

Section 2

Mono Basin Operations

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**Compliance with State Water Resources Control Board
Decision 1631 and Order Nos. 98-05 and 98-07**

May 2012

Los Angeles Department of Water and Power

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Introduction

Pursuant to State Water Resources Control Board (SWRCB) Decision 1631 and Order Nos. 98-05 and 98-07 (Orders), the Los Angeles Department of Water and Power (LADWP) undertakes certain activities in the Mono Basin in compliance with the terms and conditions of its water right licenses 10191 and 10192. In addition to restoration and monitoring activities covered in Section 1 of this report, LADWP also reports on certain required operational activities.

MONO BASIN OPERATIONS PLAN RY 2012-13

Forecast for RY 2012-13

The Mono Basin's May 1st forecast for Runoff Year (RY) 2012-13 for April to March period is 67,400 acre-feet (AF), or 55 percent of average using the 1961-2010 long term mean of 122,333 AF (attached). This value puts the year type within the "Dry" category. According to the Grant Lake Operations Management Plan (GLOMP) approved under SWRCB Order 98-05, LADWP will follow Guideline A (attached) for the operating requirements during RY 2012-13, with certain variations described below.

Rush Creek

Baseflows will follow Guideline A of 31 cubic feet per second (cfs) from April 1 to September 30, 2012, and 36 cfs from October 1, 2012 to March 31, 2013, or the equivalent of Rush Creek flow at Damsite, whichever is less.

Rush Creek Augmentation

In wetter years, LADWP employs one or both of its additional facilities to release higher peak flows. These facilities include the 5-Siphons bypass, which can release at least 100 cfs from Lee Vining Creek, and the Grant Lake Reservoir (GLR) Spillway, which can release large reservoir spills into Lower Rush Creek during the wetter years.

5-Siphons Bypass

Aside from utilizing the 5-Siphons bypass facility to augment Rush Creek peak flow requirements, LADWP was intending to test the physical capability to augment up to 150 cfs from the Lee Vining Conduit through the 5-Siphons bypass facility. However, Southern California Edison (SCE) operates the upstream reservoirs and their preliminary estimates show that they most likely will not be able to provide in excess of such flow down the Lee Vining Creek due to their operating requirements and lack of adequate forecasted runoff.

Grant Lake Reservoir Spill

GLR is forecasted not to spill during the RY 2012-13.

Lee Vining Creek

Baseflows will follow Guideline A of 37 cfs, or flow at Lee Vining Creek Above, whichever is less, from April 1 to September 30, 2012, and 25 cfs, or Lee Vining Creek Above, whichever is less, from October 1, 2012 to March 31, 2013. All flows in excess of these requirements will be diverted to GLR through the Lee Vining Conduit. No peak flow is required in Dry year type.

Parker and Walker Creeks

If there is enough runoff available, Parker and Walker creek facilities will be operated according to Guideline A table below. If the incoming flow is lower than flows in the table, the facilities will be operated as pass through. If the incoming flow is higher, excess flow will be diverted to GRL.

	Apr. 1, 2012 to Sept. 30, 2012	Oct. 1, 2012 to March 31, 2013
Parker	9 cfs	6 cfs
Walker	6 cfs	4.5 cfs

Grant Lake Reservoir (GLR)

GRL storage volume was 35,595 AF, corresponding to a surface elevation of 7,118.8 feet above mean sea level (AMSL) at the start of the runoff year. According to LADWP model, using representative historical data from the 1987 runoff year (55 percent of normal year), and Guideline A baseflows, the model forecasts GRL to be approximately 35,000 AF by the end of the runoff year (see Scenario A at the end of this section). Before selecting a representative historical runoff year for modeling, the year's preceding runoff year is also looked at for similarities with the preceding runoff year of the current forecasted year. Forecasted scenarios will be relatively close only if this year's hydrology turns out to be similar to the hydrology of the selected past runoff year. Operations are subject to change with variations in actual hydrology during the upcoming runoff year.

Planned Exports for RY 2012-13

LADWP plans to export 16,000 AF this year in accordance with SWRCB Decision 1631 and Guideline A. Because there is a planned maintenance project at East Portal, export release pattern will vary. Approximately 60 cfs will be exported from late April to early June. In the month of June, export will be halted to enable crew to install a by-pass pipe around the project area and will be used to re-route export during second phase of the project. Beginning mid-July, export will be resumed and will remain constant (approximately 35 cfs) until the end of runoff year.

Expected Mono Lake Elevations during RY 2012-13

Mono Lake began this runoff year at 6,384.0 ft AMSL where it is forecasted to remain about the same and at the end the runoff year at 6,382.7 ft AMSL (see attached chart).

REVIEW OF THE MONO BASIN RY 2010-12 OPERATIONS

Report on Temporary One Year Variance Operation

November 1, 2010 - October 31, 2011

This temporary operation was part of the Los Angeles Department of Water and Power's (LADWP's) "Petition for Temporary Urgency Change" (Water Code 1435) request to the State Water Resources Control Board (SWRCB) to operate in the Mono Basin for one year by deviating from the original flow requirements of Decision 1631 and Order 98-05 for Rush, Lee Vining, Walker, and Parker creeks (Licenses 10191 and 10192).

The purpose of the temporary operation was to test the feasibility of flow recommendations of the Synthesis Report submitted by the SWRCB-appointed stream scientists before the SWRCB makes a final determination and amends LADWP licenses in the Mono Basin. Per Order 98-05, Section 1.b (2)(a) and (b), the stream scientists submitted their final Synthesis Report in April 2010, after considering comments from LADWP and interested parties on the draft report. The final report was a summary of the overall performance of Order 98-05's Stream Restorations Flows (SRFs) and baseflow hydrographs, and recommended actions deemed beneficial to further the stream ecosystem recovery and trout populations based on their 12-year monitoring program funded by LADWP.

Specifically, the purposes of this one year operation's test were

- 1) Implement certain Synthesis Report recommendations that can be immediately accomplished;
- 2) Test the feasibility of various operational approaches to achieving certain recommendations;

Every effort was made to make sure this temporary change had no unreasonable negative effect upon fish, wildlife and other instream beneficial uses.

RUSH CREEK

The runoff from Rush Creek was approximately 83,178 AF which is the total water delivered to GRL 'Damsite' by Rush Creek. Rush Creek flows below 'the Narrows', which consist of Rush Creek releases (Return Ditch, Spill, and 5-Siphons Augmentation) combined with Parker and Walker Creek flows, had an approximate total of 109,333 AF released to Mono Lake with the highest flow of 565 cfs occurring on July 7, 2011.

Rush Creek was operated according to the Wet year type of the recommended 'Stream Ecosystem Flows' (SEFs). A spring baseflow of 40 cfs was followed in April before ramping began for peak operation. A high flow of approximately 380 cfs for 5 days was released through the MGORD. The MGORD was closely monitored during the high release as the integrity of the ditch at higher than 350 cfs had been an issue in the past. Other than a couple low freeboard spots (the clearance between water surface and

adjacent access road), which would be fixed in future, no immediate major issue was observed in the ditch.

When ramping to high flows began, there were some issues with calibration for high flows for the return ditch. As a result, for a few days, the ditch readings were higher than what was being released from GRL outlet but was later fixed and was reading within 6 cfs or 3 percent.

The SEF recommendation for the peak was to flow 650 cfs in Rush for a minimum of five days. However, due to insufficient inflow from SCE, a combined maximum of 441 cfs was released to lower Rush Creek, 72 cfs from spill and 374 cfs from MGORD. The highest spill occurred on June 17 at 224 cfs but MGORD was only at 137 cfs while ramping up towards 380 cfs. This is expected because it is very difficult to time the highest spill with the maximum MGORD release. The higher MGORD release is, the more dampened the spill becomes. LADWP did consult with SCE regarding the possibility of releasing more water but they informed us that they did not have enough runoff to accommodate such a high spill. They also informed us that they could not coordinate timing of their operational releases with the exact timing of the runoff peak. The main reason was because their U.S. Forest Service (USFS) 4(e) condition and Federal Energy Regulatory Commission (FERC) licenses necessitate that they accumulate and hold storage for recreation purposes during the summer months, and drain the storage during the winter months.

The important confirmation learned from this exercise is that it is very difficult to coincide spill timing with MGORD releases as hydrology cannot be controlled and SCE's operation plans has criteria which cannot always accommodate our schedule. As a result, such high peak spills from GRL cannot be guaranteed.

Grant Lake Reservoir (GRL) Storage and Spill

RY2011 was a 'Wet' year type with plenty of runoff. GRL started at full capacity and stayed full long enough to satisfy the recommended storage threshold of 20,000 AF from July to September. As a result, spill occurred from the beginning of the runoff year until mid-August.

Fisheries team were scheduled to conduct their annual electrofishing field work in September. In early August, GRL was still spilling about 150 cfs. The inflow into GRL from Rush Creek was still high (200 cfs+) and Walker and Parker had a combined flow of 48 cfs going straight to lower Rush Creek. GRL's spill in conjunction with Walker & Parker's contribution were adding approximately 200 cfs to lower Rush Creek. The fishery team could not conduct electro-fishing in such high and dangerous flows. For that reason, they requested flow releases to be lowered for their field work. Lee Vining Creek flow also had to be lowered for the field work which meant flow had to be diverted to GRL via the Lee Vining Conduit. This made it problematic because it added storage gain in GRL and increased spill possibility. As such, it was agreed by all parties that LADWP should increase export and lower GRL to prevent spill and manage lower Rush Creek below 40 cfs as requested by the fishery team. Export was increased to 90 cfs

and then 120 cfs to lower GRL quicker. As a result, GRL's rise was slowed, spill was avoided, and the field work was conducted uninterrupted.

However, with continuous high inflow into GRL well into September, an early spill (before January) was possibility. An idea was introduced by the Department of Fish and Game to mitigate the concern which was to send a pulse of water down in Rush Creek in October and go back to Order 98-05 flows (before variance ended) for the remainder of the RY. The pulse in Rush Creek in October would reduce storage in GRL prior to trout spawning. Note that Order 98-05 baseflow is much higher than the SEF baseflow (55 cfs vs 27 cfs) which would also help lower GRL storage quicker.

On October 6, 2011, SWRCB sent an approval letter to do the pulse before the existing variance ends. The following day, LADWP started ramping Rush Creek release from 48 cfs to 350 cfs at 20 percent daily ramping. Approximately 350 cfs was released for 7 days and ramped down back to Order 98-05 baseflow of 55 cfs in time for the October 31 variance end date.

Overall, these mitigation actions taken did avoid early spill and preserved the survival of trout eggs. It was a good experiment because lowering the Rush Creek releases as the SEF did, will increase the frequency of GRL spilling before trout spawning season. Of course this is highly dependent on hydrology and SCE's releases. If runoff coming from SCE's three upstream reservoirs is high enough to force early GRL spill, this issue could be minimized as done so this past year. However, it may not always work. Hydrology is unpredictable and as result depending on the storage status of GRL from previous year(s), early spill may be unavoidable. As result, spill can occur when least desired and will disarray the Synthesis Report SEF recommendations hydrograph. The SEF prescribes 27 cfs in baseflow in all year types for summer, fall, and winter, and if GRL spills when Rush Creek should be flowing 27 cfs, depending on the magnitude of the spill, it could compromise trout eggs.

Export amount is fixed but a portion may be moved around from one year to another as done so this RY, with the SWRCB's approval. However, there will be a time no matter how much a 16,000 AF export is manipulated, it may not be enough to prevent GRL from spilling. There is also the risk that if LADWP exports too much of a future year's export allocation just to lower GRL away from spill, it risks having little to export if the subsequent year turns out to be a dry year.

A pulse can be released before spawning season to drain GRL but this will mean deviating from the recommended SEF hydrograph. If a pulse occurs frequently, then the SEF purpose is defeated. To do both of these options (export and pulse), operational flexibility would be essential to LADWP which means there should be options for LADWP without having to go through a SWRCB variance process and fees. Of course, such matters will be discussed in advance with SWRCB, but there should not be special approval required.

LEE VINING CREEK

Total runoff for the year for Lee Vining Creek was approximately 69,658 AF. The primary peak on Lee Vining Creek below occurred on June 26, 2011 at approximately 532 cfs followed by second one on July 5 with 528 cfs. When flows exceeded 250 cfs, no diversions into the conduit were made because the Synthesis Report diversion rate regime was being implemented (with LADWP modification) as will be discussed below.

From November 2010 to March 2011, the Synthesis Report bypass flow recommendations for Wet year was followed with 20 cfs in lower Lee Vining Creek and everything else diverted to the Lee Vining conduit. The result of the first half of the variance operation/monitoring was reported in Section 3 of the May 2011 Compliance Reporting.

From April to September 2011, LADWP followed the diversion rate table (with LADWP modified 5 cfs increments) as shown below. Every morning, around 9 AM, LADWP personnel checked the flow at the flume at Lee Vining Creek 'Above Intake' facility, and depending on that flow, the Lee Vining conduit intake was adjusted using stop-logs. The nearby Langemann gate in Lee Vining Creek was positioned to maintain a set elevation so flows into the conduit remain approximately as specified for the day per diversion table below.

With the current setup, the Langemann gate was set in level control mode. This allowed the gate to maintain a constant upstream level, until a new set point is entered. LADWP personnel adjusted both this upstream set point, added or removed stop logs as needed to achieve the desired flow down the conduit. Due to the large pond upstream of the Intake structure, this adjustment took few hours to balance out each day. As the flow upstream changes throughout the day, the flow to both the conduit and down lower Lee Vining Creek fluctuated.

Diversion Table

Lee Vining Creek 'Above Intake' Flow (cfs)	Conduit Diversion (cfs)
$30 \leq Q < 35$	0
$35 \leq Q < 40$	5
$40 \leq Q < 50$	10
$50 \leq Q < 80$	15
$80 \leq Q < 100$	20
$100 \leq Q < 130$	25
$130 \leq Q < 170$	30
$170 \leq Q < 200$	35
$200 \leq Q < 240$	40
$240 \leq Q < 250$	45
$250 \leq Q$	0

Despite doing diversion adjustment manually once a day, crew tried to maintain conduit flows as relatively close to the diversion table prescription as possible. When inflow was 250 cfs and more, the conduit was shut and no flow was flowing in but when looking at the data ('Above' minus 'Below'), it showed negative flow. This was probably due to

different reasons: 1) At those high flows, the Lee Vining 'Above' station might not be reading very accurately due to the lack of laminar flow during high flow conditions; 2) The Langemann gate at those high flows, is required to lower its level significantly to pass those flows, as a result, the Langemann gate for short periods can become submerged and not read accurately; 3) It is always hard to get an instantaneous flow to the conduit performing subtraction of 'Below' from 'Above', due to the distance and large pond level gaining or lowering in between the two locations; and 4) built in measuring error in the flow measuring devices.

EXPORT

In December 2010, there was concern that GRL was on course to spill too early. Because we were still conducting data collection on flow loss and temperature change (as part of the variance), and the possibilities of washing out the fish eggs, it was undesirable that GRL spilled. Therefore, on December 20, LADWP requested SWRCB to allow it to export about 6,000 AF more water in RY2010-11 and reduce export by the same amount in RY2011-12. This way GRL could be lowered without increasing the release to lower Rush Creek.

After gathering comments from stakeholders and scientists, on January 4th 2011 SWRCB approved the request. This was an amendment to the November 4, 2010 variance approval and allowed RY2010 and RY2011 export amount to deviate from Decision 1631 of 16,000 AFY and be disproportionate but the combined total not to exceed 32,000 AF.

LADWP exported 22,475 AF in RY2010 which delayed the GRL from spilling too early. Data for flow losses between various reaches in Rush Creek were gathered until March. GRL started to spill on March 29, 2011, (spill increased 21-, 39-, 63-, 81-, 92-,....100-cfs). By the time GRL started spilling, the data collection was concluded and the brown trout fry had emerged from the gravel and were able to find suitable habitat to survive the spill. Remaining 9,478 AF of 9,525 AF was exported in RY2011-12.

PARKER AND WALKER CREEKS

Parker Creek had its highest flow on July 5 at 80 cfs. Total runoff for the year was approximately 10,911 AF.

Walker Creek had its highest flow on July 8 at 50 cfs. Total runoff for the year was approximately 7,303 AF.

For three weeks in September, flows in lower Walker and Parker creeks were maintained at 5 cfs by diverting any extra water to GRL. This was done to accommodate the fishery scientist's field work to make sure no more than 40 cfs flowed in lower Rush Creek. Other than that, flow-through conditions were followed on both creeks throughout the variance which was no different from normal operation.

MONITORING

This one year temporary operation had no unreasonable effect upon fish, wildlife and other instream beneficial uses. For the purpose of this operation, LADWP continued to follow the monitoring requirements and agreements currently in place under D1631 and Order 98-05. Detail reports on the monitoring done this past year (and variance) are in the subsequent Section 3 and Section 4.

Grant Lake Reservoir (GRL)

1. GRL elevation and storage volume

GRL elevation and storage was continuously monitored throughout Runoff Year (RY) 2011, and the elevation data was posted on the LADWP website.

2. GRL water temperature

Water temperature and dissolved oxygen concentrations were measured at one-meter depth intervals at the deepest part of the reservoir and adjacent to the MGORD's intake pipe at GRL. Depth profiles samples were collected each month from May until the GRL surface froze and once during late winter when surface ice melted. The data is reported in Section 4.

Mono Basin Tributaries

1. Water Temperature

Water temperature loggers (and duplicate backup loggers, Onset ProV2) are currently deployed at fifteen locations along Rush, Parker, Walker and Lee Vining creeks, and the Lee Vining Conduit at the head of the 5-Siphons Bypass and at the confluence of the 5-Siphons Bypass with Rush Creek. Water temperatures were recorded at one-hour intervals in RY2011. Water temperatures are reported in tabular and graphic formats in Section 4.

2. Groundwater Monitoring

Groundwater monitoring continued in RY2011. Data were collected by LADWP at seven piezometers surrounding the lower Rush Creek 8-channel, and by the Mono Lake Committee at six piezometers in lower Rush Creek and at ten piezometers in upper Lee Vining Creek. Data from piezometers during RY2011 are reported in Section 4.

3. Stream Flow Gauging

LADWP continued to operate all existing gauging stations. LADWP continued to report as usual daily average flows on a real-time basis on the LADWP website for the following:

- 1) Rush Creek Dam site (Station 5013);
- 2) MGORD (Station 5007);
- 3) Lee Vining Creek above Intake (Station 5008);
- 4) Lee Vining Creek below Intake (Station 5009);
- 5) Parker Creek above Conduit (Station 5017);
- 6) Parker Creek below Conduit (Station 5003);

- 7) Walker Creek above Conduit (Station 5016);
- 8) Walker Creek below Conduit (Station 5002);
- 9) GRL Spill (Station 5078).

A daily snap-shot of flows and a reservoir report were also posted on the website.

4. Synoptic Stream Discharge Measurements

LADWP hydrographers conducted monthly synoptic stream discharge measurements on Rush, Lee Vining, Parker, and Walker creeks to determine the extent of groundwater recharge or discharge downstream of the Narrows during different seasons and stream flow periods. The results are reported in Section 4.

5. Winter Baseflow

The ice monitoring for the winter of 2010-2011 was conducted using SEF baseflows for Rush and Lee Vining Creeks in two of the five sections (Sections D and F) established during the winter of 2009-2010, and a new section set up on Rush Creek upstream of the Parker Creek confluence. On Lee Vining Creek, the monitoring was conducted along pool and riffle transects in Sections D and F. These are reported in Section 4.

6. Sediment Bypass Operation

The sediment bypass operation was conducted in RY2011 as described in the LADWP Sediment Bypass Plan. This is reported in Section 4.

7. Side Channel Maintenance

Side-channel maintenance on the 4Bii and 8-channels continued as recommended by the Stream Scientists and approved by the SWRCB on October 6, 2008. LADWP monitored monthly Channels 3D, 4, 8 (on Rush Creek) and A-3 and A-4 (on Lee Vining Creek) without committing to long-term monitoring. These are reported in Section 4.

8. Trout Population Metrics

The annual sampling of existing trout population was conducted in September 2011. The results are presented in Section 3, Fisheries Report.

9. Primary Productivity Study

The second year of the primary productivity study was conducted in September of 2011. Data collected are presented in Section 3, Fisheries Report.

10. Pool Surveys

During the summer of 2011, pool surveys were repeated on Rush Creek from the shepherd's cabin to Mono Lake and on the 10,000 feet of Lee Vining Creek that was previously surveyed. The results are presented in Section 3, Fisheries Report.

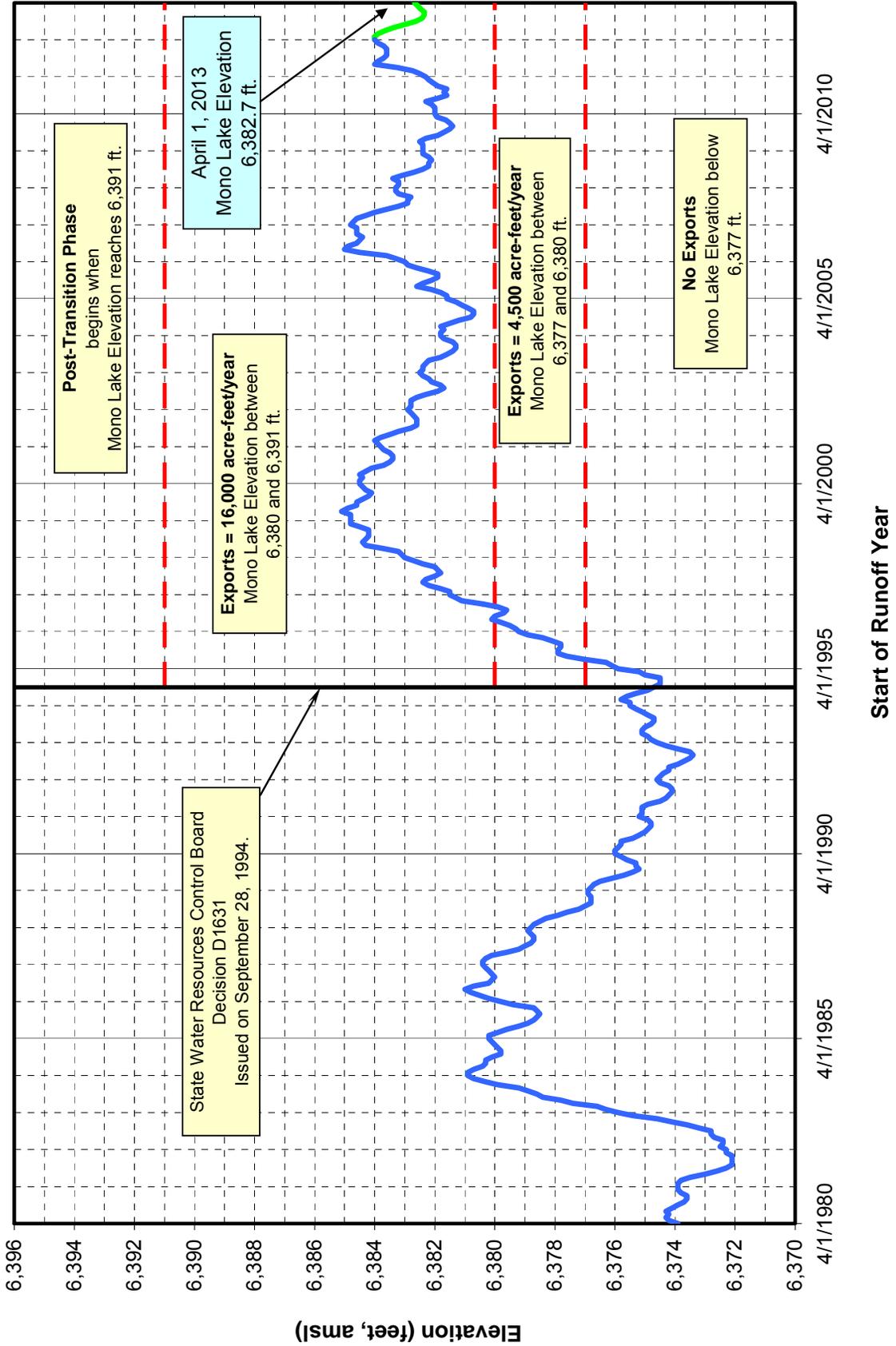
Mono Lake Elevations during RY 2011-12

Mono Lake elevations were monitored 19 times during RY 2011-12 as shown in the following table. The Lake elevation was at 6,382.3 ft AMSL at the beginning of the runoff year, and ended the season at 6,383.9 ft AMSL.

RY 2011-12 Mono Lake Elevation Readings (ft AMSL)

Year	Month	Day	Elevation (ft AMSL)
2011	4	7	6,382.3
2011	4	13	6,382.4
2011	4	27	6,382.5
2011	5	5	6,382.5
2011	5	12	6,382.6
2011	6	9	6,382.8
2011	7	7	6,383.4
2011	8	3	6,384.0
2011	8	17	6,384.0
2011	8	31	6,383.9
2011	9	7	6,383.9
2011	10	13	6,383.6
2011	11	29	6,383.6
2011	12	20	6,383.6
2012	1	18	6,383.7
2012	2	9	6,383.9
2012	3	8	6,383.9
2012	4	10	6,384.0
2012	4	19	6,383.9

Mono Lake Elevation



**2012 EASTERN SIERRA
RUNOFF FORECAST
May 1, 2012**

APRIL THROUGH SEPTEMBER RUNOFF

	MOST PROBABLE VALUE		REASONABLE MAXIMUM	REASONABLE MINIMUM	LONG-TERM MEAN (1961 - 2010)
	<u>(Acre-feet)</u>	<u>(% of Avg.)</u>	<u>(% of Avg.)</u>	<u>(% of Avg.)</u>	<u>(Acre-feet)</u>
MONO BASIN:	51,200	49%	59%	40%	103,522
OWENS RIVER BASIN:	166,300	55%	66%	43%	303,841

APRIL THROUGH MARCH RUNOFF

	MOST PROBABLE VALUE		REASONABLE MAXIMUM	REASONABLE MINIMUM	LONG-TERM MEAN (1961 - 2010)
	<u>(Acre-feet)</u>	<u>(% of Avg.)</u>	<u>(% of Avg.)</u>	<u>(% of Avg.)</u>	<u>(Acre-feet)</u>
MONO BASIN:	67,400	55%	66%	44%	122,333
OWENS RIVER BASIN:	263,000	64%	75%	53%	412,193

Note - Owens River Basin includes Long, Round and Owens Valleys (not incl Laws Area)

MOST PROBABLE - That runoff which is expected if median precipitation occurs after the forecast date.

REASONABLE MAXIMUM - That runoff which is expected to occur if precipitation subsequent to the forecast is equal to the amount which is exceeded on the average once in 10 years.

REASONABLE MINIMUM - That runoff which is expected to occur if precipitation subsequent to the forecast is equal to the amount which is exceeded on the average 9 out of 10 years.

Mono Basin Operations, Guideline A

Year Type.....DRY
 Forecasted Runoff in acre-feet.....≤ 83,655

Lower Rush Creek

Base Flows:

	Apr-Sep	Oct-Mar
Flow (cfs)	31	36

Minimum base flows are those specified above unless Grant Lake storage drops below 11,500 acre-feet (7,089.4' elevation), in which case base flows should equal the lesser of Grant Lake inflow or the minimum requirements listed above (D-1631, p 197-198).

Peak Flows: - None.

Ramping: - None.

Lee Vining Creek

Base Flows:

	Apr-Sep	Oct-Mar
Flow (cfs)	37	25

Minimum base flows are those specified above or the stream flow at the point of diversion, whichever is less.

Peak Flows: - None.

Ramping: - None.

Diversions: - Divert flows in excess of base flows.

Augmentation: - None.

Parker and Walker Creeks

Base Flows:

	Apr-Sep	Oct-Mar
Parker (cfs)	9	6
Walker (cfs)	6	4.5

Minimum base flows are those specified above or the stream flow at the point of diversion, whichever is less.

Peak Flows: - None.

Ramping: - None.

Diversions: - Divert flows in excess of base flows.

Exports

4,500 acre-feet scenario – Maintain 6 cfs export throughout the year.

16,000 acre-feet scenario – As much as possible, maintain 22 cfs export throughout the year.

Scenario A: RY 2012 Grant Lake Reservoir Projection

