated with regular budget activities) and equipment costs. The proposed assessment total is \$4,513,300. Compared to the 2010-11 assessment total of \$4,703,600, the proposed assessment represents a 4.05% decrease (-\$190,300) over fiscal year 2010-11. The 2011-12 budget contains adjustments in each category to meet commitments made by the District in the 2006 Settlement Agreement and 2008 SIP & EIR, including: 1) maintenance and replacement of air monitoring equipment at Owens Lake; and 2) consultant fees necessary to carry out committed regulatory and compliance tasks at Owens and Mono Lakes. The assessment is summarized in Table 2 and details on some of the categories are shown in Table 3. The personnel associated with the SB 270 Assessment are summarized in Table 4.

A graphic comparison of this year's assessment with previous years is shown in Figure 1. The decrease can primarily be attributed to a reduction in workforce personnel dedicated to the SB 270 program. In the 16 years since 1995, the SB 270 budget has decreased a total of 3.69%.

¹ 2008 Owens Valley PM10 Planning Area Demonstration of Attainment State Implementation Plan (SIP)

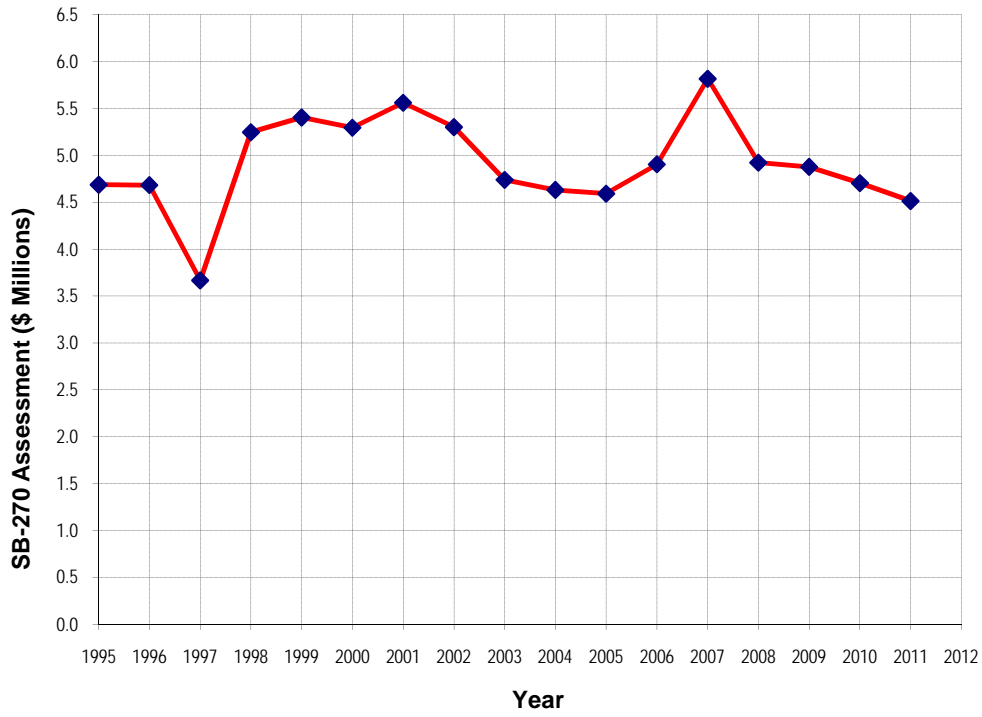
² 2008 Subsequent Environmental Impact Report (EIR)

TABLE 1

FY 2011-12 SB-270 Total Assessment Summary

Assessment	2010-11	2011-12	% Change
I. Employee Costs	3,060,000	2,840,000	-7.19%
II. Operating & Compliance	1,437,600	1,469,300	2.21%
III. Materials & Equipment	206,000	204,000	-0.97%
Total SB-270 Assessment	4,703,600	4,513,300	-4.05%
		-190,300	

Figure 1 - Historic SB-270 Assessments



Year	Amount
1995	4,686,414
1996	4,682,317
1997	3,666,543
1998	5,246,725
1999	5,403,643
2000	5,295,089
2001	5,561,270
2002	5,300,597
2003	4,739,313
2004	4,631,000
2005	4,591,000
2006	4,903,825
2007	5,816,250
2008	4,922,265
2009	4,876,300
2010	4,703,600
2011	4,513,300

Assessment Details

Assessment Details

Introduction

The 2011-12 SB 270 assessment total is \$4,513,300. This should be compared to the 2010-11 assessment total of \$4,703,600. The proposed assessment represents a 4.05% decrease (–\$190,300) compared to fiscal year 2010-11. The assessment is summarized in Table 2 and details on some of the categories are shown in Table 3. The 2011-12 budget contains adjustments in each category to meet commitments made by the District in the 2006 Settlement Agreement and 2008 SIP & EIR, including: 1) maintenance and replacement of air monitoring equipment at Owens Lake; and 2) consulting services necessary to carry out committed regulatory and compliance tasks. The personnel associated with the SB 270 assessment are summarized in Table 4.

I. Employee Costs

The SB 270 assessment pays some or all of the costs of 23 employees, including 19.55 regular employees (two full-time benefited contract employee positions are being eliminated and two regular employee positions are being created) and one part-time (16 hours/week) non-benefited employee (see Table 4 - Employee Time Allocation) for a total of 19.86 Full-Time Equivalent (FTE) employees. This is reduction of 1.25 FTEs compared to FY 2010-11. The proposed assessment does not include any cost of living adjustment to be considered by the Board at their May meeting for the 2011-12 FY.

Total employee costs are \$2,840,000, a decrease of 7.19% (–\$220,000) over FY 2010-11. The decrease is attributable to the retirement, non-replacement and re-organization of three regular full-time employees during the fiscal year. This cost category includes wages, retirement costs, medical benefits, taxes, unfunded future liability for retiree medical insurance costs and workers compensation insurance. The City has been assessed an annual amount since the 2005-06 FY to pre-fund the unfunded liability of SB 270 retiree medical costs. The \$348,000 amount for FY 2011-12 remains the same as FY 2010-11. In 2009 the District adopted and partially funded an IRS §115 trust under Governmental Accounting Standards Board (GASB) 45 requirements. An actuarial evaluation was completed as of July 1, 2010 to reflect this change in status of retiree health funds for future budgeting purposes. Another valuation will be conducted in 2013. Depending on the rate of return and various other factors that are analyzed, the price-index-adjusted contribution will be required anywhere from 2 to 5 more years. Thereafter, lower annual normal service costs (present value of benefits accruing in the current year) will be assessed as determined by the actuary.

The assessment shows an overall decrease of 1.25 employees for the 2011-12 fiscal year. In January 2011, the Director of Technical Services position was restructured and filled at a lower cost. The former position of the employee who assumed the new DOTS position was eliminated. In addition, there will be additional restructuring in the Keeler office to respond to changing duties and reduce overall employee costs. Keeler staff will be reduced by one full-time employee and an additional vacant position will be unfunded for the upcoming fiscal year (see Board Agenda Item 7, Board Packet: March 17, 2011). These changes are expected to result in a salary cost savings of between \$34,320 and \$51,312 per year.

In FY 20110-11, the Administrative Services Officer position was vacated by a retiring employee and not replaced (the position was 25% of that fiscal year). Staff proposes that future human resources needs be met with a combination of existing staff and consultant support.

There are 11.50 full-time-equivalent FTEs to perform air quality monitoring and dust source identification both on and off the exposed beds of Owens Lake and Mono Lake, including design, purchasing, installation, data collection, maintenance, calibration, filter weighing, quality assurance, data review, and supervision. There are 2.95 FTEs to do data processing and analysis, preparation of maps and figures, maintenance of the GIS system, operation of the Owens Lake Health Advisory network, and purchasing and maintenance of all computer hardware/software. There are 3.10 FTEs to cover all administrative tasks such as policy recommendations to the Board, overall supervision, project design and management, contract management, document preparation, technical supervision, engineering design, compliance enforcement, government agency coordination, budget preparation, technical support to legal consultants, risk manager, personnel manager and public information. There are 2.31 FTEs to act as administrative assistants, receptionist, document copier, mail clerk, file clerk, supply clerk, billing clerk, fiscal supervisor, fiscal clerk, safety clerk, and board clerk.

II. Operating Costs

This category includes rent for all offices (two offices in Bishop and the Keeler office), utilities, insurance, office supplies and equipment, travel and professional services. Materials and equipment in this category generally have a cost of less than \$5,000 each and/or a short life. Operating costs are \$1,469,300 and will increase by 2.21% (\$31,700) compared to FY 2010-11. The items in this category that require more explanation are described below.

II.C. – Equipment: Scientific, Computer, Software, Furniture, Office, Safety & General (<\$5,000)

This category encompasses items costing \$5,000 or less and includes new scientific equipment (calibration devices, etc.) and related equipment (electronic test equipment, digital multimeters, etc.), computer equipment (including printers, scanners and parts), software (office upgrades, data logger, GIS, accounting software, anti-virus), furniture, office machines and safety equipment. Monies are budgeted for replacement of wind, humidity, temperature, barometric pressure and precipitation equipment as the sensors in the field range in age from three to ten years old. The budget includes funds for 25 new Sensits and datalogger upgrades (\$115,000) for the Dust ID system. The current Dust ID network consists of approximately 170 Sensit sites 16 cameras, and a lakewide wireless broadband communication system. The information collected from the Dust ID network has been highly successful in supplying real time data to the District, LADWP and the public. District staff working out of the Keeler office extensively use this information to make decisions when and where to collect field data during and directly after dust events.

The cost to purchase, maintain and upgrade items in this category will be \$197,000. This category shows an increase of \$1,900 or +0.97%.

II.G.2. – Leases and Rents

Rental and lease costs are down slightly this year (-\$4,600 or -4.27%) due to the elimination and relocation of a few monitoring sites.

II.H. – Maintenance of Equipment – Labor

Included in this category are: annual certifications of laboratory equipment, including balances and standard weights. These certifications are a requirement for the District to maintain an EPA- certified laboratory for particulate matter filter processing. Additionally, all calibration and audit equipment used by the District’s air monitoring technicians must be certified annually. These devices (the District owns twelve) must be sent out to the manufacturer for certification. These certifications are required by EPA regulations for all entities conducting air quality monitoring. This category also includes vehicle maintenance, i.e. tires, oil changes, tune-ups, etc., which accounts for half the budget amount. (\$45,000)

II.I. – Maintenance of Equipment – Materials

The District operates twenty (24) or more (depending on special projects) PM monitors in the Owens Lake and Mono Basin networks. Items included in this category for those monitors include: pumps, filters, solar panels, air inlets, bearings, rebuild kits, and other associated equipment. This category also includes the cost to maintain 190+ Owens Lake Sensit sand-motion monitoring sites, existing ATV’s, vehicles, plus monitoring stations (shelters, tubes, rails, pipes). Further, maintenance items have been included for the seventeen (20) meteorological stations with sensors that can be repaired and/or refurbished. \$55,000 has been budgeted for this equipment.

II.K.10 – Owens Lake Air Quality Modeling

The District has retained the services of Mr. Ken Richmond to conduct Owens and Mono Lake air quality modeling since the early 1990s. Mr. Richmond has worked for a number of consulting firms over the years and now works for Environ. Mr. Richmond has been invaluable in assisting the District with the development of the dust monitoring program at Owens Lake. The proposed assessment includes \$200,000 for Mr. Richmond to continue to assist the District. This is the same as the 2010-11 assessment.

II.K.15. – EIR Monitoring

Sapphos Environmental, the District’s consultant that prepared the EIR for the 2008 SIP, will continue to assist District staff with implementation of the Environmental Quality Assurance Program that tracks the many environmental mitigation measures associated with the SIP and EIR requirements. Sapphos will provide on-call field services for biological and archaeological issues and will track compliance with all environmental impact mitigation measures. The budget contains \$75,000 for this item. A more detailed description of Sapphos Environmental’s work efforts is found below.

II.K.18. and II.K.19. – Dust Source Research & Consulting (Keeler Dunes)

This part of the assessment includes professional services related to the Keeler Dunes Investigation (\$125,000). Work for this part of the assessment will be conducted by HydroBio Inc. (II.K.19: \$50,000) and the Desert Research Institute (DRI) (II.K.18: \$75,000).

The Keeler Dunes are the main contributing dust source to exceedances of the Federal PM10 standard in the community of Keeler. The 2008 SIP commits the District to meeting the federal and state standard within the community of Keeler by 2017. In order to meet this timeline, the District included a budget for continued work on the Keeler Dunes in the SB270 Assessment commencing in 2008-2009. The purpose of the proposed work is to (1) continue to operate monitoring sites and collect data in order to define the magnitude and extent of the

contributing source area, (2) hold meetings and interact with all interested agencies and parties, and (3) development of a control strategy. The overall amount for the work in the Keeler Dunes is \$125,000. More detail on the scope of the work and the associated costs are provided below.

II.K.20. – Owens Lake Video Analysis and Consulting

This part of the assessment includes professional services for working on the video images captured through the District's Owens Lake time-lapse camera network. The 16 remote cameras in the network provide images of conditions and dust source activity on Owens Lake. The video is captured regularly during daylight hours and is transmitted to Keeler. Up to the present the main use of the video data is to view dust events either in real time or qualitatively to verify dust activity in areas for the annual Dust ID model. District staff developed a process to use this video to produce accurate maps of dust source areas with possible input into the Dust ID model. Building off initial work by District staff, HydroBio began working in FY 2010-2011 on refining the technology in order to develop a method for using the video data to produce accurate maps of dust source areas. These maps could then be incorporated into the construction of the Dust ID model to improve accuracy of source area activity. So far the results of this work are promising and if developed sufficiently could drastically improve the source area configuration and accuracy of the model results. This portion of the assessment provides funds (\$75,000) for professional services from HydroBio for development and implementation of this tool.

II.K.21. – Dust Control Measure Compliance Using Satellite Imagery

Because of the very large areas involved with dust control at Owens Lake, the District uses satellite imagery to evaluate the City's continued compliance with the performance requirements associated with the managed vegetation and shallow flooding dust control measures. This component of the assessment is for the satellite imagery and compliance analysis efforts. \$205,000 is being assessed for compliance imagery and analysis. The three budget tasks to be completed are: Shallow Flood Compliance (\$75,000), Managed Vegetation Compliance (\$50,000), and Research on Compliance Monitoring of Hybrid Shallow Flooding-Managed Vegetation (\$60,000) plus an additional \$20,000 budgeted for upgrade and support for the GIS system and other support related to all budgeted tasks. Cost details and a description of work are provided below. This cost category has been reduced from the current fiscal year, as it is staff's intention to take over the Shallow Flood compliance analysis over the course of the upcoming fiscal year and cut this consulting category completely in fiscal year 2012-13.

II.L. – Supplies and Tools

Budgeted items for this category include general office supplies, use supplies, computer supplies and in-field supplies and materials. Items in this category typically have a limited operating life. Backup meteorological audit equipment and miscellaneous tools are required for the District to maintain all of the monitoring equipment in good operating order. Many of the District's meteorological systems are more than 9 years old, as is the equipment used to audit them. It is important to keep the equipment in good working order and to have funds available to procure additional equipment, should the aging equipment in use fail.

Respirators, replacement parts, cartridges and safety training materials are all necessary parts of the District's safety program. Every staff member that spends any time in the field has a

respirator and gets annual training on its use. Air-purifying cartridges for the respirators require regular replacement and the respirators themselves wear out and require replacement parts or full replacement in order to ensure employee safety. \$33,000 has been budgeted for the Supplies and Tools category.

III. – Materials and Equipment Costs

This category includes materials and equipment not associated with general support. This equipment has a higher per item cost (more than \$5,000 each or as a whole) and a longer life. Materials and equipment costs in this category for 2011-12 total \$204,000. This is a decrease of \$2,000 or -0.97% from FY 10-11.

III.A. – Equipment: Scientific, Computer, Office, & General (>\$5,000)

This category encompasses items costing more than \$5,000 and includes new or replacement scientific equipment, air monitors and related parts, certain computer equipment, software (office upgrades, data logger, GIS, accounting, anti-virus), furniture, office machines and safety equipment.

The air quality monitoring equipment the District currently uses will typically have an operational lifespan of five to seven years, given the harsh environment in which it functions. Some of the older monitors currently in operation were purchased in 1995, are worn out and need replacement. Equipment failures are sure to follow given the age of the monitoring equipment currently in place. In order to address these failures and avoid data loss, jeopardizing the District's ability to determine the efficacy of the LADWP mitigation measures, sufficient funds need to be budgeted for replacement equipment each year. During the 2008-2009 fiscal year, the District started capital accrual accounts for equipment replacement. In order to minimize the impact that wholesale equipment replacement would cause in any single budget year, District staff proposed spreading the equipment replacement over several years, thereby reducing the impact in any one year and smoothing out year-to-year budget variations.

One replacement filter-based PM monitor (\$18,000 each) is necessary to ensure uninterrupted monitoring at the Keeler site. The filter-based monitors currently in use are at least seven years old, and some are up to eleven (11) years old. The District purchased six monitors during FY 2010-11, and now plans to replace the remaining monitors at a rate of two to three per year until the old monitors are phased out.

The District is currently operating 21 TEOM PM₁₀ monitors (19 in the SB 270 program and 2 in the District program). Replacement of the TEOM monitors (\$36,000 each) will be necessary over the few years. The newest TEOMs in the network are seven years old. The manufacturer stopped producing the model used in the District network in July 2008. They have committed to supporting these units for ten years, however, in the dusty environment in which the District monitors operate, it is unlikely they will last another ten years. In order to address this issue, staff proposed replacing TEOM monitors starting in fiscal year 2008-2009. In FY 2010-11, five (5) new TEOMs were purchased. Staff is recommending funds be allocated for the replacement of two (2) TEOMs and one filter-based sequential PM10 monitor in FY 2011-2012.

On the current replacement schedule, all of the TEOMs throughout the District funded by SB270 will be replaced by 2016.

Lab Temp/RH Control System (\$5,000): The District started an accrual account for the replacement of the laboratory temperature/humidity control system in 2008-2009. That system was replaced in 2011. The lifespan for these systems is ten years, so the next replacement will occur in 2021, when the accrual account will have accumulated \$50,000. Cost of the current system was approximately \$35,000.

Mono Lake (\$6,000): The District has operated the Mono Lake monitoring network for over twenty years. Over the next year it is anticipated that the replacement of some or all of the meteorological monitoring equipment at the Mono Shore site will be required. Most of equipment at the Shore site has been in place for eleven years. The typical lifespan of such equipment on Owens Lake has been anywhere from 5 to 10 years, thus replacement of the meteorological equipment in the 2011-2012 fiscal year will be necessary.

Data Management System (\$20,000): The District's air quality database management system has performed adequately for the past two decades. In recent years, extensive monitor additions in conjunction with an increased frequency of 5 minute meteorological and 30 minute PM10 observation intervals have taken place. With these changes, new challenges have been encountered and the time has come to investigate other potential database management options which may better suit our needs. The District is currently looking into various systems with the ability to integrate all aspects of our existing air monitoring data collection network and fulfill our data reporting requirements.

III.B. – Vehicles and ATVs

The District relies daily on off-road vehicles and all-terrain vehicles (ATVs) for transportation from and to monitoring stations at Owens Lake and Mono Lake. The District policy on replacement of vehicles states that field vehicles may be replaced after they have accumulated 110,000 miles, or when staff determines significant maintenance and/or safety issues warrant replacement. Staff may determine that vehicles be kept beyond the 110,000 mile limit but must inspect the vehicles regularly and annually reassess them.

Purchase of two new vehicles is anticipated for the 2011-2012 fiscal year. Replacement vehicles will include one (1) sport-utility vehicle and one (1) compact pickup truck. The vehicles being replaced are the same types as those listed above. The vehicles to be replaced and the mileage on each of them are listed below:

2000 Toyota Tacoma	110,000 Miles
1999 Toyota 4Runner	115,000 Miles

The two (2) vehicles have served the District well for many years but have gotten to the point where maintenance costs are at or above the value of the vehicles. Both vehicles are used in the rugged environment at Owens Lake. These vehicles will require replacement.

The District has a fleet of ATV's that are used by District staff for monitoring, collection and maintenance of various sites on and around the Owens Lake. These vehicles are used daily

and need to be reliable and in good working order. One of our older (2000) units with over 17,000 miles has started to show signs of its age and needs replacement. Repair cost are estimated to be more than the ATV is worth, because of this one new replacement ATV (\$8,000) is required in Keeler

Workplan

The following efforts will take place under the SB 270 Assessment:

Air Quality Monitoring

For fiscal year 2011-12 the SB 270 program will operate 25 air quality monitors (21 TEOMS and 4 Partisols) at 14 separate sites at Owens Lake and 2 monitors at 2 sites at Mono Lake. In addition to the air quality monitors, there are 19 meteorological sites at Owens Lake and 2 at Mono Lake (many of the meteorological sites are located at air monitoring sites). District personnel are responsible for the operation and maintenance of the monitoring equipment as well as installing and removing filters, weighing filters, validating data, conducting quality control checks, conducting quality assurance audits, and data reporting. Some of these responsibilities will increase as a result of the District becoming a primary quality assurance organization, separate from the California Air Resources Board, reporting directly to EPA.

Dust ID Program

The District will continue to operate the Owens Lake Dust Identification Program. This effort consists of operating approximately 200 Sensit sand motion sensing devices on the lake bed, and within the Keeler Dunes, mapping the location of dust emissions during dust storms, time-lapse video recording of dust events and GPS mapping the location of emission areas on the lake bed after dust storms.

The Dust ID Program is an ongoing effort to identify dust source areas at Owens Lake, and to quantify their dust emissions and impacts on air quality. The program was initiated in 1999 and includes an extensive network of erosion monitoring equipment, time lapse cameras, PM₁₀ monitors, and meteorological towers. The Dust ID Program also provides resources for personnel to map source area boundaries and dust plumes, and to collect and analyze the information.

The Dust ID Program is a required program in the 2008 SIP and is the primary method used to identify dust source areas that cause or contribute to exceedances of the PM₁₀ standard. These would include new sources of the dust that may need control or controlled areas that are out of compliance with SIP requirements.

TABLE 2

FY 2011-12 SB-270 Assessment Summary

EXPENSES	10-11	11-12	% change
I. Employee Costs			
A. Employee Wages	1,615,000	1,460,000	-9.60%
B. Retirement	369,000	355,000	-3.79%
C. Insurance Benefits	412,000	405,000	-1.70%
D. Taxes	291,000	245,000	-15.81%
E. Retiree Medical Insurance Unfunded Liability	348,000	348,000	0.00%
F. Worker's Compensation Insurance	25,000	27,000	8.00%
Employee Costs	3,060,000	2,840,000	-7.19%
		-220,000	
II. Operating & Compliance			
A. Advertising - Legal Notices & Ads	4,000	4,500	12.50%
B. Dues, Subscriptions, Education, Use Tax & Fees	15,000	28,000	86.67%
C. Equipment: Computer, Furniture, General, Office, Safety, Scientific, Software (<\$5,000 ea)	195,100	197,000	0.97%
D. Fuel & Gasoline	30,000	34,000	13.33%
E. Health & Safety	3,000	4,500	50.00%
F. Insurance - Liability, Fire & Casualty	60,000	51,000	-15.00%
G. Leases & Rents: Equipment, Office, Site, Storage	107,700	103,100	-4.27%
H. Maintenance & Repairs of Equipment - Labor	45,000	45,000	0.00%
I. Maintenance & Repairs of Equipment - Materials	72,800	55,000	-24.45%
J. Postage & Shipping	3,000	4,000	33.33%
K. Professional & Special Services	78,000	824,500	4.63%
L. Supplies & Tools (In-Field, Office, General Use)	35,000	33,000	-5.71%
M. Transportation & Travel	27,000	26,000	-3.70%
N. Utilities	52,000	59,700	14.81%
Operating & Compliance Costs	1,437,600	1,469,300	2.21%
		31,700	
III. Materials & Equipment			
A. Equipment: Computer, Furniture, General, Office, Scientific, Software, Furniture (>\$5,000 ea)	79,000	126,000	59.49%
B. Vehicles & ATVs	127,000	78,000	
Materials & Equipment Costs	206,000	204,000	-0.97%
		-2,000	
TOTAL SB270 EXPENSES	4,703,600	4,513,300	-4.05%
		-190,300	

FY 2011-2012 BUDGET DETAILS

TABLE 3

II.C. - Equipment (<\$5k)		SB270
1	Computers, Printers, Scanners, Parts	29,500
2	Furniture	2,500
3	General Use & Safety	1,500
4	Office	1,500
5	Scientific (SB270: 25 Sensits & Datalogger Upgrades)	133,000
6	Software	29,000
Equipment (<\$5k)		197,000
II.G. - Leases & Rents		SB270
1	Bishop - Main Office	65,600
2	Bishop - Tech Workspace	6,100
3	Bishop / White Mtn Research (NCORE grant may subsidize partial)	-
4	Equipment	5,000
5	Keeler - Office (Owens Lake)	8,300
6	Keeler - Office Portable Trailer (Owens Lake)	5,900
7	Lone Pine - Site	1,800
8	Mammoth Lakes - Site	-
9	Mono Lake - Simis Site	600
10	Mono Lake - Crowe Site & Storage	1,300
11	Olancha - Site w/ Utilities	3,000
12	Parking	3,000
13	Storage	2,500
14		
15		
Leases & Rents		103,100
II.H. - Maintenance & Repairs of Equipment - Labor		SB270
1	Laboratory certifications, telephone system, office equipmt, etc.	16,000
2	Vehicle Maintenance: Contingencies, tires, tun-ups, oil changes	20,000
3	Vehicle Maintenance: Washing & detailing	4,000
4	Transportation/Installation of short-term monitors	-
5	Safety respiratory screen	5,000
		45,000
II.I. - Maintenance & Repairs of Equipment - Materials		SB270
1	TEOM Repl. Pumps, \$700 ea.	4,200
2	TEOM Pump Rebuilds, \$250 ea.	1,000
3	Partisol Pumps, \$600 ea.	1,200
4	Partisol Pump Rebuilds, \$250 ea.	1,000
5	TEOM Sample Filters, 20/pkg, \$300 ea.	1,500
6	TEOM In-line Filters, \$200 ea.	5,000
7	TEOM Repl. Tubing, Fittings, etc.	1,000
8	TEOM/Partisol Misc.	1,500
9	Partisol In-line filters, \$100 ea.	1,100
10	Partisol Filter Exch. Mech., 1 spare	1,500
11	46.2 mm PM-10 Filters and supplies, \$7 ea. (funded by EPA)	-
12	Laboratory Support Equipment	4,000
13	Addl Mon. Support Equip., QA equip.	1,000
14	Asst'd Cables and Fittings	1,000
15	Datalogger Solar Panels, Batteries, etc.	1,500
16	Replacement PM10 inlets, \$1500 ea.	1,500
17	WS/WD sensor rebuilds @ \$400 ea.	2,000
18	Transportation/Installation of short-term monitors	-
19	Keeler: Site equipment, Sensits (+150), Vehicles, ATVs	25,000
M&R-Materials		55,000

FY 2011-2012 BUDGET DETAILS

TABLE 3

II.K. - Professional & Special Services		<u>SB270</u>
1	Board Stipend	4,200
2	Board Stipend - Hearing Board	1,000
3	CARB: 2588 Hot Spots Prog.	-
4	Financial Software Support Services	2,500
5	Human Resources Consulting	8,500
6	Independent Fiscal Auditor	7,500
7	Independent Fiscal Services/Consulting	2,400
8	Inyo Co. Auditor: Fiscal Support	5,100
9	Inyo Co. Counsel: Legal	11,900
10	Janitorial Services: Bishop & Keeler	9,000
11	Legal Services: Morrison & Foerester (General)	25,000
12	Owens Lake Air Quality Modeling: Environ	200,000
13	Mono Lake Public Outreach & Education (Interpretive Display)	50,000
14	Respiratory Testing	3,000
15	Environmental Consulting: Sapphos	75,000
16	Supplemental Consulting Services (Air Monitoring)	6,800
17	Supplemental Consulting Services (IT Services, Data Mgmt, Web)	7,600
18	Dust Source Research & Consulting: DRI (N. Lancaster)	75,000
19	Dust Source Research & Consulting: HydroBio	50,000
20	Owens Lake Video Analysis & Consulting: HydroBio	75,000
21	DCM Enforcement: Satellite image analysis & Other Tasks: HydroBio	205,000
Professional & Special Services		<u>824,500</u>

II.N. - Utilities		<u>SB270</u>
1	Electric/Water/Gas/Trash	25,000
2	Communications/Internet/Telephone	25,500
3	Cell Phones	9,200
4		
Utilities		<u>59,700</u>

III.A. - Equipment: Scientific, Computer, Office, Furniture(>\$5k)		<u>SB270</u>
1	Replacement PM Filter Monitors, @\$18,000 ea.	18,000
2	Backup TEOM Replacement, @\$36,000 ea.	72,000
3	Off-grid TEOM system - Mono Shore	2,000
4	Mono Network Upgrades	2,000
5	Owens Lake PM Monitoring Network Upgrades	2,000
6	Replacement Lab Temp/RH Control System	10,000
7	Data Management System	20,000
Equipment (>\$5k)		<u>126,000</u>

III.B - Vehicles & ATVs		<u>SB270</u>
1	Replacement Vehicles	70,000
2	Replacement ATVs	8,000
3		-
		<u>78,000</u>

TABLE 4

PROPOSED

FY 2011-12 Employee Time Allocation	District	SB-270		FTE
Regular Employees				
Air Pollution Control Officer (TS)	0.10	0.90		
Deputy Air Pollution Cont Officer (DO)	0.20	0.80		
Air Quality Specialist II (JS, JB)	2.00	-		
Director Technical Services (NB)	-	1.00		
Technical Services Technician (JJ)	-	1.00		
Technical Services Specialist	-	0.00		-1.00
Field Services Technician I & II (Proposed)		2.00		+2.00
Sr. Systems & Research Ana. (PK)	0.05	0.95		
Systems Research Analyst (MS)	-	1.00		
Systems Research Analyst (CH)	0.10	0.90		
Geologist (GH)	-	1.00		
Administrave Projects Manager (SO)	0.15	0.85		
Admin Asst/ Board & Permit Clerk (TD)	0.25	0.75		
Fiscal Services Specialist (LA)	0.15	0.85		
Air Monitoring Specialist (CL)	0.15	0.85		
Air Monitoring Technical Specialist (DJ)	-	1.00		
Air Monitoring Tech II (Vacant, SW)	-	2.00		
Air Monitoring Tech II (GD)	0.10	0.90		
Air Monitoring Tech II (MH)(VT)	0.20	1.80		
Air Monitoring Tech I (SM)	-	1.00		
Subtotal Regular Employees	3.45	19.55		23.00
Contract Employees				
Fiscal/Admin Clerk (PT/No Benefits)	0.06	0.31		
Technical Field Services Tech (SG)	-	0.00		-1.00
Technical Services Field Tech (BR)	-	0.00		-1.00
Subtotal Contract Employees	0.06	0.31		0.37
TOTAL 2011-12 FTE	3.51	19.86	-1.25	23.37
TOTAL 2010-11 FTE	3.55	21.07	-1.75	24.62
TOTAL 2009-10 FTE	3.66	22.71	0.00	26.37
TOTAL 2008-09 FTE	3.65	22.72		26.37

Additional Details Regarding Professional Services Items II.K.15, II.K.18, II.K.19, II.K.20 and II.K.21.

The Professional Services sub-budget contains funds for contracts with HydroBio for the use remote sensing techniques for dust control measure compliance enforcement, Desert Research Institute and HydroBio for work on the Keeler Dunes project and Sapphos Environmental for environmental services associated with the implementation of the 2008 SIP EIR. Additional details on the scope of work for these contracts are provided below.

II.K.15 – Environmental Services Assistance – Sapphos Environmental

The 2008 Owens Valley SIP and EIR contain a considerable number of mandatory mitigation measures to reduce the environmental impacts caused by the dust control project. The District has implemented an Environmental Quality Assurance program (EQAP) to ensure objective and timely compliance and reporting pursuant to the Mitigation Monitoring and Reporting Program (MMRP). The MMRP is a mandatory component of the 2008 EIR and is required by the California Environmental Quality Act (CEQA). The efficient implementation of the EQAP and MMRP involves coordination, communication, and reporting among the District, the City of Los Angeles Department of Water and Power (City), responsible public agencies, interested public agencies, and the public. These other agencies mainly include the California State Lands Commission and the California Department of Fish and Game. This effort involves reviewing the adequacy of compliance plans submitted to the District by the City in fulfillment of mitigation measure requirements to avoid and/or reduce environmental impacts. As the MMRP is implemented, the District will be responsible for ensuring compliance with dozens of subtasks within the MMRP and compliance programs. Where compliance is achieved, the District intends to document it and report it to responsible agencies and the public.

The budget contains a total of \$75,000 for both the compliance monitoring and reporting.

II.K.18-19. – Dust Source Research & Consulting (Keeler Dunes)

The Keeler Dunes dust emissions work is designed to investigate the Keeler Dunes area and associated PM₁₀ exceedances that cause continued air quality impacts in the community of Keeler. The work planned for 2011-2012 continues and builds on work that began in fiscal year 2007-2008. Investigation of the dust emissions from the Keeler Dunes is committed to by the District and the City in the 2006 Settlement Agreement (Para. 30) and is required by the 2008 SIP (Sec. 7.5).

The Keeler Dunes and associated sand deposits are a source of fugitive dust emissions that impact the community of Keeler. The dune area is located to the northwest of Keeler above the historic shoreline of Owens Lake. Much of the sand present within the dune area is thought to have been deposited from migration off of the bed of Owens Lake after the lake bed was dried due to the LADWP's water diversions, but before dust control projects were implemented starting in 2000. Since the operation of dust control measures (DCMs) on the lake bed started in 2001, the supply of sand has been largely cut off. However, due to the large volume of loose sand deposits within the dunes and across the alluvial fan, sand migration and dust emissions continue. Dust concentrations measured within the community of Keeler from the Keeler Dune area continue to exceed the Federal and State PM₁₀ 24-hour standards of 150 and 50 µg/m³, respectively (Figure 1). Even though the number of exceedances in the community of Keeler of the Federal PM₁₀ standard that are attributed from Owens Lake has decreased with time as dust

controls projects on the lake bed are implemented, the uncontrolled Keeler Dunes continue to cause multiple PM₁₀ standard exceedances every year, averaging over five exceedances per year. The 2008 SIP calls for control of the dust emissions from the Keeler Dunes on or before December 31, 2013. The District is the agency responsible for developing a dust control strategy and plan for the Keeler Dunes PM₁₀ emissions.

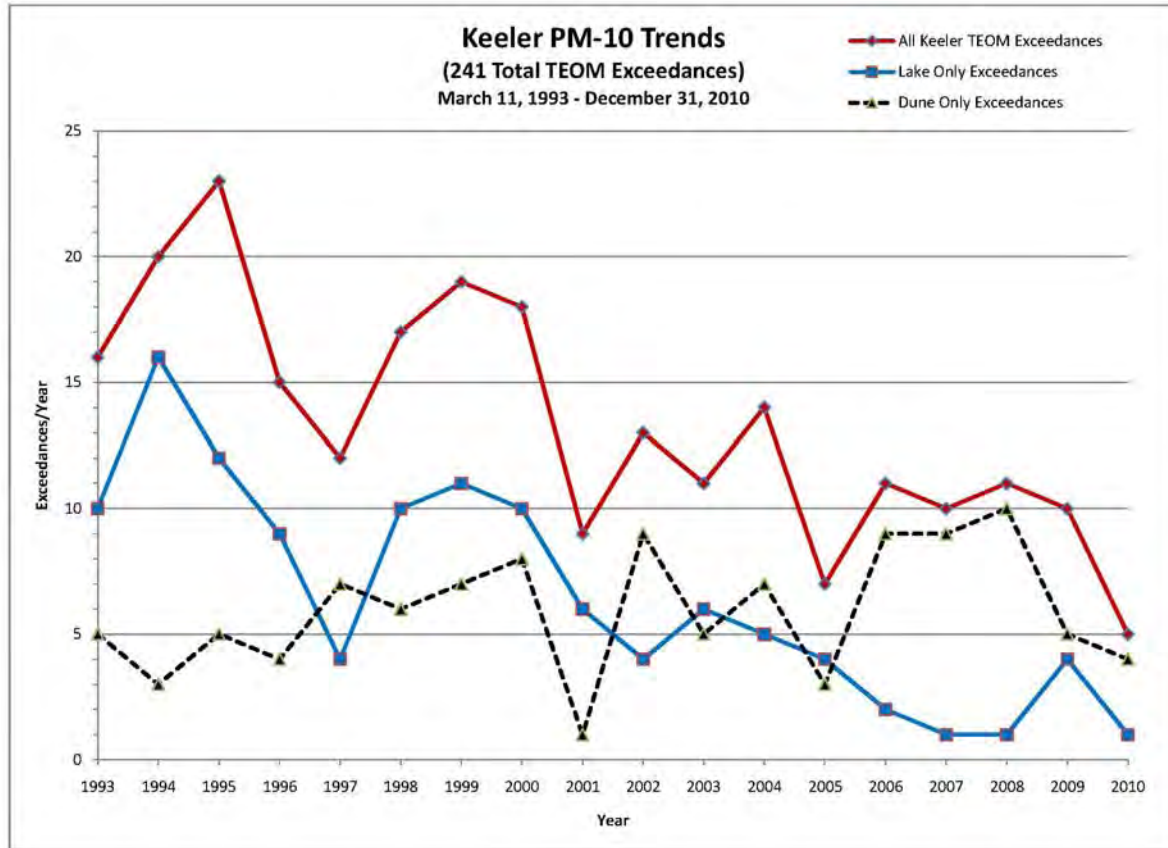


Figure 1. Graph of the number of monitored exceedances of the Federal PM₁₀ standard per year measured at the Keeler Monitoring site from 1993 to 2010.

Purpose

Previous dust source identification and dust control activities by the District have mainly focused on areas on the bed of Owens Lake, where the largest and most emissive dust sources were present. Now, with control of most of the main dust sources on the lake bed and implementation of almost 40 square miles of dust controls by the Los Angeles Department of Water and Power (LADWP) from 2000 through 2010, the full magnitude of the dust problem from the Keeler Dune area is more evident and no longer masked by dust sources on Owens Lake.

Currently, there are seventeen sand motion monitoring sites installed in a network across the Keeler Fan (Figure 2). These sites are located such that they provide information on the spatial and temporal resolution of sand movement and the wind field across the area. Data from these sites combined with information on the historical development of the dunes and focused field surveys are designed to provide knowledge for the development of a dust control strategy for the dune area.

The overall purposes of this project are to work to define and determine the mechanisms causing the dust problem and the extent of the problem and to develop a plan to mitigate the dust impacts from the Keeler Dunes. These objectives will be reached through an integrated project that combines information from multiple sources that include not only sand transport monitoring but also a satellite/air photo analysis, field mapping and sampling, observations conducted during dust events and historical research.

Approach

There are several agencies and groups that will have to be involved in this project at some level. The land on which the area is located is owned mostly by the U.S Department of the Interior under the jurisdiction of the Bureau of Land Management (BLM). Other owners include the LADWP and Southern Pacific Railroad. Additionally, Native American tribes need to be involved due to the presence of sensitive cultural resources in the general area. The project will be headed by the District and will involve other groups and agencies, as needed, for permission to access the dune area as well as for meetings to discuss the project and its results.

Due to the complex nature of some of the questions that need to be answered before a successful dust mitigation strategy can be developed, this is a multi-year project. The project tasks and budget outlined here are just for the 2011-2012 fiscal year. However, as the work started in earnest a couple of years ago, a brief summary of the main tasks that have been completed or are in progress is given below, followed by a discussion of the plans for 2011-2012.

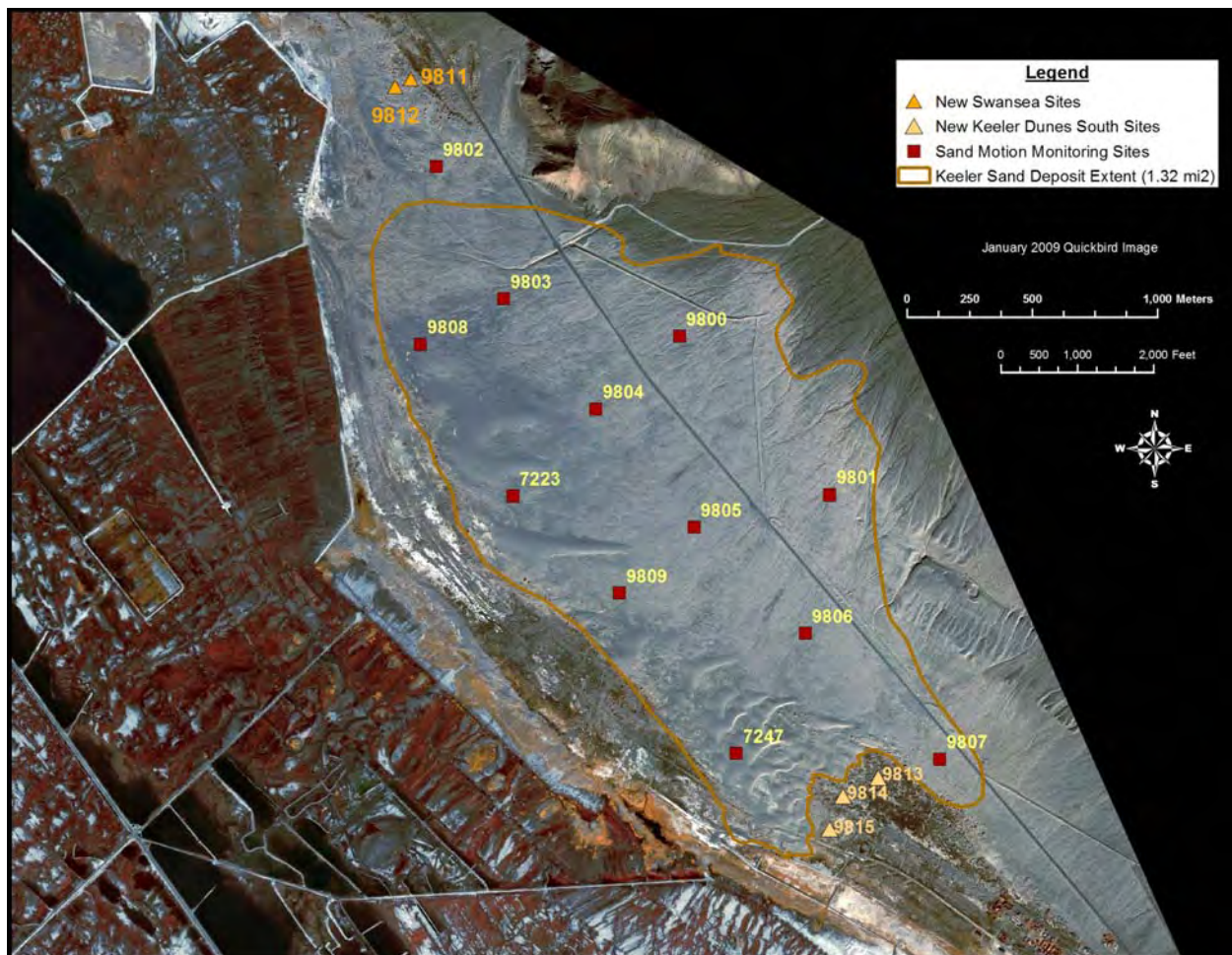


Figure 2. Map of monitoring locations in the Keeler Dune area and the approximate extent of the associated sand deposits.

Activities Completed or in progress

- Operation of seventeen sand flux and wind speed/direction monitoring sites within the Keeler Dune and Keeler sand sheet area.
- Operation of two remote cameras with vantage over Keeler Dune area. Cameras collect images during daylight hours and send them into Keeler field office. Images from one of the cameras are then up-loaded to the Internet for public viewing. Main camera unit switched to High Definition for higher resolution.
- Observational mapping of active source areas within Keeler Dunes during wind events.
- Photo observations. Pictures taken of area surrounding each sand flux monitoring site (frequency = episode)
- Survey transects across selected dune forms for analysis of dune movement and dynamics. Sand budget estimation.
- Creation of a library of satellite imagery and air photography of the dune area. Each image is being geo-referenced for interpretation and analysis of temporal changes.

Analysis of dune movement and development over time through interpretation of historic images.

- Particle size analysis of sand catch samples and sand samples from within the dune area.
- Detailed delineation of vegetation cover and extent across Keeler Fan area using high resolution geo-referenced air photographs from fall 2009.
- Collection of age date samples for analysis via optical luminescence methodology.
- Acquisition of LiDAR data (from the LADWP) for the Keeler Dunes from January 2010.
- Public Meeting with interested local agencies and parties to discuss the project and dust controls for the Keeler Dunes.

Plans for 2011 - 2012

The Keeler Dunes Investigation is a multidimensional project with the main components of the project for 2011-2012 separated into five categories.

1. Historical development of the Keeler Dunes
2. Data collection and monitoring site operation
3. Data analysis and interpretation (includes air quality modeling focused on Keeler Dune sources and their impacts to the local area)
4. Development of dust control strategy
5. Public and agency participation

The project is designed to utilize all of the information gathered from the component parts in order to develop a dust control strategy that will not only mitigate the PM₁₀ impacts from the Keeler Dunes, but do so in a way that works with the dynamic dune system and takes into account the needs of all interested agencies and parties.

1. Historical Development of the Keeler Dunes

Along the eastern side of Owens Lake, there are two general types of sand and dune deposits. The first are the vegetated shoreline dunes that are present along much of the eastern shoreline from the northern portion of the lake southward past the community of Keeler. These are thought to be natural features that formed along the shoreline of the lake prior to its desiccation and are characterized by their linear trend along the shoreline and relative abundance of vegetation (mainly saltgrass and greasewood). The second type of dune and sand deposits are present upslope from the shoreline dunes and sit on top of older alluvial fan surfaces. These types of deposits are present in several locations around Owens Lake with the most notable being the Keeler Dunes and are thought to have formed from windblown material from the dried lake bed.

The source of the sediment present in the Keeler Dunes and associated sand sheet is thought to be the exposed bed of Owens Lake to the west and northwest of the dune area (an area known as the North Sand Sheet). The line of reasoning for this is based on the predominant east to southeast sediment movement direction both within the dunes and the North Sand Sheet as well as the high proportion of fine material in addition to the sand-sized particles within the Keeler deposits (indicating relative youth and proximity to the sediment source, lack of winnowing). However, more information is needed to determine the development of the Keeler deposits over time and to verify their origin.

The northeastern portion of the lake bed became exposed following diversion of the Owens

River and associated recession of the lake waters in the early 1900's. Starting in late 2001, with the beginning of dust control measure implementation, the exposed North Sand Sheet area west of the Keeler Dunes was stabilized by wetting of the lake bed surface through the Shallow Flooding dust control measure. The focal point of this task is to investigate the historical development of the Keeler Dunes in order to determine their age, origin, and evolution over time.

A library of historical satellite imagery, air photos, and other documented records is being gathered and evaluated to understand the changes of the dune and sand deposits over time and changes that are evident with implementation of DCMs on the Owens Lake bed. The library contains a mix of images from different satellite platforms and spatial resolutions ranging from Landsat images (spatial resolution of 30 meters) to Quickbird (spatial resolution of 0.61 meters) and Ikonos (spatial resolution of 0.82 meters). The current library contains imagery mostly from the mid-1990's to the present. However, there are a few images and air photos that have been found that extend the record to the 1947. (Some of the known photos available from the USGS Earth Explorer photo database and the US military include photos from as early as 1947, 1967, and 1976.) These older photos and images provide some of the best historical information on the development of the dunes and are currently being analyzed.

Historic ground-based air photos and maps are another means for providing spatial information on the extent and evolution of the area. Other sources, such as the LADWP, State of California, China Lake Naval Weapons Center, Cal Trans, Southern Pacific Railroad, USDA, BLM, Fairchild Collection at Whittier College etc, may have additional photographs. A priority is to search for any photos prior to 1947, and to fill in the gap between 1947 and 1976 with more information in order to provide more detail on the development of the dunes and sand deposits with time.

Searches for information on the dune area are also being made through old county records, highway maintenance records, and other documents that might be available from former mining operations along the eastern portion of Owens Lake. The District is working with the Eastern Sierra Museum for searches of historical documents and photos. All of the information gathered in this task will allow for a more complete understanding of the evolution of the dune area from the early 1900's to the present and potential changes that would be expected in the future.

2. Data Collection and Monitoring Site Operation

Monitoring Site Data: The primary data collection task for 2011-2012 is to operate, maintain, and collect the sand flux and wind speed/wind direction data from the 17 monitoring sites located within the area. Each of these sites is equipped with a Sensit, Cox Sand Catcher (CSC) and wind speed instrumentation. Additionally, seven of the sites also have wind direction probes. The electronic data (particle count, wind speed, wind direction) are all recorded on a 5 minute average and downloaded to the Keeler field office through a radio telemetry system. The sand caught in the CSC is collected following every major wind event or every month (depending on which is sooner). The mass of the catch is weighed in the field and also removed from the site and taken to the lab in the Keeler field office where it is dried (if needed) and reweighed under controlled conditions. The samples are then cataloged and stored.

Photographic, Video, and Mapping Data: In conjunction with the sand flux and wind field data, video imagery from remote camera locations is collected from two vantage points that overlook

the Keeler dune field. One location is to the east in the foothills of the Inyo Mountains and the second is to the north of the dunes are on a ridge between Dolomite and Swansea. These camera sites collect images every 15 seconds during daylight hours with the imagery transmitted to the Keeler field office. During dust events, observational maps are drawn of the location of activity within the dune area by District staff from a vantage location above the deposits on the Keeler Fan. The purpose of the camera imagery and mapping is to gather spatial information on the extent and strength of dust source activity throughout the sand deposit and dune area.

Particle Size Data: Results on samples collected from the loose surface deposits at each monitoring site indicate that the aeolian material changes in particle size across the area with an overall fining of the sand size material from northwest to southeast as well as from west to east matching the overall trend in sand movement. This observed pattern is consistent with progressive fining of sand as it moves downwind. The samples collected from the southern and eastern portions of the area are dominated by particles classified as fine sand to very fine sand, typical of aeolian dune fields. The higher proportion of coarser sized particles (coarse grained to very-coarse grained sands) found in the samples from the northern sites is consistent with the observed presence of lag-type deposits and closer proximity to the sediment source.

Survey Transects: A three-dimensional analysis of the dune field and sand sources within the area will be conducted through an analysis of data from survey transects. The goal of this is to develop a sand budget for the dunes in order to understand the dynamics of sand movement from one dust season to the next. A set of survey transects were established and the initial measurements were taken in the fall of 2008. Additional measurements were taken in 2009 and 2010 and will continue in subsequent years until dust mitigation measures are in place. Analysis of the dune profile data will be useful for understanding the dynamics of the dune area and for quantifying the amount of volume change of sand deposits within the dune field over time.

3. Data Analysis and Interpretation

Dune Dynamics: The results from the data collection efforts from the monitoring sites and analysis of historical satellite and aerial photos will be used to develop an understanding of the dynamics of dune formation and changes over time. The long-term record from photos and images can be used as a time-series to determine rates and direction of dune migration and associated changes in dune morphology. The comparatively short record gathered from the 12 monitoring sites within the dunes will provide detailed data on sand flux rates and directions of sand movement.

A study by Hydro-Bio (2009) looking at satellite images from 2002-2008 produced valuable data on the recent rates and direction of dune movement. The results of this study are consistent with results and data from the District's sand flux monitoring sites and show that the western portion of the dune area appear to be moving south-eastward while the eastern portion of the Keeler sand deposits are moving eastward to northward. The initial indication from these two initial data sets is that the sand movement across the area is non-uniform. Further analysis of sand flux data, wind speed and wind direction data as well as historical imagery/photos will provided further valuable information as to the complex development of the dunes, sand motion magnitude and direction, and the annual or seasonal patterns that may exist and allow for a more complete understanding of the dune formation, their change over time and their expected development in the future.

Air Quality Model: The Keeler Dunes area has been included by the District in the air quality models developed for the Owens Valley PM₁₀ Planning Area as part of the Dust ID program since 2000. However, until recently, the focus of past models has been the dust sources on the bed of Owens Lake and sources within the Keeler Dunes have not been well defined. With the addition of new monitoring sites within the dune area and more detailed data on sand flux and wind field information, better definition can be included for sources within the dune area. Future air quality models that include the Keeler Dunes area will synthesize the data from air monitoring, wind speed, wind direction, and sand flux along with video and observational mapping to assist in determining the portion(s) of the dune deposits that need to be mitigated and the level of control needed in order to reduce the impacts in air quality in the community of Keeler to levels below air quality standards. The model protocol will be similar to that used successfully by the Dust ID program in determining those areas where control is required on the adjacent bed of Owens Lake however, the model inputs will be refined to provide more detail about the dust emissions and impacts from the dune area.

4. Development of a Dust control Strategy

Control of the dust emissions from the dunes is required in order to obtain the PM₁₀ air quality standards in Keeler and in the local area. The measures for dust control will be determined and evaluated as part of an overall dust control strategy. This strategy will be different from that utilized on Owens Lake. The strategy will take into consideration the resources of the area. This will be a complex task that involves creativity and input from many sources.

5. Public and Agency Participation

Any successful dust mitigation strategy for the Keeler Dunes will require input and participation from multiple agencies and members of the public so that all of the separate interests of the groups and individuals can be considered. The principle government agencies with jurisdiction in the Keeler Dune area include the BLM, LADWP, as well as the District however there are additional agencies and parties with interests in the area including the Keeler Community Service District and the local Indian Tribes.

The District is planning on holding a series of meetings to present the data and information collected during the project. All of these groups, as well as other interested individuals, will be notified of the meetings so that they can participate, if desired. The first meeting was held in January 2011 and introduced the project and provided initial information from the data collection efforts. Additional meetings will be scheduled throughout to present future information and to facilitate input about the work and future dust control plans. Any reports that are produced during the project will be made available to all interested parties and agencies.

Professional Services

The services of professionals from HydroBio Inc. and the Desert Research Institute (DRI) will be used during the Keeler Dunes Investigation in 2010-2011. The District is fortunate to have the services of these notable experts to assist in the analysis and interpretation of data from the project.

HydroBio Inc. will mostly be used in the acquisition, rectification, and interpretation of satellite imagery and air photos as well as assistance in analysis of survey transect information. HydroBio

Inc. personnel have worked with the District for many years on various projects concerning Owens Lake and they are familiar with the region and local area as well as the processes that are important within the dune area

Dr. Nicholas Lancaster (DRI) is considered one of the world's foremost experts on desert sand dunes³. In addition to previous work at Owens Lake, he has worked in the deserts in Africa (Namib, Kalahari, northern and western Sahara), Antarctica, and the western United States (Mojave and Sonoran Deserts). Dr. Lancaster's experience will provide valuable insight into evolution and dynamics of the Keeler Dunes and interpretation of the data collected.

Dr. Jack Gillies (DRI) has over 14 years experience in the research field of aeolian processes with focus on the physics of fugitive dust emission by wind, the transport and deposition processes, as well as the mitigative actions that can be taken to ameliorate problem areas. Dr. Gillies has worked with the District in the past on projects concerning dust emissions from Owens Lake and is familiar with previous work on air quality modeling and dust mitigation projects. Dr. Nick Lancaster and Dr. Jack Gillies will be used in the analysis of dune formation, dune evolution and in determining the sand balance as well as dust generation across the area.

Schedule

The timeline provided for attainment of the PM₁₀ NAAQS (National Ambient Air Quality Standard) in the 2008 Owens Valley Planning Area SIP requires mitigation of the PM₁₀ emissions from the Keeler Dunes by 2017. In order to meet this deadline, the District must prepare an order for the control of the Keeler Dunes source by 2012 and control measures must be implemented by 2014. Before the control order can be approved by the District Board, a control strategy needs to be prepared that includes participation by all affected agencies and parties and is supported by CEQA. The control strategy needs to be developed by 2011 so that there is sufficient time available for preparation of the CEQA documents. In order to meet this ambitious timeline, it is imperative to move forward purposefully both scientifically and in communication and discussions with other agencies and interested parties within the next year.

Budget

Dust Source Research & Consulting (Keeler Dunes) for 2011-12 (II.K.18 and 19):

Professional Services – Desert Research Institute	\$75,000
Professional Services – HydroBio Inc.	\$50,000
	\$125,000

II.K.19-21. – Dust Control Measure Compliance Using Satellite Imagery – HydroBio, Inc.

The FY 2011-2012 budget contains \$330,000 for the continuation of dust control measure compliance enforcement and research by the District's remote sensing consultant, HydroBio. HydroBio will provide services for five tasks split between budget categories II.K.19 (\$50,000), II.K.20 (\$75,000) and II.K.21 (\$185,000). Task 1 provides for consultation services with District staff for operational evaluation of the Shallow Flood compliance. Task 2 will provide compliance and continuity measurements for the Managed Vegetation Area. Task 3 is a research

³ Lancaster, Nicholas, 1995. Geomorphology of Desert Dunes. Routledge, London and New York, 290 p. (as well as many other noted journal publications)

effort for determining a compliance measurement method for a hybrid Shallow Flooding-Managed Vegetation dust control measure. Task 4 will provide assistance to the District with the Keeler Dunes study. Task 5 will provide assistance to the District with video analysis and associated dust source area mapping. In addition to the five tasks listed here, the budget includes \$20,000 to support the updating, refinement and reconfiguration of the GIS so files are in the same format and consistent with other Owens Lake data and also for other technical support for dust control research and compliance work. Each task is discussed in more detail below.

Task 1 — Shallow Flood Compliance (II.K.21)

HydroBio, Inc. has conducted analyses of the Shallow Flooding areas on Owens Lake over the past 5-6 years to determine compliance with the requirements for the 2008 SIP. During this time they researched and developed a robust method that uses LandSat imagery. The District will conduct these analyses during the 2011-2012 fiscal year using the methodology developed by HydroBio. Evaluations for Shallow Flooding dust control measure compliance will be performed at approximately monthly cycles from early October through June. The methodology to be used is the well-established TM Band 5 technique that has proven to be an accurate and reliable method over the last few years. The professional services of HydroBio will be retained over the next year to provide technical assistance with the Shallow Flooding compliance monitoring. The cost of the technical support from HydroBio is \$75,000.

Task 2 — Managed Vegetation Compliance (II.K.21)

An evaluation measuring the saltgrass vegetation cover on the Managed Vegetation dust control measure will be completed using satellite imagery. The evaluation of the plant cover will be performed in early October 2010 with prior images analyzed to assess trend and avoid error. A total budget is \$50,000, down \$10,000 from FY2010-2011.

Task 3 — Hybrid Shallow Flooding-Managed Vegetation Compliance (II.K.21)

The City has successfully created wetland areas within the Shallow Flooding dust control measure in several areas on the lake bed. These wetland areas are composed of a mix of vegetation, standing water, and exposed soils. Current dust control compliance determinations are based on whether an area meets either the Shallow Flooding wetness cover OR the Managed Vegetation cover requirement with credit only allowed for one measure of the other. This task is to continue to work in the establishment of a method for determining compliance in an area with mixed vegetation and water such that both control techniques are credited and factored into the compliance call. The cost for this task is \$60,000.

Task 4 — Dune Migration and Dust Release from Keeler Dunes (II.K.19)

HydroBio will perform remote sensing and GIS support roles for the District in our evaluation of the Keeler Dunes. The cost for the services of HydroBio for this task is \$50,000. Additional services for this task will be provided by the Desert Research Institute (DRI) (\$75,000) under budget item II.K.18. A detailed discussion of the planned Keeler Dunes work is provided in II.K.18-19, above.

Task 5 — Owens Lake Video Analysis and Consulting (II.K.20)

HydroBio will perform services to the District in the analysis and interpretation of video imagery from the camera network established around Owens Lake. The cost for the services of HydroBio for this task is \$75,000. A discussion of the video work is provided in II.K.17, below.

HydroBio – Task Summary – Estimated Costs (II.K.20-21)

Task 1 Shallow Flood Compliance	\$75,000	II.K.21
Task 2 Managed Vegetation Compliance	50,000	II.K.21
Task 3 Hybrid DCM Compliance	60,000	II.K.21
Task 4 Dust Source Res.& Consulting-Keeler Dunes	50,000	II.K.19
Task 5 Video Analysis and Consulting	75,000	II.K.20
Other (GIS work and technical support)	20,000	
TOTAL Budget	\$330,000	

II.K.20. – Owens Lake Video Analysis and Interpretation Consulting

The District has a network of 16 video cameras on Owens Lake as part of the Dust ID program. The cameras are located at air monitoring sites and vantage points surrounding the lake bed and provide visual information on the conditions present in the area. Images are captured regularly during daylight hours and transmitted to the District’s Keeler office where they are reviewed. During the past couple of years several of the cameras have been upgraded to High Definition providing high resolution images of the lake bed.

The video imagery has proven valuable in multiple ways over the years. The first camera information was used mostly for verification of dust events and to provide a better record of dust activity from the lake bed. Most of the actual dust source delineation efforts were conducted by on-the-ground mapping following dust events supplemented with observers who completed visual mapping from surrounding vantage points during dust storms. These efforts were limited to regular work hours and missed many of the dust events.

With the installation of additional cameras and the transmission of video footage in real time to the Keeler office, more sophisticated use of the information from the cameras is being developed. District staff has worked on identification of the dust source boundaries from the oblique video imagery and converting that to maps for use in the Dust ID program. The initial results from this methodology are promising and once fully developed should allow for improved source area inputs into the Dust ID model. This is especially true with the use of High Definition cameras at many of the sites. The results of the video analysis also have potential for verification of model outputs through overlay of visible dust plume paths with that predicted by the model.

The District plans to use the funds allocated in the 2011-2012 budget for obtaining the services of HydroBio in order to assist the District in the review, processing, analysis, and interpretation of the information from the Owens Lake video camera network. The goal is to develop a more stream-lined process where the video data is initially put through a series of screens to remove footage without dust activity. Then using the remaining footage, interpret and compile the data from all of the different cameras to create a useable map of dust source activity during a dust event. The cost for this task in 2011-2012 is \$75,000.