Phillip L. Kiddoo
Air Pollution Control Officer

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT
157 Short Street, Bishop, California 93514-3537
760-872-8211 Fax: 760-872-6109

REASONABLE FURTHER PROGRESS REPORT FOR THE MONO BASIN PM-10 STATE IMPLEMENTATION PLAN

September 2015

Executive Summary

This document provides a progress report on air quality trends in the Mono Basin federal PM-10 nonattainment area since the adoption of the Mono Basin PM-10 State Implementation Plan in May 1995. It was preceded by similar RFP Reports prepared in 2001, 2004, 2007 and 2010.

The PM-10 nonattainment problem in the Mono Basin is caused by windblown dust from the exposed lakebed of Mono Lake. Exposure of the lakebed was caused by the declining lake level caused by the diversion of a large percentage of the surface runoff from the Mono Basin by the City of Los Angeles from 1941 through 1989. The solution to controlling windblown dust from these exposed areas is to raise the lake level to 6,392 feet above mean sea level. At this lake level, most of the shoreline areas that are causing windblown dust will be submerged. In 1994, the State Water Resources Control Board (SWRCB) approved Decision 1631, which limited the diversion of water from the Mono Basin to achieve this goal.

Since the 1994 SWRCB decision, the lake level rose to a high level of 6,385.1 feet in July 1999 and August 2006. During that time PM-10 concentrations decreased at Mono Lake to a point where a monitor site that had previously recorded violations on the north shore of Mono Lake (Simis), showed compliance with the federal PM-10 standard. However, the District's air quality analysis indicated that other areas on the north shore could have higher PM-10 concentrations.

A new PM-10 monitor site (Mono Shore) was installed in 2000 on the north shore, east of Simis. PM-10 concentrations at Mono Shore showed 2 to 25 violations of the PM-10 standard each year. In 2012, 25 violations of federal PM-10 standard were recorded, the highest number of violations since monitoring began. The highest daily PM-10 concentration was monitored at the Mono Shore site in 2009 (14,147 micrograms per cubic meter). This monitor reading is almost 100 times higher than the federal standard of 150 micrograms per cubic meter, and was the highest PM-10 concentration measured in the country in 2009.

After an initial rise in the lake level, measurements show that the lake level fluctuated between 6,381 and 6,385 feet until 2013 when it was dropping. The reading taken August 1, 2015 was the lowest monthly reading since March of 1996 at 6,379.0 feet. Over the last 21 years, runoff has been close to the long-term average runoff value for the Mono Basin. Measurements showed that the lake level increased during periods with above average runoff, and decreased during periods with below average runoff. These fluctuations around 6,383 feet, while potentially explainable, are still cause for concern. Changing hydro-climatic conditions, such as potentially lower precipitation on the lake, decreased groundwater inflow and/or increased evaporation may result in a longer transition period to the 6,391 foot lake level target. The hydrologic model performance and water balance components should be evaluated as previously called for in the 2001, 2004, and 2010 RFP Reports.

Because of the likelihood that PM-10 violations will continue if the lake level doesn't reach the 6,392 foot management level, and the need to have an updated lake level forecast model, the District encourages the SWRCB and other interested parties to work together on these tasks well before the 2020 hearing that the SWRCB will hold if the lake has not reached 6,391 feet by that time. (Settlement Agreement Regarding Continuing Implementation of Water Rights Orders 98-05 and 98-07, 2013) In addition, the District is collecting wind erosion, PM-10, and meteorological data to improve the air quality model that was used to predict the air quality impact from windblown dust. The improved modeling effort will be similar to the method that has been used successfully to model windblown dust at Owens Lake, CA.

Introduction

The Mono Basin PM-10 planning area experiences episodes of high PM-10 concentrations due to windblown dust from the exposed lakebed of Mono Lake. PM-10 stands for particulate matter less than 10 microns in average diameter. PM-10-sized particles are extremely small, less than one tenth the diameter of a human hair. Because of their small size they can penetrate deeply into the lungs causing health problems. These small airborne particles can aggravate asthma, bronchitis, heart disease and other lung diseases.

Exposure of the lakebed to wind erosion was caused by the diversion of Mono Lake's tributary streams by the City of Los Angeles (City) from 1941 through 1989. During this period, the City's water diversions caused Mono Lake's surface level to drop approximately 45 feet, exposing more than nine square miles of highly erodible material to wind erosion. Lakebed sediments and efflorescent salts become airborne under wind conditions producing PM-10-sized particles in extremely high concentrations. The largest dust storms occur during spring and late fall. Prior to 1995, PM-10 monitors located downwind from dust source areas at Mono Lake measured peak PM-10 concentrations of around 1,000 micrograms per cubic meter ($\mu g/m^3$), which was more than six times higher than the National Ambient Air Quality Standard (federal standard) of 150 $\mu g/m^3$ for a 24-hour average.

These high air pollution levels at Mono Lake prompted the U.S. Environmental Protection Agency to designate the California portion of the Mono Lake hydrologic basin a federal PM-10 nonattainment area in 1993. It is formally referred to as the Mono Basin PM-10 Nonattainment Area. In response to this federal nonattainment designation, a Mono Basin PM-10 State Implementation Plan (SIP) was adopted by the Great Basin Unified Air Pollution District (District) and the State of California to comply with the requirements of the 1990 federal Clean Air Act (Patton and Ono, 1995). The SIP provided an analysis of the air quality problem and identified control measures necessary to reduce air pollution to a level that will attain the federal air quality standards. The Mono Basin SIP relies on a decision of the California State Water Resources Control Board (SWRCB), known as Decision 1631. The SWRCB decision provided an enforceable mechanism to reduce particulate air pollution by requiring that the level of Mono Lake be raised to 6,392 feet above mean sea level as measured on April 1 of each year by significantly reducing the diversions from the streams controlled by LADWP. At this lake level most of the exposed shoreline areas that are the source of windblown dust will be submerged. The decision projected that with its export restrictions, variations in the annual hydro-climate, based upon historic values, would cause the Lake to fluctuate around 6392 feet ("dynamic" equilibrium).

Clean air was only one of several public trust values considered in SWRCB Decision 1631, which was approved on September 28, 1994. Decision 1631 amended the City's water rights licenses in the Mono Basin to require specific actions to help recover the natural resources degraded by 48 years of diverting large portions of water from Mono Lake's tributary streams. The decision established minimum stream flows and higher flushing flows in tributaries to protect fisheries. It also required an increase in the surface level of Mono Lake to 6,392 feet to protect aquatic and terrestrial ecosystems, enhance scenic resources, and to meet clean air standards by submerging sources of windblown PM-10 (SWRCB, 1994).

Air Quality and Lake Level

The air quality modeling analysis in the SIP predicted that the 6,392-foot lake level would likely be sufficient to bring the area into attainment with the federal PM-10 standard, since the lake would then submerge much of the exposed lakebed that was causing dust storms. The time it would take to reach this final lake level would depend on yearly runoff, precipitation, and evaporation in the Mono Basin.

The SIP estimated (Figure 1) that it would take twenty-six years for Mono Lake to rise to 6,391 feet assuming each year experienced average hydro-climatic conditions. This hydrologic modeling was performed after the SWRCB Decision 1631 by LADWP. Since actual conditions vary between wet and dry years, the lake level is not expected to continuously rise as shown in Figure 1. Twenty-six years is approximately midway between projections using historic hydrologic sequences. These sequences showed that a series of extremely wet years could result in the lake reaching the target level in as little as nine years. Conversely, a prolonged series of drought years could extend the period to for lake level to reach 6,391 feet to 38 years (Figure 2).

Figure 3 provides a comparison of lake level to annual runoff from four creeks that are monitored in the Mono Basin by the City of Los Angeles: Rush, Lee Vining, Parker and Walker Creeks. A runoff year runs from April 1 to March 31 of the following year (e.g. runoff year 2009 is April 1, 2009 – March 31, 2010). This runoff data does not include other creeks in the basin or sources of inflow such as precipitation on Mono Lake and groundwater inflow to Mono Lake. The LADWP-reported runoff comprises about 55% percent of average annual total inflow to the basin when the lake is around 6,392 ft (Vorster, 1985). Long-term mean runoff of the four creeks is 122,124 acre-feet per year (ac-ft/yr), based on the 50-year runoff average from 1941 to 1990. Average runoff since the SWRCB decision has been similar, averaging 121,202 ac-ft/yr between 1995 and 2014.

Between 1997 and 2014, the City was allowed to export 16,000 ac-ft/yr of water from the Mono Basin under the SWRCB decision and their revised water license. In 2015 the lake level dropped below 6,380 feet resulting in a decrease in allowed export to 4,500 ac-ft/yr.

After SWRCB's decision in 1994, the lake level rose significantly. The upper graph in Figure 3 shows that annual runoff in the Mono Basin was higher than average from 1995 through 1998. As seen in the lower graph of Figure 3, this wet period corresponded to a 9 foot increase in the lake level that peaked at

6,385.1 feet in August 1999. This dramatic increase in the lake level in the years following the Water Board decision seemed to be an indicator that Mono Lake was well on its way to meeting the lake level target of 6,391 feet as predicted by the hydrologic models. The lake level varied only moderately until 2012 when a severe drought caused lake levels to drop sharply. The April 1, 2015 lake level was at 6,379 feet, the lowest since 1996.

Averaging the annual runoff through the series of wet and dry periods over the 21 years between 1995 through 2014 (121,202 ac-ft/yr) showed that it was very close to the 50-year mean runoff rate (122,124 ac-ft/yr) that is expected to bring the lake level up to the 6,392 foot management level for the lake. The interesting observation is that since 1997, above average runoff years corresponded to increases in lake level and below average runoff years corresponded to decreases in lake level. This cause and effect relationship leads to one hypothesis that the lake level has reached an equilibrium condition under the current hydro-climatic conditions. Despite the average runoff from the LADWP streams, the hydro-climatic conditions over the last 21 years appear different than what the projections were in the SIP, namely precipitation, temperature and resulting evaporation. The question becomes, are the recent hydro-climatic conditions a long-term deviation from the assumptions made in the model projections or are they a temporary fluctuation in climate? These questions regarding model projections and changing climate should be investigated by updating the Mono Basin hydrologic model developed by Vorster, and the monthly forecast models developed by the SWRCB and LADWP. These updates will require additional data collection including precipitation around and on the Lake and potentially other hydrometeorological data to better quantify evaporation rates. The resulting model would be used to re-evaluate the management of water resources in the basin in order to raise the lake to the 6,392 foot management level. To help with this effort the District plans to install a precipitation gage at the Mono Shore station and coordinate with stakeholders to determine what, if any additional hydromet data collection, would be useful in the model updating effort.

Regarding a lake level target date, Decision 1631 states, *"In the event that the water level of Mono Lake has not reached an elevation of 6,391 feet by September 28, 2014, the SWRCB will hold a hearing to consider the conditions of the lake and the surrounding areas, and will determine if any further revisions to this license are appropriate."* (SWRCB. 1994, para. 4.a.(4) of the order). However, in 2013 the Mono Lake Committee completed a Stream Restoration Agreement with LADWP delaying the 2014 target date to 2020. (Settlement Agreement Regarding Continuing Implementation of Water Rights Orders 98-05 and 98-07, 2013)

It is anticipated that the lake level will not reach 6,391 feet by 2020 unless the next 5 years have significantly above average precipitation. Based on the need to understand lake level fluctuations with the current climate and make updated projections, it would be beneficial to initiate a cooperative process of updating and recalibrating the hydrologic models with interested stakeholders to analyze model performance and assumed hydro-climatic sequences. We recommend that the parties consider updating the forecast models with future climate projections and not just historic hydro-climatic sequences. The District encourages the stakeholders to work together to develop a forecast model that all parties can use as soon as possible and have a common basis for moving forward.

Reasonable Further Progress

An air quality modeling analysis was performed as part of the SIP to estimate PM-10 concentrations at the historic Mono Lake shoreline. This model was based on wind erosion data collected near the Simis PM-10 monitor site. The model predicted that as the lake level rose and submerged portions of the exposed shoreline that PM-10 emissions due to windblown dust would be reduced proportionally. The air quality model predicted that a 6,391-foot lake level would bring the Mono Basin into attainment with the federal air quality standard for PM-10. Decision 1631 set a management level one foot higher at 6,392 feet in order to meet this air quality target and for long-term management of the resources in the Mono Basin. Figure 4 shows the results of modeled design day PM-10 impacts for Receptor 45 (magenta line), which is the receptor site with the highest modeled PM-10 concentrations. The modeled design day concentration is the 6th highest PM-10 concentration that would be expected over a 5-year period.[1] Predicted concentrations at Receptor 45 are shown for each year, based on the lake level trend for normal runoff, as shown in Figure 1. The Receptor 45 trend line for normal runoff (dashed blue line) shown in Figure 4 is the "reasonable further progress" trend expected as a result of implementation of the SIP.

In addition to the Receptor 45 normal runoff trend line, Figure 4 also includes modeled air quality trends from 1995 to 2015 at four receptor sites (Simis, Warm Springs, Mono Shore and Receptor 45), based on the actual April 1 lake level for each year. To demonstrate that the Mono Basin has made reasonable further progress to attain the federal standard, the model-predicted trend line for Receptor 45 (magenta line) in Figure 4 should be at or below the line for Receptor 45 under normal runoff conditions (dashed blue line). Based on the April 1, 2015 lake level and the model prediction Mono Basin is not currently meeting the reasonable further progress trend. This is primarily due to the lake level in 2015 being about 9.7 feet below the expected lake level to demonstrate reasonable further progress.

The accuracy of the model predictions in Figure 4 can be evaluated by comparing the model prediction for the design concentration at Mono Shore to the actual monitor value at that site. The 6th highest monitored PM-10 concentration at Mono Shore from 2009 through 2014 was 3,393 µg/m^3. This is approximately seven times higher than the expected concentration predicted by the air quality model. This indicates that the model is under-predicting concentrations near the Mono Shore site. The lower prediction by the model of PM-10 concentrations at the Mono Shore site, however, indicates that PM-10 emissions near Mono Shore may have been significantly under-estimated in the model.

The District plans to improve the air quality modeling analysis in the Mono Shore area by utilizing measurement and modeling techniques that have been applied successfully to model windblown dust at Owens Lake, CA. In 2005, the District installed additional monitoring equipment at the Mono Shore site to measure wind erosion using sand flux monitors and hourly PM-10 concentrations. The results from this new model will help the District to re-evaluate the relationship between PM-10 concentrations and the lake level near the Mono Shore site.

Ambient PM-10 Monitor Concentrations

The District has operated PM-10 monitors in the Mono Basin since 1988. These sites are shown in Figure 5, which includes a graphical representation of source areas for wind-blown dust. Monitor site locations included Lee Vining, Simis, Warm Springs and Mono Shore. Warm Springs was shut down in

[1] Compliance with the federal PM-10 standard allows no more than 1 exceedance of the 24-hour standard per year, thus if the 6th highest monitor value over a 5 year period is less than 150 µg/m^3 then the site would be considered to be in compliance.

1993 due to operational difficulties at this remote site. The Simis site was shut down in 2008 after recording no exceedances of the federal standard for 12 years. Lee Vining and Mono Shore are still operating. See Attachment A.

The Mono Shore PM-10 monitor site was installed to monitor concentrations at a location the District expected the highest windblown dust levels in the Mono Basin. A worst-case PM-10 site was needed to verify in the future if the area was in attainment with the federal standard. From January 2000 through June 2015, 216 violations of the federal PM-10 standard (>150 $\mu g/m^3$) were monitored at the Mono Shore site, or about 13 violations per year). The 24-hour average concentrations on 59 of these violation days exceeded 1,000 $\mu g/m^3$, with the highest concentration being 14,147 $\mu g/m^3$. See Attachment B.

Conclusion

Dust storms and federal PM-10 violations continue to occur in the Mono Basin PM-10 nonattainment area. Since it began operation in January 2000, the Mono Shore monitor on the north shore of Mono Lake has recorded 216 violations of the federal PM-10 standard, or about 13 per year. The Simis PM-10 data indicate that PM-10 concentrations at Simis currently meet the federal standard. No violations have been recorded at Simis since 1996 and the highest concentration between 1991 and 1996 was 120 $\mu g/m^3$. The air quality model was found to properly predict the concentrations at Simis, but under-predicted concentrations at Mono Shore site. This indicates that PM-10 emissions near Mono Shore were higher than expected. In 2005, the District installed additional wind erosion monitoring equipment at the Mono Shore site to improve the air quality model. The District will employ a PM-10 air quality modeling method that has been used successfully to model windblown dust at Owens Lake, CA.

Over the last 21 years, runoff has been close to the long-term average runoff value for the Mono Basin while stream diversions were close to 16,000 acre-feet per year. During the same time period the lake level has fluctuated around 6,383 feet. Runoff measurements show that the lake level increased during periods with above average runoff, and decreased during periods with below average runoff. Assuming future runoff is around the long-term average and the other components of the water balance are different than what was projected in the models (e.g. precipitation over Mono Lake below average and evaporation above average), these measurements raise the question that future lake levels could fluctuate around a level below 6,392 feet or take longer to reach that level. Because of the likelihood that PM-10 violations will continue if the lake doesn't reach the 6,392 foot target, the District encourages the SWRCB and other interested parties to cooperatively investigate the climate and lake level projections and update the models as soon as possible.

References

MLC, 2015. Mono Lake Committee, *Mono Lake Levels 1979 to Present,* http://www.monobasinresearch.org/data/levelmonthly.php, August 2015.

Patton, Christopher and Duane Ono, 1995, *Mono Basin Planning Area PM-10 State Implementation Plan – Final*. Great Basin Unified Air Pollution Control District, Bishop, California, May 1995.

Reis, 2010a. Creek flow data for the Mono Basin were provided by Greg Reis, Mono Lake Committee, Lee Vining, CA, July 30, 2010.

SWRCB, 1994. State of California Water Resources Control Board, *Mono Lake Basin Water Right Decision 1631*. Sacramento, California, September 28, 1994.

Vorster, 1985. *A Water Balance Forecast Model for Mono Lake*, California Earth Resources Monograph No. 10 USDA, United States Forest Service Region 5.

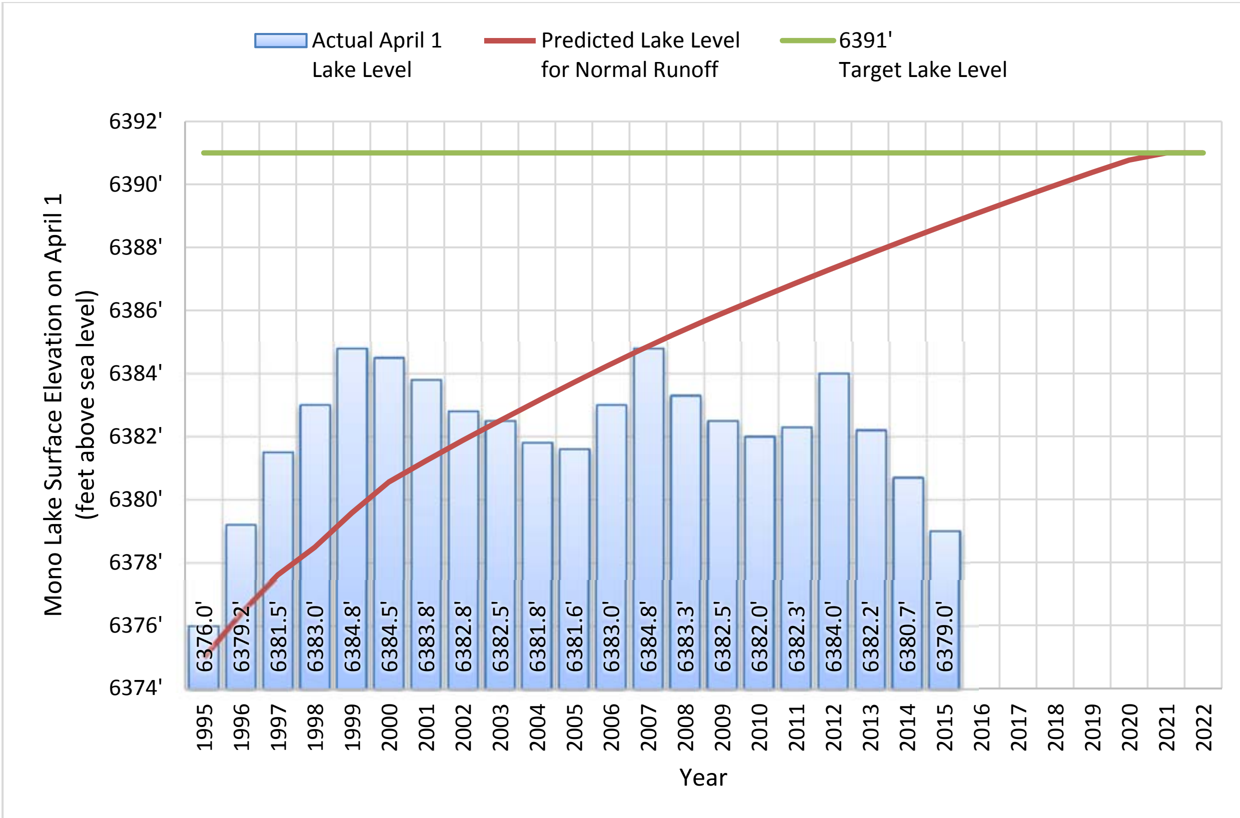

Figure 1. Mono Lake's surface elevation as measured on April 1 of each year was 10 feet below the lake level predicted by LADWP's hydrologic model which assumes the same average runoff, precipitation, evaporation and 16,000 acre-feet of exports in each year.

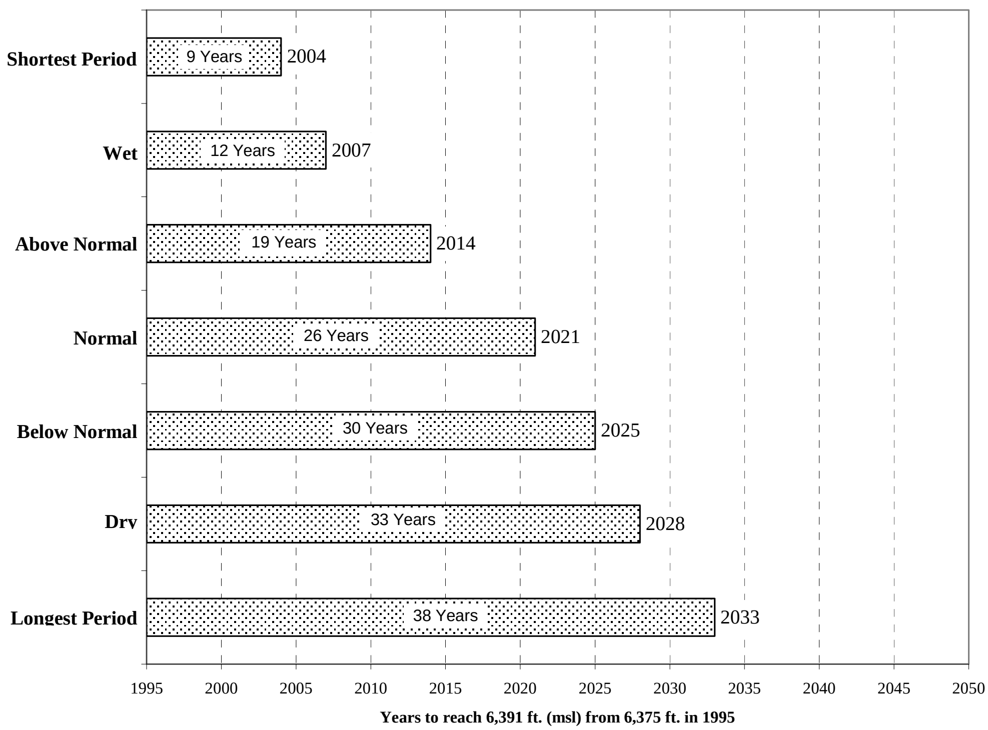

Figure 2. LADWP's hydrologic model in 1995 predicted that under the same average hydroclimatic conditions it would take 26 years for the lake level to reach 6,391 feet using the D-1631 Operational Rules for water management. Depending on the sequence of wet and dry years, the target level of 6391 feet could be achieved in 9 years or as long as 38 years.

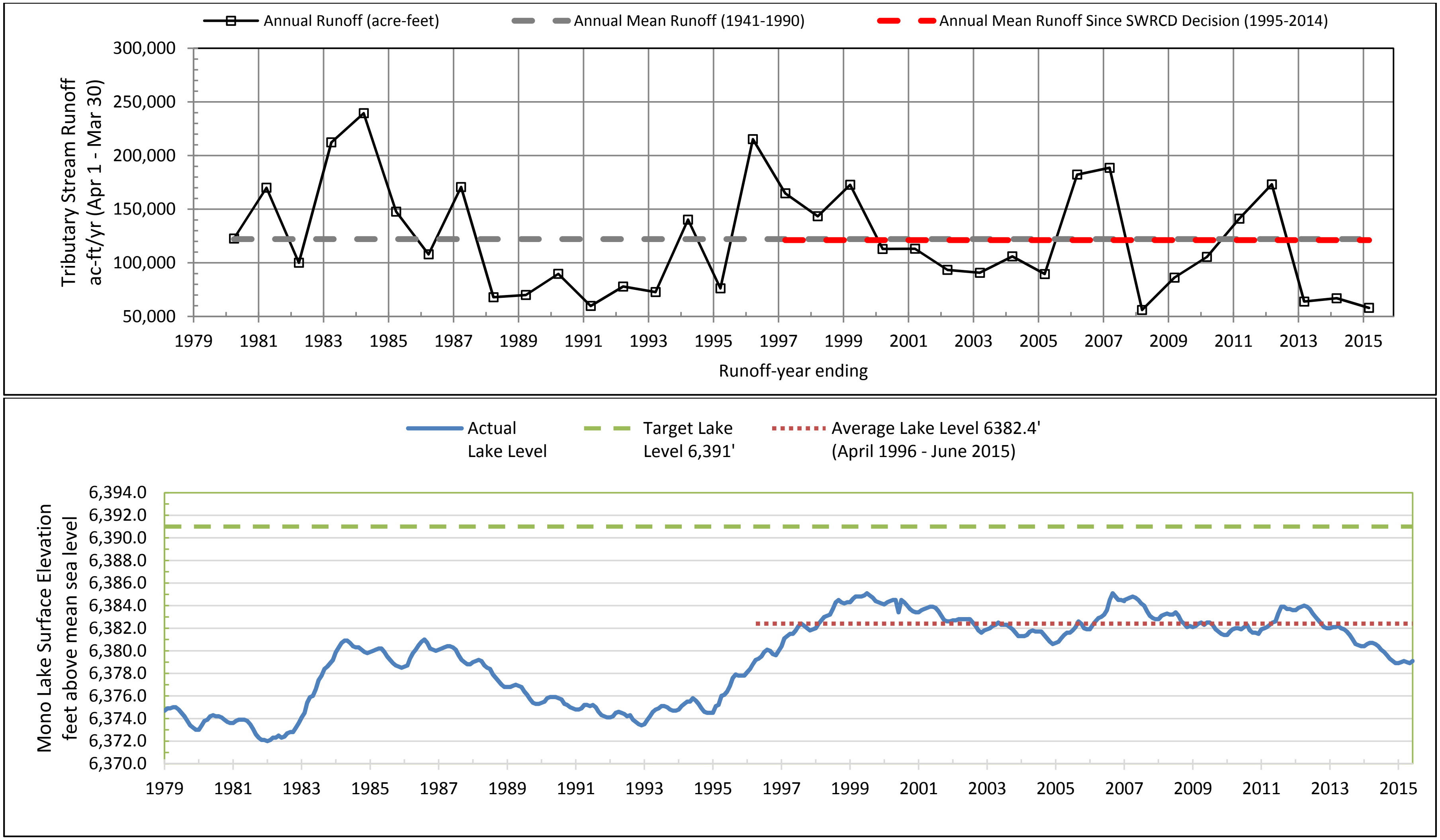

Figure 3. The upper graph shows that average runoff to Mono Lake from April 1996 through March 2015 was close to the long-term average runoff value used in the hydrologic models, an index representing 55% of the inflow to the Basin. During the same period Mono Lake's surface elevation averaged 6,382.5 feet. As seen in the lower graph, increases and decreases in lake level appeared to correspond to years when runoff was above or below average runoff. Further investigation is required to determine if the lake level will continue fluctuating around 6,383 feet with the current hydro-climatic conditions.

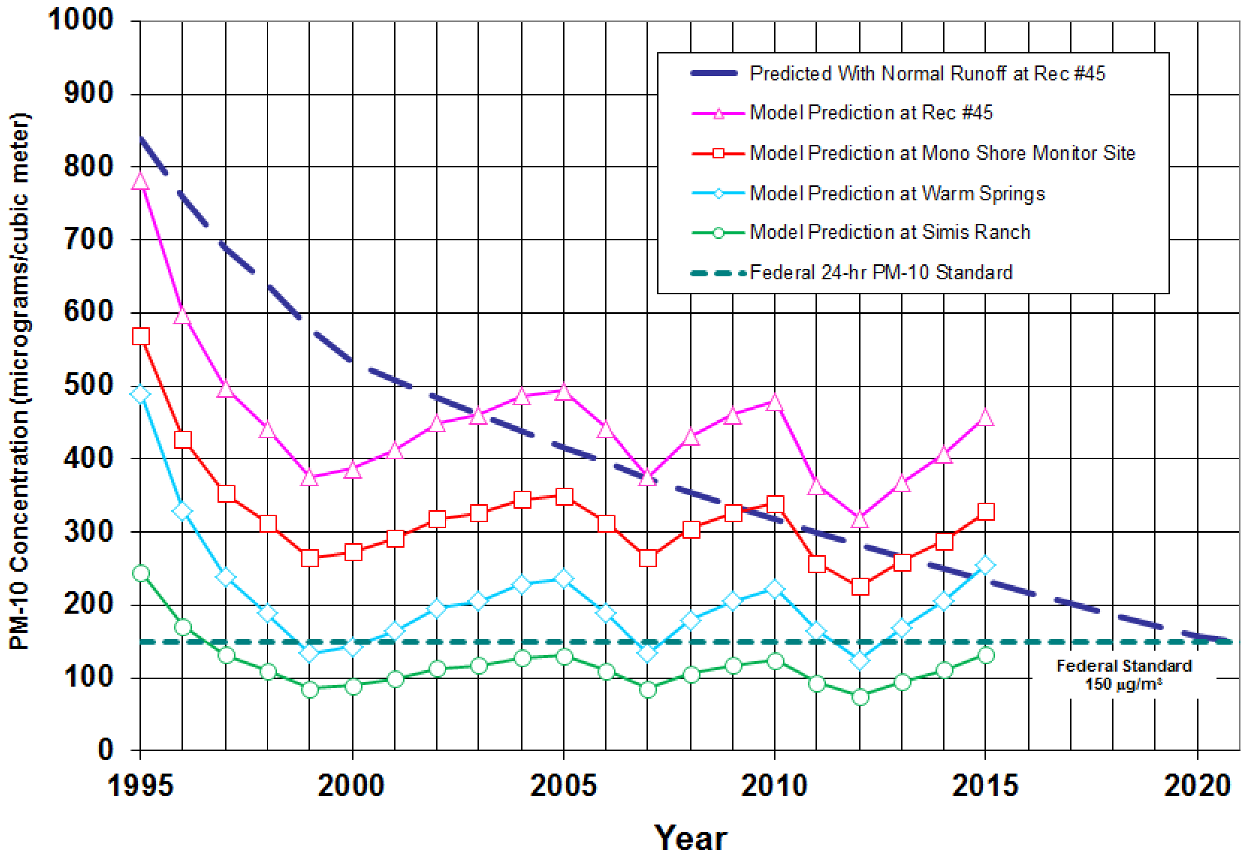

Figure 4. Modeled PM-10 impacts at Mono Lake sites compared to the reasonable further progress trend at Receptor 45 for average runoff. A comparison of monitored values at Mono Shore to the model predicted PM-10 value shows that the 2009-14 monitored design day concentration was about 7 times higher than predicted by the model. The district is collecting data to improve the air quality model.

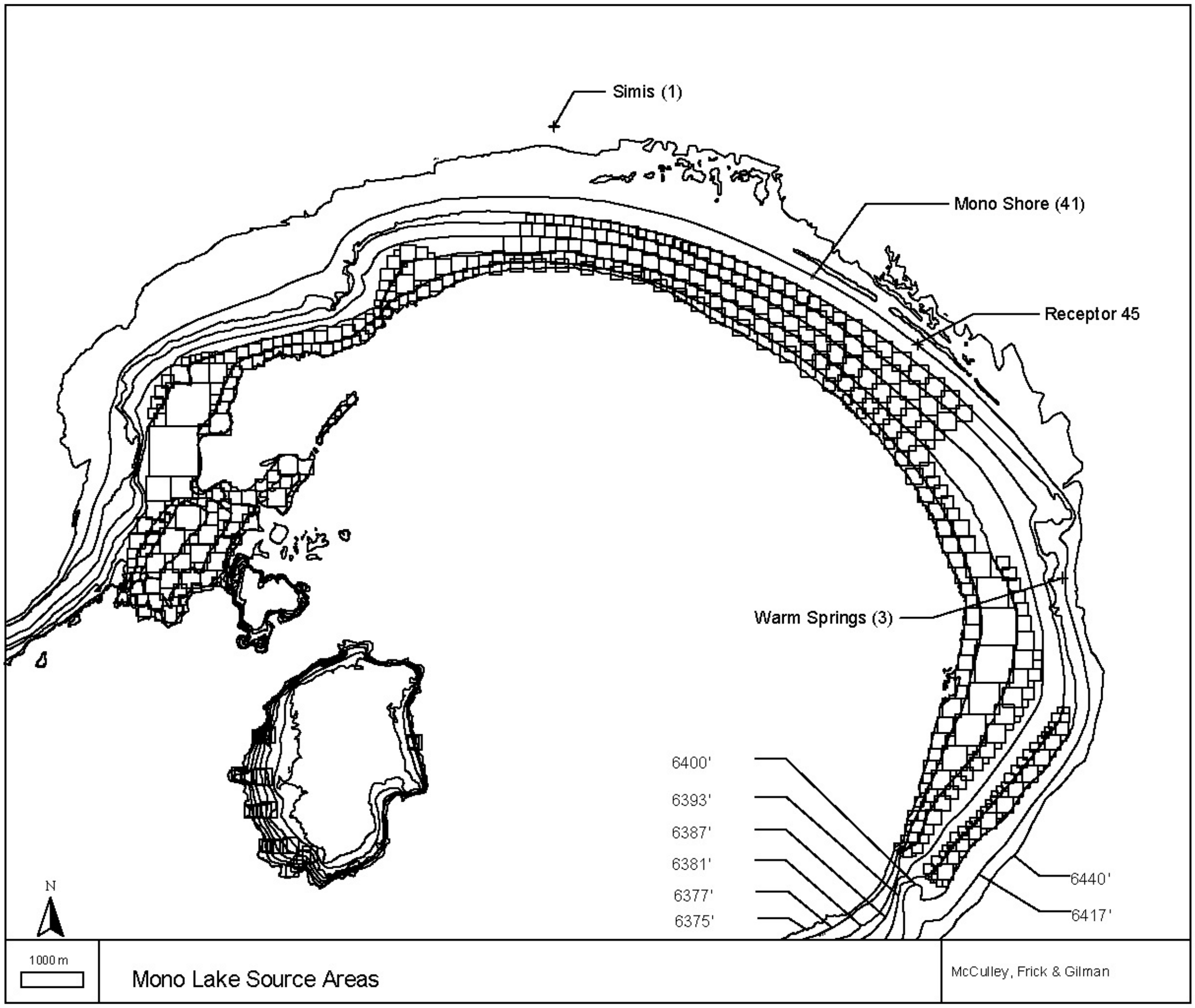

Figure 5. Mono Lake dust source areas and locations of Receptor 45 and monitoring sites at Simis, Mono Shore and Warm Springs.

ATTACHMENT A

PM-10 SITES IN MONO BASIN

AND NUMBER OF MONITORED VIOLATIONS

Mono Basin PM-10 Monitor Violation Summary				
Year	**Monitor Site**	**Number of Violations**	**Number of Sample Days**	**Sample Method**
1986	Simis	0	16	a
1987	Simis	0	45	a
1988	Simis	0	81	a
1988	Lee Vining	0	51	b
1989	Simis	0	132	a
1989	Lee Vining	0	60	b
1990	Warm Springs	0	2	a
1990	Simis	0	168	a
1990	Lee Vining	0	62	b
1991	Warm Springs	1	7	a
1991	Simis	0	85	a
1991	Lee Vining	0	58	b
1992	Warm Springs	1	9	a
1992	Simis	2	77	a
1992	Lee Vining	0	59	b
1993	Simis	2	42	a
1993	Lee Vining	0	31	b
1994	Simis	0	27	a
1994	Lee Vining	0	56	b
1995	Simis	0	41	a
1995	Lee Vining	0	51	b
1996	Simis	1	56	a
1996	Lee Vining	0	60	b
1997	Simis	0	60	a
1997	Lee Vining	0	61	a,b
1998	Warm Springs	0	4	a
1998	Simis	0	66	a
1998	Lee Vining	0	47	a
1999	Simis	0	98	a
1999	Lee Vining	0	106	a

a-Andersen, b-Wedding, c-BGI, d-Partisol, e-TEOM, *Mono Shore (Jan-May) and Lee Vining (Jan-Mar)

PM-10 SITES IN MONO BASIN

AND NUMBER OF MONITORED VIOLATIONS

Mono Basin PM-10 Monitor Violation Summary				
Year	**Monitor Site**	**Number of Violations**	**Number of Sample Days**	**Sample Method**
2000	Mono Shore	9	272	c
2000	Simis	0	92	a
2000	Lee Vining	0	113	a
2001	Mono Shore	2	221	c
2001	Simis	0	104	a
2001	Lee Vining	0	110	a,d
2002	Mono Shore	8	276	c
2002	Simis	0	79	c
2002	Lee Vining	1	100	d
2003	Mono Shore	9	212	c
2003	Simis	0	70	c
2003	Lee Vining	0	107	d
2004	Mono Shore	11	166	c
2004	Simis	0	48	c
2004	Lee Vining	0	102	d
2005	Mono Shore	14	189	c
2005	Simis	0	73	c
2005	Lee Vining	0	90	d
2006	Mono Shore	16	167	c
2006	Simis	0	67	c
2006	Lee Vining	0	121	d
2007	Mono Shore	15	238	c
2007	Simis	0	99	c
2007	Lee Vining	0	109	d
2008	Mono Shore	14	245	c,e
2008	Simis	0	55	c
2008	Lee Vining	0	116	d
2009	Mono Shore	16	365	e
2009	Lee Vining	0	115	d
2010	Mono Shore	22	362	e
2010	Lee Vining	0	23	d

a-Andersen, b-Wedding, c-BGI, d-Partisol, e-TEOM, *Mono Shore (Jan-May) and Lee Vining (Jan-Mar)

PM-10 SITES IN MONO BASIN

AND NUMBER OF MONITORED VIOLATIONS

Mono Basin PM-10 Monitor Violation Summary				
Year	**Monitor Site**	**Number of Violations**	**Number of Sample Days**	**Sample Method**
2011	Mono Shore	18	362	e
2011	Lee Vining	0	113	d
2012	Mono Shore	25	366	e
2012	Lee Vining	0	110	d
2013	Mono Shore	9	365	e
2013	Lee Vining	1	100	d
2014	Mono Shore	12	363	e
2014	Lee Vining	0	115	d
2015*	Mono Shore	11	165	e
2015*	Lee Vining	0	23	d

a-Andersen, b-Wedding, c-BGI, d-Partisol, e-TEOM, *Mono Shore (Jan-May) and Lee Vining (Jan-Mar)

ATTACHMENT B

MONITORED PM-10 VIOLATIONS

AT MONO SHORE SITE

Violation Date	PM-10 (μg/m³)	Violation Date	PM-10 (μg/m³)
2000 – 9 violations		**2004 – 11 violations**	
April 8, 2000	690	May 11, 2004	192
May 4, 2000	1,063	May 12, 2004	843
May 6, 2000	490	May 17, 2004	913
May 9, 2000	3,059	June 7, 2004	447
May 10, 2000	1,513	September 18, 2004	987
June 7, 2000	1,642	October 8, 2004	430
June 8, 2000	241	October 17, 2004	322
October 9, 2000	387	October 18, 2004	898
November 29, 2000	10,466	October 19, 2004	871
2001 – 2 violations		October 26, 2004	208
June 2, 2001	414	November 3, 2004	152
September 25, 2001	4,482	**2005 – 14 violations**	
2002 – 8 violations		April 7, 2005	285
February 28, 2002	195	April 13, 2005	386
March 10, 2002	396	May 28, 2005	990
April 14, 2002	3,089	June 6, 2005	507
April 15, 2002	1,157	June 17, 2005	235
May 18, 2002	201	June 18, 2005	292
May 19, 2002	6,505	June 19, 2005	328
May 20, 2002	1,481	June 20, 2005	298
November 7, 2002	1,745	June 21, 2005	541
2003 – 9 violations		September 10, 2005	546
March 13, 2003	487	September 11, 2005	487
March 14, 2003	1,658	October 1, 2005	940
March 26, 2003	333	October 2, 2005	264
April 13, 2003	1,170	October 13, 2005	477
April 21, 2003	467	**2006 – 16 violations**	
April 24, 2003	5,283	May 19, 2006	1,915
April 25, 2003	5,745	May 20, 2006	238
April 26, 2003	341	May 21, 2006	174
April 27, 2003	399	June 12, 2006	450

ATTACHMENT B - CONTINUED

MONITORED PM-10 VIOLATIONS AT MONO SHORE SITE

Violation Date	PM-10 (μg/m^3)	Violation Date	PM-10 (μg/m^3)
2006 – 16 violations, continued		**2008 – 14 violations, continued**	
June 13, 2006	168	June 4, 2008	694
June 27, 2006	210	June 5, 2008	913
September 14, 2006	1,012	June 21, 2008	906
September 15, 2006	306	August 31, 2008	858
November 8, 2006	624	September 19, 2008	287
November 10, 2006	434	October 30, 2008	310
November 21, 2006	231	October 31, 2008	330
November 22, 2006	174	November 3, 2008	410
November 28, 2006	1,764	December 13, 2008	470
December 8, 2006	300	**2009 – 16 violations**	
December 23, 2006	721	March 3, 2009	490
December 26, 2006	4,300	March 9, 2009	625
2007 – 15 violations		March 29, 2009	477
January 10, 2007	1,909	April 14, 2009	1,131
January 11, 2007	359	May 1, 2009	159
April 6, 2007	168	May 3, 2009	766
April 14, 2007	2,008	May 4, 2009	1,377
April 17, 2007	726	September 29, 2009	236
September 30, 2007	1,500	October 3, 2009	335
September 30, 2007	2,154	October 13, 2009	717
October 4, 2007	1,657	October 19, 2009	364
October 10, 2007	10,020	November 11, 2009	343
October 16, 2007	266	November 12, 2009	249
October 19, 2007	1,347	November 20, 2009	14,147
October 20, 2007	304	December 6, 2009	1,462
November 27, 2007	1,336	December 7, 2009	182
November 29, 2007	480	**2010 – 22 violations**	
November 30, 2007	2,736	March 25, 2010	340
2008 – 14 violations		March 29, 2010	159
April 6, 2008	247	March 30, 2010	495
April 11, 2008	930	April 2, 2010	755
April 30, 2008	2,769	April 3, 2010	740
May 7, 2008	161	April 4, 2010	444
May 20, 2008	2,563	April 11, 2010	795

ATTACHMENT B - CONTINUED

MONITORED PM-10 VIOLATIONS AT MONO SHORE SITE

Violation Date	PM-10 (μg/m³)	Violation Date	PM-10 (μg/m³)
2010 – 22 violations, continued		**2012 – 25 violations**	
April 20, 2010	182	January 15, 2012	1,488
April 27, 2010	4,345	January 19, 2012	1,482
May 9, 2010	305	January 20, 2012	269
May 10, 2010	308	February 29, 2012	341
May 21, 2010	3,096	March 1, 2012	476
May 25, 2010	1,529	March 6, 2012	563
May 26, 2010	318	March 12, 2012	678
May 27, 2010	460	March 13, 2012	315
June 16, 2010	319	March 31, 2012	1,410
August 28, 2010	211	April 10, 2012	151
September 7, 2010	358	April 12, 2012	204
September 8, 2010	211	April 23, 2012	533
October 24, 2010	735	April 26, 2012	1,385
November 19, 2010	808	May 14, 2012	1,386
December 14, 2010	1,112	May 17, 2012	271
2011 – 18 violations		May 24, 2012	228
February 15, 2011	655	June 1, 2012	158
February 16, 2011	254	June 4, 2012	1,266
March 10, 2011	916	June 23, 2012	220
March 15, 2011	477	June 25, 2012	631
April 20, 2011	1,376	October 22, 2012	210
April 28, 2011	213	November 8, 2012	3,972
May 25, 2011	4,886	November 28, 2012	290
May 28, 2011	1,214	November 29, 2012	2,188
May 30, 2011	216	December 21, 2012	599
May 31, 2011	1,802	**2013 – 9 violations**	
June 1, 2011	633	March 5, 2013	174
June 28, 2011	835	April 7, 2013	3,285
October 3, 2011	477	April 14, 2013	436
November 3, 2011	1,994	April 15, 2013	530
November 18, 2011	3,394	June 18, 2013	188
November 30, 2011	242	June 19, 2013	214
December 1, 2011	343	August 20, 2013	171
December 30, 2011	650	September 21, 2013	296

ATTACHMENT B - CONTINUED

MONITORED PM-10 VIOLATIONS AT MONO SHORE SITE

Violation Date	PM-10 (μg/m³)	Violation Date	PM-10 (μg/m³)
2013 – 9 violations, continued		**2015 (-May) –11 violations**	
October 27, 2013	1,871	February 5, 2015	1,072
2014 – 12 violations, continued		February 6, 2015	3,295
March 29, 2014	626	March 31, 2015	239
April 17, 2014	258	April 1, 2015	1,049
May 18, 2014	2,619	April 4, 2015	288
September 25, 2014	341	April 5, 2015	4,099
October 15, 2014	174	April 7, 2015	406
October 25, 2014	908	April 13, 2015	514
October 31, 2014	269	April 14, 2015	1,837
November 22, 2014	1,188	May 12, 2015	244
November 28, 2014	1,890	May 13, 2015	289
December 10, 2014	391		
December 11, 2014	1,405		
December 29, 2014	402		