

Measuring Mono's Dust

Tag Team Machines Capture Continuous Data

Mono Basin Still Far From Meeting Standards

by Geoffrey McQuilkin



It's a cool spring day, and we're climbing up a twenty-foot sand dune just north of Mono Lake's blue-green waters. As we ascend, a curious silhouette appears on the horizon: 10 white boxes uniformly spaced on platforms with pie-plate capped funnels thrust into the air. These are the Mono Lake dust monitoring stations of the Great Basin Unified Air Pollution Control District. Minute by minute, hour by hour, day by day they suck air through engineered pathways, past Teflon filters, to measure how much health-damaging dust is rising off the dry bed of Mono Lake.

The view of the Sierra is spectacular, but this is clearly not a spot to set up camp. Calculated to be the site of maximum dust storm impact, it doesn't take long to note the pockmarked glass covering the solar panels or the sand thickly drifted into platform crevices four feet off the ground. Equipment rated for a seven-year life lasts a year out here. That's the point, though: use this wind-blasted spot to find out whether the Mono Basin has achieved compliance with the Clean Air Act. So far, the answer is no.

The problem began as Mono Lake's level fell, the result of water diversions to Los Angeles starting back in 1941. Nine square miles of that exposed lakebed became alkali playa that offers salts and minerals to the winds. Storms of dust sweep across the lakebed, traveling up to 100 miles before settling.

The minute dust particles, including toxics like selenium and arsenic, can be drawn deep into the lungs—and being less than a tenth the width of a human hair in size, they tend not to come back out. That leads to health problems, especially for those with heart and lung diseases. Clean air regulations limit concentrations of these particles, and since the dust problem resulted from water diversions, the Los Angeles Department of Water and Power (DWP) is responsible. At Owens Lake the troubles are even larger and DWP is currently investing hundreds of millions of dollars to control the situation with flooding, gravel, and saltgrass.

Here at Mono Lake, the solution is a little simpler: raise the lake to cover the areas that generate the worst dust storms. Complex models predict that the federal air quality standard will be met when the lake reaches 6,392 feet, the management level set by the State Water Resources Control Board. Today, though, we're nine feet from the management lake level and the dust storms rage on.

Fourteen violations of the standards have been recorded since January 2000 (only one is allowed annually). Mono Lake violations leave the air quality violations of other places, well, in the dust. In six of those events, dust concentrations exceeded 1,000 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and on November 29, 2000, a massive storm hit 10,000 $\mu\text{g}/\text{m}^3$. Compare that to the federal standard of 150 $\mu\text{g}/\text{m}^3$, or a bad smog day in San

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Technicians collect dust samples weekly from remote, solar-powered equipment. The data are critical to understanding air quality trends.

Bernardino of between 250 $\mu\text{g}/\text{m}^3$ and 300 $\mu\text{g}/\text{m}^3$, and you start to understand the scope of the problem.

I walked up to a monitor that was apparently running, given the hum coming from inside. After one of these solar-powered devices runs for a 24-hour period, it shuts down and the next one starts up, right on down the line. That gives the instrument technician a week to get back to the site, collect each of the exposed filters, fix problems, install fresh filters, and start the cycle again. The filters are sealed for transport to Bishop, where they are weighed in a special, environmentally controlled clean room to determine their dust content. How well do the monitors work? “Nothing is designed for long life in the abuse we get here,” offers technician Gabriel Ibarra, “but given that, they work great.” This year, redundant monitors will be installed to assure statistical accuracy.

As the lake level has drifted downward over the past four years, the air quality model has predictably showed a downward trend in air quality improvement. Such are the cycles of nature, however, and wet years ahead will move the lake upward and air quality toward attainment. Once the basin meets the standards for three years in a row, the area comes into attainment.

As I inspect the weather instruments atop a 10-meter tower, I learn that 2002 holds the dubious distinction of being the first year that a violation was measured in Lee Vining. Usually the dust moves northward, but on February 28 everything went west and it looked like fog had descended into town. The measurement from the town equipment came in at 220 $\mu\text{g}/\text{m}^3$.

Still, the plan for solving the air quality problem is in place, thanks to the Water Board decision of 1994. Like Mono Lake dust, the question of when we'll get there is up in the air. In the meantime, the weekly treks to pull the filters and gather data will continue. That means Ibarra will be putting a lot more miles on his truck. “It's a great job,” he says, wiping dust from a digital screen. “I get to enjoy this view of Mono Lake almost every week of the year.” ❖

PM-10 Violations in the Mono Basin since 1991

Site	Date	PM-10 Concentration ($\mu\text{g}/\text{m}^3$)
Lee Vining	28-Feb-02	222
Simis	12-Apr-92	493
Simis	02-Dec-92	225
Simis	11-May-93	981
Simis	12-May-93	658
Simis	31-Aug-96	158
Warm Springs	08-May-91	389
Warm Springs	02-Dec-92	265
Mono Shore	08-Apr-00	690
Mono Shore	04-May-00	1,063
Mono Shore	06-May-00	490
Mono Shore	09-May-00	3,059
Mono Shore	10-May-00	1,513
Mono Shore	07-Jun-00	1,642
Mono Shore	08-Jun-00	241
Mono Shore	09-Oct-00	387
Mono Shore	29-Nov-00	10,466
Mono Shore	02-Jun-01	414
Mono Shore	27-Jun-01	150
Mono Shore	25-Sep-01	4,482
Mono Shore	28-Feb-02	195
Mono Shore	10-Mar-02	396

The most recent progress report from the Great Basin Unified Air Pollution Control District is available on the Mono Basin Clearinghouse at www.monobasinresearch.org.

Geoff McQuilkin is the Committee's Co-Executive Director. He and his wife Sarah expanded their garden to grow fresh veggies to mush-up for their daughter Caelen.



April 9, 2002 dust storm on the north shore of Mono Lake.