Comments of the
Mono Lake Committee

on the

Draft Synthesis

of Instream Flow Recommendations

to the State Water Resources Control Board
and the Los Angeles Department of Water & Power

March 2010

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March 30, 2010

Victoria Whitney
Chief, Division of Water Rights
State Water Resources Control Board
P.O. Box 100
1001 I Street
Sacramento, CA 95812-0100

RE: Mono Basin draft instream flow recommendations

Dear Ms. Whitney:

The Mono Lake Committee (MLC) is writing to provide comments on the recently submitted draft document titled *Synthesis of Instream Flow Recommendations to the State Water Resources Control Board and the Los Angeles Department of Water & Power*.

More than a decade in the making, this draft report represents a major milestone on the road to achieving the stream restoration goals set forth in Decision 1631 (D1631). The analysis contained within shows the continued success of taking a science-based approach to the restoration process and utilizing an adaptive management strategy to refine and improve streamflow management by incorporating on the ground monitoring results.

MLC recognizes that the Synthesis Report is an important part of a larger State Water Board endeavor to maximize the restoration of Rush, Lee Vining, Walker, and Parker creeks in the Mono Basin within the context of Decision 1631. As we understand the process we are in the first of three substantial and detailed phases:

1. The Synthesis Report will provide the scientific recommendation for optimizing the management of stream flows to achieve the State Water Board's goals. We provide comments here understanding that the designated stream scientists will respond, make appropriate adjustments, and finalize their report;

2. Once the Synthesis Report is final, the Los Angeles Department of Water & Power (LADWP) will evaluate the feasibility of operating its aqueduct facilities to deliver reliably the recommended flows and provide a proposed operations plan. Interested parties will then have the opportunity to comment on LADWP's submission. MLC expects to have substantial comments on LADWP's ability to deliver the recommended flows reliably with existing facilities; these could be significantly reduced

should LADWP propose facilities modifications that offer a high degree of reliability;

3. The State Water Board will set forth a process that will ultimately lead to the issuance of a new streamflow order that revises or replaces Order 98-05 and implements a new flow regime as well as a monitoring and adaptive management program and associated requirements. This process will involve interested parties and may include measures such as temporary test flow variances to allow monitoring and evaluation. An implementation schedule may be appropriate with respect to ensuring reliable delivery of the new stream flows, particularly the spring peaks in wetter year types.

In the comments that we provide here, MLC takes a focused approach on the draft Synthesis Report and the scientific recommendations it contains.

MLC would be happy to provide more information as needed and we are available for any discussions that would assist in development of the final report. We look forward to providing our comments on matters of feasibility and implementation in due course.

Sincerely,

Geoffrey McQuilkin
Executive Director

Lisa Cutting
Eastern Sierra Policy Director

Table of Contents

I. Comments on core recommendations in the draft synthesis report

The draft Synthesis Report charts a course for enhanced restoration of Mono Lake's tributary streams within the context of State Water Board Decision 1631.

The Mono Lake Committee (MLC) commends the stream scientists and their teams for an impressive document built on a strong analytical approach. By grounding the analysis and recommendations in innumerable hours of field work to gather extensive site specific data, the recommendations are tailored to the real on-the-ground processes and conditions in the Mono Basin.

The draft report recommendations also result from the science-based adaptive management approach to Mono Basin restoration. Studies of key topics have been developed over the past twelve years in response to data gathered and identified test scenarios, resulting in more robust and thorough recommendations in the draft report.

In this section, MLC provides overall comments on the core recommendations in the draft report. In the section II, MLC provides suggested additions to the draft report. The final sections have more detailed technical and scientific comments on the draft report, which are in some cases referenced here.

A. Overall Approach

1. Primary objectives

The draft report identifies ten objectives (p.60) that inform the instream flow recommendations. These objectives identify operational constraints that have been affecting the restoration of Rush and Lee Vining Creeks (e.g. reducing SCE's elevated winter baseflows, encouraging SCE's assistance in releasing higher peak runoff events, and managing Grant Lake Reservoir at a higher level to facilitate spills). The objectives also identify specific needs of the system to reinstate natural processes (e.g. adjusting Rush Creek Stream Restoration Flows to better achieve ecological function, provide a shallow groundwater system necessary for riparian vegetation, and improve trout populations for both creeks by increasing habitat and improving growth rates). We agree with all of them with the exception of number ten—the elimination of termination criteria—as discussed subsequently.

2. Desired ecological outcomes

The summary of the desired ecological outcomes for Rush and Lee Vining creeks (table 3-1) is very helpful to understanding how each component was evaluated and factored into actual flow recommendations.

MLC is pleased to see that a flow range is prescribed for each desired outcome. This represents more accurately the fact that thresholds for biological and physical processes are not discrete but vary spatially and temporally.

MLC offers a detailed comment in section III, comment F.17.

3. <u>Number of Good Days (NGD) analysis approach</u>

While MLC is not in a position to render judgment on the universal benefit of the Number of Good Days (NGD) approach to stream restoration throughout the western United States, we observe that this represents the most successful integration to date of the multiple factors that influence Mono Basin stream restoration. Accordingly, MLC recognizes the NGD strategy as a useful approach to the task at hand of producing Mono Basin stream flow recommendations.

The NGD approach leads to determination of "good years" and "bad years" for the desired ecological outcomes being evaluated. Bad years are to be expected, yet it is the good years that advance restoration. The draft report, however, is unclear on how many good years are needed over a specified time period to achieve the desired ecological outcomes listed in table 3-1. We suggest adding this information

4. <u>Rebalancing of export volume between Rush and Lee Vining</u>

The draft report proposes to rebalance diversions to more equitably divert water for export to Los Angeles from Lee Vining and Rush creeks (p.35). MLC believes this is a good approach that will go a long way to balancing the restoration progress of both systems.

MLC notes that in the present day this will result in a significant reallocation of diversions, and that in the post-transition situation (after Mono Lake has achieved its required management level) exports will be larger and the balance will shift toward greater proportional diversion impact on Rush Creek. The final report should anticipate the need to monitor these situations for possible adaptive management action, and MLC offers a detailed suggestion in section III, comment A.19.

5. <u>Abandonment of Rush Creek augmentation</u>

MLC agrees that making diversions into the aqueduct to achieve "augmentation of Rush Creek peaks from Lee Vining Creek … is not ecologically sustainable" (p.35). This strategy has been given a 12-year test run to prove viability. Over that time period, it has proven to be inconsistent in success, has caused flow violations and downstream Lee Vining Creek impairment, and has been operationally difficult for LADWP due to the required snowmelt forecasting and short notice operational changes to the aqueduct. MLC concurs that augmentation as a flow delivery strategy should be abandoned.

B. Lee Vining Creek

1. <u>Hybrid strategy of bypass and diversion</u>

MLC generally supports the stream scientists' recommendation that a "hybrid" diversion strategy be employed for Lee Vining Creek to achieve the recommended flows in winter and provide greater natural flow variability in spring and summer. This will result in a specified bypass flow being released between October 1 and March 31, and a defined rate of diversion being employed between April 1 and September 30.

2. <u>Peak passing strategy</u>

MLC supports the strategy outlined of halting diversions at flows above 250 cfs in order to assure passing the peak flow on Lee Vining Creek to achieve downstream ecological and geomorphologic restoration benefits.

This approach, however, is only required for April 1- September 30, and we do have concern that the over-winter peaks October 1 – March 31 will not be passed. The draft report (p. 82) states that one rain on snow event in 19 years provides "no justification" for preserving winter peaks. The draft report also states (p. 41) that no specific ecological objectives are solely met by a winter flood. In contrast, we would like to point out that the groundwater recharge and channel avulsions during the January 1997 event were on a scale that has not been matched since.

The final report should reconsider the value of passing winter peak flows, and MLC offers a detailed suggestion in section III, comment F.14. The final report should also consider the obstacles to achieving the anticipated SEF peaks, and MLC offers a detailed comment in section III, comment F.12.

3. <u>Reduced winter flow strategy</u>

MLC supports the draft report's winter flow recommendations with the caveat that the benefits of lower winter flows to the ability of trout to overwinter are still in the process of being tested and confirmed. The draft report offers the premise that the lower winter flows will not cause any habitat degradation. If this indeed proves to be the case, long term implementation of the recommended winter flows will be appropriate.

Of key importance during this testing period is maintaining a comprehensive monitoring program to assess the benefits or impacts to the trout under these flow conditions. Should the lowered flow prove damaging to trout or other stream ecosystem components then the flow should be reconsidered.

Additionally, MLC notes that these new, lower baseflows of less than 25-40 cubic feet per second (cfs) will place the system in a condition that is highly vulnerable in the event of operational error; a 5 cfs release reduction error would reduce flow by 25–30% and likely cause significant fishery impacts. Operational precision and reliability will be needed to prevent such situations.

4. **Bypass and diversion flow tables**

1. Table 2-6 for April 1 to Sept 30

MLC supports the daily diversion rate table presented (table 2-6) because it reduces the risk of peak flow diversion, is operationally simpler and more reliable, and was developed through an appropriate stage height change analysis (p.39).

MLC understands that for operational reasons LADWP may propose modifying the table to utilize steps larger than the 1 cfs increments provided. MLC concurs with the stream scientists' 5% bracketing strategy (p. 58) in this event. MLC underscores that this is not a strategy to allow lower minimum flows. It does provide a good faith measure to accommodate tolerable operational impacts on flow. If LADWP proposes to take advantage of this approach, an accompanying reporting and compliance analysis plan should be developed.

The final report should address possible undesirable operational impairment of the peak flows at times when flows are fluctuating around 250 cfs. MLC offers a detailed suggestion in section III, comment F.9.

2. Table 2-7 for October 1 to March 31

MLC supports the recommended daily bypass table presented (table 2-7) because it shifts water diversions to a less impactful time of year and is expected to benefit fish downstream without causing habitat degradation.

For both tables 2-6 and 2-7, the final report should address possible undesirable flow fluctuations during the semiannual transitions between the two strategies. MLC offers a detailed suggestion in section III, comment F.8.

C. Walker and Parker Creeks

1. **Continued curtailment of diversions**

MLC supports the recommendation that there continue to be no diversion of Walker and Parker creeks into the aqueduct conduit (p.37). This flow management approach has been successful to date, resulting in a positive fishery, channel form, vegetation, and other ecosystem attributes documented by the stream scientists.

MLC agrees with the stream scientists (p.38) that flow through conditions will also benefit Rush Creek by adding flow volume and natural variability below their confluences in Lower Rush Creek.

MLC notes that successful implementation of sediment bypass measures is still pending at the diversion facility on these two creeks. This task, required in Order 98-05, will be in its second year of testing in summer 2010.

MLC also notes that maintaining flow through conditions on Parker and Walker creeks will not impair the ability of LADWP to export the full volume of water it is allowed under D1631 from the Mono Basin, either in the transition or post-transition timeframes.

D. Rush Creek

1. Flow release strategy

Streamflows are the most critical component of stream restoration in the Mono Basin. MLC supports the approach taken in developing the flow release strategy for Rush Creek.

As seen in the past 12 years of monitoring, focusing on reinstating natural processes to the greatest extent possible has provided a solid foundation of information to build upon. MLC appreciates the use of the unimpaired hydrograph as a template to shape the regulated hydrograph and prescribe Rush Creek flows, especially the call for higher peak flows to achieve the geomorphic work of channel shaping and pool creation that Rush Creek still needs. We also support the inclusion of refinements such as the recommended snowmelt benches.

MLC's greatest concern for Rush Creek continues to be the ability of LADWP to reliably deliver the required flows. Given the capacity limitations of the Mono Gate One Return Ditch (MGORD) and the management issues of Grant Lake Reservoir (GLR) including the necessary coordination with SCE, we have serious concerns that within the existing infrastructure limitations, the flows recommended in this draft report won't be reliably delivered at the time or in the volume required. We anticipate commenting on this further once we receive LADWP's feasibility analysis.

The final report should anticipate the need for monitoring to evaluate the success of the recommended flow release strategy and for possible adaptive management action, and MLC offers detailed suggestions in section III, topic A.

2. Reduced winter flow strategy

MLC supports the draft report's winter flow recommendations with two caveats.

First, the benefits of lower winter flows to the trout's ability to overwinter are still in the process of being tested and confirmed. The draft report offers the premise that the lower winter flows will not cause any habitat degradation. If this indeed proves to be the case, long term implementation of the recommended winter flows will be appropriate.

Of key importance during this testing period is maintaining a comprehensive monitoring program to assess the benefits or impacts to the trout under these flow conditions. Should the lowered flow prove damaging to trout or other stream ecosystem components then the flow should be reconsidered.

Second, at the February 23, 2010 restoration meeting in Sacramento, the stream scientists indicated that the actual values stated in the draft report are incorrect due to a calculation error. MLC understands the numbers will be revised and requests to be notified of the corrected recommendation and associated modeling prior to finalization of the report

Additionally, MLC notes for the record that reducing the volume of water reaching Mono Lake in the winter under these recommendations has no effect on the availability of water for export from the Mono Basin; rather any water held back in winter will be available for increased springtime peak flows and will ultimately still be required for release to assure maintenance of Mono Lake's surface elevation as provided in D1631.

3. Year type forecasting

Forecasting of the correct year type is critical to delivering the Stream Ecosystem Flows (SEFs) presented for Rush Creek. Past experience, particularly in 2008, has shown that the lack of a May 1 forecast can cause significant operational problems that affect both stream conditions and LADWP export.

Decision 1631 (3) requires a May 1 runoff forecast: "Preliminary determinations of the runoff classification shall be made by Licensee in February, March, and April with the final determination made on or about May 1."

May forecasts are very important and must continue to be implemented. For example, Scenario 6 (p.112) "demonstrates that runoff year forecasts require high accuracy" (in this example, a correct 2008 forecast increases GLR storage by 9000 acre feet (af). However the draft report forecasting recommendation on p.38 is unclear. The final report should be consistent with D1631 and be explicitly clear on the need for a May 1 forecast.

4. Temperature management

The draft report (p.36) identifies the temperature of Rush Creek water below the narrows as unfavorable to trout in July and August. This is a new restoration consideration that was not part of Order 98-05 or D1631 but instead has been identified through twelve years of monitoring and analysis by the stream scientists. This is a good example of the strength of the science-based adaptive management approach to restoration in the Mono Basin.

MLC commends the stream scientists for making a substantial effort to address temperature management in the draft report. Because management actions designed to address water temperature are a new element to the restoration program, as is the associated modeling, this is an area that will certainly need monitoring and adaptive management adjustments over time.

Because of concern about Rush Creek water temperature, the draft report (p.105) recommends the release of Lee Vining Conduit diversions through the 5-Siphons Bypass for cooling Rush Creek in certain rare situations. Only water already scheduled for diversion from Lee Vining Creek would be utilized.

MLC sees the limited utility of this approach and accepts it as a possible emergency measure. However we note that the availability of water in the conduit in warmer months is constrained and suggest that this temperature driven release is primarily a distraction from more reliable temperature control alternatives such as maintaining a high GLR, shading the stream, and possibly recharging Vestal Springs.

MLC is not in support of increasing Lee Vining diversions beyond what the SEFs allow for the sake of Rush Creek temperature control due to the numerous tradeoffs incurred and suggests the final report recommend firm rules for the emergency temperature control release that explicitly avoid this scenario.

MLC also offers specific comments on temperature modeling and management section III, topic C.

5. Grant Lake Reservoir management

Successful management of GLR to meet multiple objectives is the key to the success of Rush Creek restoration. MLC recognizes that the management objectives may at times be in conflict with each other. Clarity and prioritization of the objective, combined with careful and thorough modeling, are required to assure a comprehensively workable management plan.

The draft report makes two recommendations regarding minimum pool levels for GLR. A volume of 11,500 af is recommended as an absolute minimum (p.38) to protect Rush Creek from damaging turbidity and elevated water temperatures. MLC supports this recommendation. SEF flow requirements would be waived when the reservoir is at or below this level and the draft report further calls for a corresponding halt to water exports. MLC supports this requirement as it equitably establishes the minimum pool requirement.

The draft report also recommends a 20,000 af storage volume minimum pool (p.38) for July, August, and September of all runoff years for temperature control reasons. MLC understands the logic and supports the recommendation in general. However, we anticipate this requirement will generate conflict between restoration objectives.

For example, delivery of a SEF peak flow might cause the reservoir to drop below the 20,000 af minimum pool; which requirement would take precedence? MLC requests that the final report discuss prioritization and management of possibly conflicting objectives such as pool maintenance, SEF peak delivery, SEF snowmelt bench delivery, export of water to Los Angeles, and other foreseeable conflicts. This discussion should include supporting modeling information to identify the frequency of such conflicts and project the results of recommended prioritizations, especially in the post-transition timeframe.

Additionally, MLC agrees with the draft report call for monitoring of GLR water temperatures and dissolved oxygen (p.118) to validate the 20,000 af minimum pool requirement. We recommend adding turbidity to the reservoir monitoring requirements.

6. <u>SCE coordination strategy</u>

The draft report focuses on achieving Rush creek SEFs through a strategy of water management coordination with Southern California Edison (SCE), the upstream hydropower operator. Successful SCE coordination can achieve spills from GLR to produce the recommended SEFs. We support the flows as recommended and are not opposed to the SCE strategy for implementation.

However, MLC is not in agreement with the draft report (p.35) statement that spills are "the best alternative for achieving the recommended high flow regime in Rush Creek" as no other alternatives have been presented in the draft report. The final report should note that SCE coordination is one of multiple release strategies that could be used to deliver the SEFs.

Because there are other ways to construct the capacity to deliver the recommended SEFs, and DWP may wish to study them in its feasibility analysis, the final report should be clear on all of the critical parameters that would need to be met in analyzing multiple options/alternatives. For example, the recommended spillway elevation requirement (p.38) in wetter year types appears to be tied to SCE coordination, not other objectives, and could be waived under a different SEF delivery strategy.

Additionally, the draft report (p.37) states that "for both Lee Vining Creek and Rush Creek, specific opportunities for SCE and the USFS to improve annual hydrographs by enhancing spill magnitudes are identified." MLC has been unable to locate these clearly in the draft report and suggests they be detailed in the final document.

E. Grant Lake outlet determination

One of the core mandates for the synthesis report is an evaluation of the ability of existing infrastructure to deliver restoration flows to Rush Creek. In particular, Order 98-05 requires (p.61):

> "The stream monitoring team shall evaluate and make recommendations, based on the results of the monitoring program, regarding … the need for a Grant Lake bypass to reliably achieve the flows needed for restoration of Rush Creek below its confluence with the Rush Creek Return Ditch."

and

> "The stream monitoring team shall also evaluate … the need for a Grant Lake outlet after consideration of relevant factors including any material adverse impacts on Lee Vining Creek and reliability of providing SRFs in Rush Creek."

By calling for a strategy of SCE coordination to assure that Grant Lake Reservoir spills, the draft report renders judgment that existing Los Angeles Aqueduct infrastructure, in particular the MGORD and the 5-Siphons Bypass, are unable to reliably deliver recommended restoration flows.

The draft report flow recommendations stand on their own restoration merits, independent of the delivery method. Should the SCE coordination strategy prove unworkable or unreliable, as has been the case in more limited coordination attempts to date, then a modification of aqueduct facilities will be necessary.

In its feasibility study, LADWP may wish to look at strategies in addition to SCE coordination that deliver the recommended Rush Creek SEFs reliably while offering other operational benefits. MLC looks forward to participating in such an analysis.

F. Side Channel Exit Strategy

The final report should note that the recommended side-channel maintenance strategy extends the current side channel maintenance agreement from another three years to 10–20 years depending on the geomorphic conditions.

While MLC was in agreement with the original five-year maintenance plan for the side channels when they were originally opened, we believe that the stream scientists have the expertise and authority to extend the maintenance program based on their evaluation of the system. Based on the information presented in the draft report, particularly the need to encourage perennial flow that will help promote and maintain riparian vegetation, MLC is in agreement with the new recommendation. We also support the measurable triggers in the report that will guide the stream scientists when making the decision to end the side-channel maintenance. However, we believe more detail is needed (see detail in section III, comment A.11 and A.13).

G. Release of Mono Lake water in transition and post-transition periods

During the transition period additional “Mono Lake maintenance” water will supplement the SEFs in order to raise Mono Lake to the management level required in D1631. The draft report provides general guidance (p.59) for how to release this supplemental water for maximum restoration benefit. MLC recommends that the final report provide more detailed guidance. Prioritization, timing, and clarity on the extent to which hydrograph elements should be enhanced will be needed for operational planning.

Additionally, the draft report appears to overlook the continued need to release Mono Lake maintenance water in the post-transition timeframe. While this release will not occur every year, it will occur in some; the volume may be 15,000 af or more, according to LADWP’s Grant Lake Operation and Management Plan. The final report should recognize this and provide detailed guidance for release of this water. Additional modeling to anticipate the size and frequency of maintenance water releases after SEF implementation would also be helpful. MLC provides additional detail in section III, comment B.3.

H. Termination criteria, adaptive management, and future monitoring

The draft report (p.126) recommends that the adaptive management approach to restoration continue “without the termination criteria” set forth in Order 98-07. This recommendation should be omitted from the final report as it is beyond the scope of the tasks assigned to the stream scientists and is inconsistent with the settled law of the case.

The draft report also notes (p.126) that the design and specific content of the future monitoring program is beyond the scope of the task given to the stream scientists. However, it is clear that a program will be needed. MLC recommends that such a program be developed during or before the implementation phase of the State Water Board process, and that the stream scientists and stakeholders be closely involved as they have an ongoing critical role to play in the adaptive management process.

That said, MLC has reviewed the monitoring and related items presented in the draft report and provides specific comments in section III, topic A.

II. Suggested additions to the synthesis report

MLC identified the following topics and information as missing from the draft report and requests they be addressed in the final report.

A. Goals should include pre-1941 conditions that benefitted the fishery

Directives to restore and maintain the pre-1941 fishery in Caltrout II and the State Water Board orders refer to the conditions that benefitted the pre-1941 fishery, and acknowledge that not all pre-project conditions can or should be restored. These directives are important overarching goals and should be included in the final report.

MLC provides numerous comments that touch on pre-diversion conditions in some way; for example section IV, comment p.61.

B. Summary of progress toward termination criteria

The draft report is mostly prospective—advancing recommendations for stream flows. Order 98-07 established that the primary purpose of the report should be retrospective summarizing how the restoration program has worked to date. The draft report provides summary info on some termination criteria, such as acreage of riparian vegetation, but is silent as to most. MLC would like to see summary information on all Order 98-07 termination criteria in order to assess progress to date.

Additionally, the final report would benefit from a review of past major restoration recommendations (such as those in Ridenhour, 1995) to see if they are still relevant.

C. Data management – reliability and access

MLC recommends that a master data set for the daily and monthly models including the unimpaired data be developed by LADWP and the stream scientists. MLC is troubled by the difficultly of getting a consistent and accurate long term daily data set for the analysis. The final report should include all final data sets used in the analysis as electronic spreadsheet files in an additional appendix. In addition, all of the modeling should be extended at least as far back as 1976 in order to include more extreme wet and dry periods than occurred during the 1990–2008 period which was modeled.

D. Additional model tools

We recognize that for a given hydrologic sequence there will be differences between the recommended SEFs, the actual SEFs, and the actual achieved streamflows. These differences will depend on 1) feasibility of implementation, 2) the guidelines for implementing the SEFs including the guidelines for delivering “Mono Lake maintenance” water, 3) how the guidelines are implemented, and 4) the level of Mono Lake and the export limits in D1631.

We believe that, in order to fully evaluate the SEFs and their feasibility, three things should be included or called for in the final report:

i. a better modeling representation of the Mono Basin facilities (e.g. one that represents existing spills better and can also evaluate facility modifications);
ii. a good modeling representation of post-transition Mono Lake levels; and
iii. a good modeling representation of export limitations in wetter years due to aqueduct system congestion.

E. Summary of recommended operational changes

The draft report recommends a number of changes to current streamflow and related requirements. The final report should be clear about each specific change and should provide a summary table of the changes recommended to D1631 and Order 98-05.

F. Vestal Springs Recharge

In recent discussions with the stream scientists and other interested parties, the idea of further evaluating the feasibility of recharging the west-side Vestal Springs has been arisen. Spring recharge offers water temperature benefits as well as many additional ecological benefits.

While certain pre-diversion conditions may be impossible to achieve under today's operational scenarios (i.e. no irrigation occurring), the idea of Vestal Springs recharge could help to bring back additional hydrological conditions that existed pre-1941 and thereby contribute to restoring the pre-1941 conditions that benefitted the fisheries.

MLC supports the exploration of this idea and requests that the stream scientists include language in the final report that speaks to the potential benefits of the idea, including the call for a feasibility analysis if appropriate. From the MLC's perspective, restoring the largely natural west-side slope spring system would be consistent with the guiding principle of restoring natural processes and for that reason should be considered. In addition, restoring the spring system could either replace or augment the current draft report recommendation of using Lee Vining Creek water for temperature amelioration purposes in Rush Creek.

G. Climate Change Implications

The climate change chapter briefly discusses the potential for warmer temperatures, earlier snowmelt, and more dry years to result in retractions in riparian corridor width. Changes in brown trout growth patterns in wet and dry years are also expected. The final report should include suggestions for how to monitor and possibly address these impacts (e.g. water for late summer vegetation maintenance if vegetation monitoring shows a decline).

Monitoring of climate effects should be proposed and possible adaptive management responses discussed in the final report. MLC provides additional detail in section III, comments A.14 and A.15.

III. Detailed technical comments and questions

The following comments address specific detailed questions MLC has about the draft synthesis report (draft report), omissions noted by MLC, and suggestions for improvements that could be incorporated into the final report. They are grouped by topic and thus are not listed in page order, however page numbers are provided for reference.

A. Adaptive Management and Monitoring

Comment A.1 (p.28, 57)
There are numerous operational recommendations that set the time period for releasing the Rush Creek spring bench and snowmelt bench Stream Ecosystem Flows (SEFs) and for maintaining Grant Lake Reservoir (GLR) elevations (p.38). It should be made very clear if the expectation is that these dates are fixed and not dynamic as the snowmelt flood appears to be (that too should be made even more explicit). We recommend that those dates be operational guidelines with the flexibility to modify them within specified criteria that would be informed by an adaptive management program. For example, the recommendation to maintain GLR at the spillway elevation should be flexible enough to allow it to occur at earlier time periods in case of early snowmelt runoff in wetter years as has occurred recently.

Comment A.2 (p.44)
Regarding the timing and magnitude of the riparian bench at 80 cubic feet per second (cfs): targeted monitoring should be proposed to see if 80 cfs is achieving the goal as well as a process for revising the threshold based on an evaluation of the monitoring results. We also need a process for evaluating timing as climate change progresses. Instead of dates, timing should be tied to a natural trigger such as degree days.

Comment A.3 (p.62)
Given the importance of table 3-1, factors to the Number of Good Days (NGD) analysis and SEFs, we recommend that the monitoring and adaptive management program include continued periodic evaluation of these thresholds and flow ranges.

Comment A.4 (p.81)
Fine tuning of the Lee Vining Creek 16–20 cfs winter flow is proposed based on continuing the winter monitoring that began this past winter. Since the 2009–2010 winter was relatively warm, few extreme icing events were observed. At the February 23, 2010 Sacramento meeting there were many questions surrounding an effective monitoring protocol, since there were few experts and papers found. We recommend the stream scientists, based on their evaluation of this winter's data, propose changes to the protocols and additional monitoring if needed in order to answer their questions that will allow them to fine tune the winter flow. This evaluation should not be based solely on fish habitat, but also on groundwater and vegetation and other aspects of the ecosystem dependent on winter flows.

Comment A.5 (p.117)
Please propose monitoring designed to evaluate the success of LADWP/SCE coordination, as well as compliance monitoring for each of the other recommendations in the report.

Comment A.6 (p.D28)
The temperature model suggests as the riparian vegetation gets larger and provides more canopy shading of the streams (as well as the whole valley floor ecosystem), the stream temperatures in lower Rush Creek will be reduced for a given ambient air temperature condition. In addition to canopy cover, monitoring should measure the age and species composition of the riparian vegetation, due to the importance of size and structure of the riparian community to not only temperature but also instream habitat.

Comment A.7 (p.46)
Recognition of the importance of Body Mass Index (BMI) is expressed in the bench flows, however no BMI monitoring is proposed in order to evaluate the effectiveness of that management strategy. Since food affects Condition Factor in trout we recommend BMI monitoring be proposed.

Comment A.8 (p.120)
The report says real time coarse sediment bypass is not warranted, but delaying until a large volume is present "will likely cause problems," however it is difficult to specify a threshold. Please propose something (such as excavating at a 2–5 yr intervals, to be adjusted based on surveys).

Comment A.9 (p.118)
At the February 23, 2010 restoration meeting in Sacramento, the discussion implied that the lack of Lee Vining Creek groundwater data loggers impaired the analysis compared to Rush Creek. A data logger should be installed in Lee Vining Creek piezometer C3 (usually the last to dry up) and B1; also Rush Creek Channel 10 piezometers 3, 4, or 5 (these three have never dried up). In addition, deeper piezometers in single-thread channel areas should be installed to evaluate whether assumed groundwater levels in these areas match that of the multiple channel areas where piezometers have been installed. They should be installed in a transect extending away from the channel in order to evaluate the reestablishment of a shallow alluvial water table which would be necessary for maintenance of a wide riparian strip.

Comment A.10 (p.121–122)
The draft report says additional study may be warranted to quantify vegetation growth and vigor due to year type patterns in piezometer areas. P. 117–126 suggests qualitative assessment of riparian response to dry year flows with shoot lengths in piezometer areas. In a personal communication with Duncan Patten (co-author of Stromberg and Patten, 1990 and 1992) he stated they used ring width (despite the difficulty of the task with cottonwoods) because they found shoot growth "was so variable it was not useful." Please describe your methodology and how you intend to account for this variability. In

addition to comparing 2007 and 2009 and qualitative assessment, what would you suggest that is measureable?

Comment A.11 (p.117–126)
Please provide a better explanation of how the RCT survey works, as well as how often it should be resurveyed, e.g. should it be resurveyed only when a side channel loses significant flow during the growing season (and how would this be monitored?), or in advance of such a development?

Comment A.12 (p.58)
We recognize that stage bracketing allows LADWP to tell the stream scientists what it can do—that the recommendations are an iterative process. How often will the Lee Vining Creek rating curve be resurveyed? Please propose a process for updating the table of diversion rates in the future.

Comment A.13 (p.85, 123)
The Committee agrees there needs to be a measurable trigger for the side-channel exit strategy (premise no. 6). An alternative remedy of a hydraulic control in the main channel is recommended for the 3D but not the other channels. If the other channels were to trigger the exit strategy early in the 10–20 year period (such as next year), would you recommend a physical control structure as you do for the 3D?

Comment A.14 (p.129)
The climate change chapter seems to end abruptly after discussing the potential for earlier snowmelt and more dry years to result in retractions in riparian corridor width. We would like to see suggestions for how to monitor and address these impacts, e.g. more water for late summer vegetation maintenance comes from export vs. somewhere else on the hydrograph if vegetation monitoring shows a decline.

A more robust analysis of the climate change that has already occurred (both in the 20th century and in the last 1000 years) and is prognosticated to occur in the Eastern Sierra should be included. In particular Stine and others (e.g. Graham and Hughes 2007) have described the past climate change including plausible hydroclimatic sequences (as confirmed by Mono Lake fluctuations) in the Mono Basin. Cayan and Dettinger have already documented changes in the snowmelt timing in adjacent watersheds. We recommend analysis of unimpaired peak snowmelt hydrographs over the last 75 years of record (since 1935) to see if such a signal manifests in the Mono Basin. We also recommend analysis of SEFs and habitat response if climatic sequences of the Stine droughts were to occur, as well as monitoring and adaptive management designed to evaluate and respond to such changes.

Comment A.15 (p.128)
The climate change chapter fails to address changes in diurnal fluctuations due to reduced nighttime snowmelt in the high country because it no longer is getting below freezing at night as often. These fluctuations would be passed down Lee Vining Creek during the summer under the diversion rate strategy, and below the narrows on Rush Creek due to

Parker and Walker Creek fluctuations. With climate change these fluctuations have already lessened greatly and could eventually disappear. The significance to aquatic life for both flow and temperature should be addressed.

Comment A.16 (p.120)
We recommend that the detailed pool surveys that include canopy cover data should be undertaken on Rush Creek and Lee Vining Creek from the diversion dams to Mono Lake.

Comment A.17 (p.126)
We agree with the monitoring metrics in Chapter 7 along with others noted elsewhere in our comments. These metrics should be used to develop indicators of ecological function and process based in part upon the ecological outcomes used in the NGD analysis.

Comment A.18 (p.126)
While certain pre-diversion conditions may be impossible to achieve under today's operational scenarios (ie. no irrigation occurring), the idea of Vestal spring recharge could help to bring back additional hydrological conditions that existed pre-1941 and thereby contribute to restoring the pre-1941 conditions that benefited the fisheries. These include:

1. Young-of-the-year (YOY) habitat. Assumes the channel that connected springs with Rush Creek could be restored.
2. Summertime temperature mitigation in Rush Creek. Assumes that 5 cfs spring discharge into Rush Creek is possible.
3. Wintertime temperature mitigation. This could be perhaps even more important than summertime temp mitigation.
4. Food source for fish.
5. Increased conductivity from minerals that could help food production.
6. Restoring pre-1941 conditions that benefited fishery (fulfilling judges order)

Additionally, non-fishery benefits include:

1. Restoring nature and natural processes
2. Spring ecosystem for its own sake—part of public trust benefits
3. Riparian vegetation enhancement in areas away from immediate main-stem channel.

Using Parker and Walker Creek water to recharge the spring has its own set of variables that would need in depth research and analysis. The benefits of implementing the spring recharge would need to be weighed with the known impacts to Parker and Walker and the suspected or possible unintended consequences of redistributing the water.

Comment A.19 (p.114)
The current GLR model output suggests that during the transition period on average 10,000 af will be exported from Lee Vining Creek and 6,000 af will be exported from Rush Creek. This is a significant change from current operations. The model output for the post-transition period indicates 10,000 af will be exported from Lee Vining Creek and 20,000 af will be exported from Rush Creek, which is a significant change from the transition period and results in some years exceeding 30% of the runoff being diverted. We recommend that in addition to a clearly defined adaptive management program that

can evaluate these changes in diversions amounts, that periodic detailed reviews (every 7 to 10 years) of the monitoring information and operations be conducted in addition to what will be routinely evaluated in an annual report.

B. Grant Lake Reservoir Management and Modeling

Comment B.1 (p.66)
The report needs a longer simulation period. We recommend that the 1990–2008 modeled base period be extended back to at least 1976 for the following reasons:

1) It does not include the 6 year drought that started in 1987;
2) It only includes one extreme year (1995) not two as is stated. 2006 was not an extreme runoff year;
3) The period from 1976–92 had greater and longer extremes of wet and dry than the 1990–2008 period.

Comment B.2 (p.A5)
We recommend that a master data set for the daily and monthly models including the unimpaired data be developed by LADWP and the stream scientists. Presumably Mike Deas is putting together a data set that should be the same as what the stream scientists are using for their work. We are troubled by the difficultly to get a consistent and accurate long term daily data set for the analysis. Daily data prior to 1990 was not obtainable even though LADWP developed one for previous versions of GLOMP that was sent to us and that is nearly continuous from 1973 (although 1977 and a few other years in the 1970's may be missing some Lee Vining Creek data). There are also stations that are not included (East and South Parker) or the historical data needs to be modified for making future predictions (such as Parker Creek above conduit, LV above conduit) since Cain Ranch and Horse Meadow irrigation diversions ceased (historical data would include irrigation but for making future predictions, one would want to have a data set that did not include irrigation diversions which were 8 TAF/YR or more—especially if the Lee Vining Creek and Gibbs Creek diversions are included).

Comment B.3 (p.41, Appendix A-1)
Hydrographs in Appendix A-1 should be refined to better represent what the expected SEFs would be in the transition and post-transition periods. Our understanding from the March 15, 2010 phone call is that hydrographs in Appendix A-1 are model outputs with only 16,000 af of export and thus do not show what the SEF on Rush Creek would be in the post-transition period. We were also told that the operational guidelines for managing the "extra" water were not explicitly modeled, thus the hydrographs and GLR levels may not be representative of what might occur given the historic runoff input. Another limitation is that the model is a simple input-output model and thus cannot accurately represent the spills. Also the recommended SEFs in the wetter years that are greater than the historic GLR inflow are not shown. We recommend that the LADWP, Mike Deas, and the steam scientists work together to develop more representative hydrographs of the recommended SEFs and GLR levels in both the transition and post-transition periods.

Comment B.4 (p.59)
The amount of diversions that SEFs allow from Lee Vining and Rush Creek (the flow split) cannot be fully evaluated until a more accurate representation of the both the transition and post-transition SEFs, GLR levels, and LADWP exports is developed. The current model output in Appendix A-1 is not fully representative of the stream hydrographs and no GLR levels are presented (see comment above on Appendix A-1).

Comment B.5 (p.7, 58, 113)
The draft report says (p.7) the revised streamflows don't change post-transition export allocations, but with a higher GLR, what is stopping that water from being exported instead of being released or stored? In table 6-2, what is the justification for limiting exports in 2007 when GLR holds 30–37,000 af, and what operational rules would be necessary for implementation of that limitation? Within certain years when Mono Lake is high (i.e. years with no lake level limit on exports), more water is available for export than under the current flow regime. All years except Dry require less water for SEFs than currently (p.58 table 2-15), implying an increase in post-transition export, however additional lake maintenance water would need to be released.

Comment B.6 (p.114 Table 6-3)
Lee Vining Creek subsidizes the Rush Creek deficit in 2007 and that makes storage balance and 367 af available for export. <u>We should presume storage decreases by the amount of the LVC subsidy since it would likely be exported.</u>

Comment B.7 (p.66, 109)
The 5-Siphons Bypass release was not modeled in the GLR model. <u>It should be included in GLR Outflow.</u> Releases were: 2005: 1461 af, 2006: 494 af, 2008: 1100 af.

Comment B.8 (p.112, D55)
Spills were not modeled in table D-4.1 and elsewhere because the GLR model can't predict spill magnitude accurately and requires more sophisticated modeling by LADWP. <u>We recommend modeling the recommended SEFs, regardless of the conveyance used (spillway or new reservoir outlet), in all the modeling.</u> Without presentation of the SEFs as recommended, it is impossible to accurately evaluate the recommended flows in comparison to the current flow regime. <u>Use of the spillway vs. a new outlet is determined later as part of LADWP's feasibility analysis and should not be presumed here—assumed use of the spillway unfairly limits the analysis of the desired SEFs.</u>

Comment B.9 (p.110–112, F11)
Scenario 11 is a reasonable adjustment to Scenario 10 for strings of wet and dry years, however both post transition scenarios show GLR will be above 7110 ft (26,000 af) less often than currently and consequently fewer NGD. The report states that the model overpredicts, therefore this reduction in high reservoir levels is likely even too optimistic. Also, prior to SCE's 1999 FERC license the upstream reservoirs were operated at lower levels during the summer (compare end of August Gem storage here:
http://cdec.water.ca.gov/cgi-progs/queryMonthly?GLK&d=18-Mar-

2010+11:33&span=20years) which slightly inflates GLR storage during the first half of the scenarios in comparison to today's operations. In addition, Gem Lake Reservoir was empty in 2007 and Waugh Reservoir was empty in 2009, therefore both of these years have higher summer GLR levels than they would have with normal SCE operations. Normal SCE operations (full reservoirs July 1–September 1) for these two years and for the pre-1999 period should be modeled in an additional scenario.

Comment B.10 (p.A63, Appendix A-5 Table 4)
(please note additional problems with this table in the corrections section)
The report shouldn't use year-types for this analysis—they are often unrelated to the winter flow (they are effectively based on summer runoff except in wetter years) and wet periods inflate the dry year averages, resulting in an often meaningless analysis. (Note that dry winters prior to a wet year are much wetter than other dry years.) They are incorrect and inconsistent as well, for example 2008 uses a forecasted Normal year and 2005 uses a measured Wet year (measured unimpaired should be used in this analysis if year-type must be used). We recommend ranking the winters instead, e.g. the driest 5 winters have a max 6.2, avg 5.6, min 5.0 (as opposed to an average of 6.2 cfs in the 5 dry years).

Comment B.11 (p.A63)
We realize the rationale for doing a year-type analysis is that flow recommendations are by year-type, and this is a convenient criterion upon which to base a winter flow requirement. But winter flows (especially in drier years) are often more affected by precipitation and temperature, which is harder to predict than annual runoff. Our concern is that averaging a wet and dry winter together and calling it a dry year average is not a meaningful analysis—it skews the wettest and driest years towards the middle. We recommend either using the lowest observed flow as a conservative estimate of gains from Parker and Walker Creeks, or setting the Rush Creek release based on real time conditions instead of these year-type averages.

Comment B.12 (p.A63)
This is not a normal distribution—62% of the months are in the range of the driest 5 and wettest 4 winters (out of 19 total). Use of median instead of average results in 8 driest years, 4 wettest, and only 7 years in the 3 middle categories. Averaging each year's monthly median instead of the monthly mean and using ranked years instead of year types in the Chapter 2 Rush Creek recommendations would result in averages more representative of the real range of flows, especially in the wettest and driest winters, as seen below

Page	Yr Type and Mean (existing Parker-Walker analysis)	Ranked Winter and Median (proposed analysis)
44	5 Dry yrs / 5.0 cfs average mean winter flow (**incorrect-should be 6.2 cfs**)	8 Driest / 5.7 cfs average median winter flow (range 4.7–6.2)
46	2 DNI yrs / 6.9 cfs	2 Drier / 6.8 cfs (range 6.75–6.8)
48	2 DNII yrs / 6.6 cfs	
50	3 Normal yrs / 7.3 cfs	2 Middle / 7.2 cfs (range 7.0–7.3)

52	2 of 3 WN yrs / 7.6 cfs	3 Wetter / 8.1 (range 7.9–8.2)
54	3 Wet yrs / 9.2 cfs	4 Wettest / 11.5 (range 9.1–15.6) Without 1996: 10.1 (range 9.1–12.0)
56	1 EW yr / 12.2 cfs	

As stated in the previous comment, a conservative estimate of gains from these creeks would not use median or average, but lowest observed flow for a year-type when setting Rush Creek baseflows. If too high a flow is of concern, the range of flows for a year-type should be used in the analysis.

C. Temperature Model

Comment C.1 (p.66)
The report needs a longer simulation period. We recommend that the 1990–2008 modeled base period be extended back to at least 1976 for the following reasons:

1) It does not include the 6 year drought that started in 1987;
2) It only includes one extreme year (1995) not two as is stated. 2006 was not an extreme runoff year;
3) The period from 1976–92 had greater and longer extremes of wet and dry than the 1990–2008 period.

Comment C.2 (p. D25)
The temperature model added 1F to account for warming in the conduit—what is the average ground temp along the conduit? Is it always warmer than the temperature of the water from Lee Vining Creek?

Comment C.3 (p.D28, D53)
The MGORD warms water exiting GLR before it enters Rush Creek. The temperature model showed that 50% shading along the ditch would mitigate this warming. This has a bigger effect than shading along the stream itself. The final report should make a recommendation regarding shading the ditch or other temperature control measures in order to mitigate the temperature impact of the MGORD.

Comment C.4 (p.D44)
In the global warming scenarios, it appears we should expect a lot more trout growth in wet years and slightly less in dry. Please run a time series to see the overall net effect.

Comment C.5 (p.D58–60)
Do flows as big as 37 cfs in the conduit have any cooling effect on Parker and Walker when running under their spillways? Or vice versa?

Comment C.6 (p.101)
All 10g fish grow at least 5g and 50g fish grow at least 10g in all years with all scenarios. Is this an acceptable minimum growth rate in the bad years? Please state what would be the minimum desired growth in a bad year vs. a good year.

Comment C.7 (p.101)
Please show how these predicted growth rates compare with similar Eastern Sierra streams. How long would a trout take to reach pre-1941 conditions (termination criteria)?

D. Groundwater and Vegetation

Comment D.1 (p.116, 121)
Is the assertion that the riparian revegetation goal is unattainable based primarily on the abandonment of the pre-41 floodplain surfaces and cessation of pre-1941 irrigation practices? Given that there has been no wetter years since the channel 8 and 4 bii were rewatered in 2007 and no extreme years since Channel 10 was rewatered in 1996, please inform us if it is premature to say that the trajectory of the riparian revegetation will be flat as shown in Figure 7-1.

Comment D.2 (p.86)
Premise #6 says "upstream change is inevitable, such that present side-channel flow conditions and floodplain groundwater dynamics may not be sustainable." When considered along with Premise #3 on p.83 that says "a multiple channel network will not evolve upstream of the Rush Creek County Road," and later suggests multiple channels may not even persist, this implies a major change from pre-diversion function in the bottomlands is in store, and that a significant future contraction of riparian vegetation in side channel areas is likely. Especially in light of expected retractions in riparian area due to climate change (p.129), do you expect the termination criteria curve for woody vegetation area to not just flatten, as it has recently, but actually decline? P.121 states "Riparian vegetation will not fluctuate more than 10% around the area mapped in RY 2009." Please state what percent change is expected with the likely loss of side-channel areas, and how this goal of less than 10% change is to be met.

Comment D.3 (p.83)
Premise #3 on p.83 contains a conceptual framework for delta channels that is not consistent with the work you cite (Stine, 1984). Specifically, it fails to distinguish between exterior and interior deltas. It is our understanding that Dr. Stine will be addressing this in his comments to the State Water Board.

Comment D.4 (p.19)
The draft report states that tree growth "appears to be bridging the dry years without significant retraction." Please include how this was measured. Can you define significant? Is this true for Rush Creek below the county road? What about in side channel areas such as Channel 13, where Chris McCreedy with PRBO Conservation Science has observed dieback as Channel 10 flow has slowly receded from the area?

Comment D.5 (p.41, 123)
The report should clarify that the A-3 side channel should be wetted with the lower fall and winter flows in Lee Vining Creek. Also, are there any recommendations on Lee Vining Creek side channels A-1 and A-2? What is the basis for recommending maintaining the A-4 side channel at a minimum flow of 30 cfs in contrast to other higher

or lower flows? Has an evaluation of the fish, invertebrate and riparian habitat in the lower section of A-4 been made at the different flow levels?

Comment D.6 (p.129)
Note the pattern of inverse gains/losses above/below the narrows in 7 out of 9 measurements (and tending to be larger losses in bottomlands in Fall–Winter). With low winter SEFs could we lose the function of winter groundwater recharge, resulting in greater springtime losses? Relative loss Above/Below:
March 2008 small/big
July 2008 big/small
June 2009 big/small
July 2009 small/big
late Jul 09 big/small
Aug 1987 big/small
Sep 87 equivalent
Oct 87 equivalent
Nov 87 small/big
<u>We strongly agree with the reactivation of the bottomlands flow gauge in order to better understand the groundwater system</u>.

Comment D.7 (p.19, see also p.123)
"….the Rush Creek 3D Floodplain has only regenerated sparse riparian vegetation despite the extensive floodplain project implemented in RY 2002." What would have been expected? Is this presumed pre-diversion condition achievable? Could something have been done to achieve expectations, such as a different flow regime or floodplain configuration or a better seed source? Or, is this an example, like the Trihey pools, of how trying to restore unnatural conditions is not effective over the long term? The presence of older trees far from the channel was presumably supported by the previous location of the channel near those trees. The groundwater conditions in this high gradient reach are different than the low gradient reach downstream of the narrows and are not conducive to maintaining a shallow water table far from the channel.

Comment D.8 (p.123)
Quickly establishing woody riparian vegetation in the 3D floodplain is recommended with no details for how to approach the task. <u>Please provide details so that we can ensure a successful revegetation.</u> An alternative remedy of a hydraulic control in the main channel is recommended for the 3D but not the other channels—why?

Comment D.9 (p.C25, C26)
Why was the groundwater during the snowmelt recession higher in 2004 than 2005 in piezometer 8C-1? This pattern does not seem to show up in 8C-8. Could it have been a post dry year effect depressing 2005 groundwater? For a similar flow, the June 2004 water level was higher than June 2005 in one of the Channel 10 piezometers. Prior year flow in drier years could be important: Bottomlands flow was over 80 cfs through July 2003, but only through July 9 2004. Could a headcut have moved up the main channel in 2005? Could earlier peak timing in 2004 have combined with high post-winter

groundwater levels—2008 groundwater was also high, and also experienced a peak with similar timing (early) and magnitude (around 380 cfs) as 2004. June–August rainfall was higher in 2004 than 2005.

Comment D.10 (p.C26)
At the February 23, 2010 restoration meeting in Sacramento it was stated that figure C17-C21 was the primary analysis that generated the 80 cfs riparian maintenance threshold on Rush Creek. We recommend looking at a longer period, such as the 1995–2009 period available from the Rush Creek Channel 10 piezometers, in order to tease out other factors that influence the water table. We also recommend a similar analysis for Lee Vining Creek. Stromberg and Patten 1990 showed that an average annual flow of 80 cfs was necessary to produce normal pre-diversion cottonwood growth in floodplain trees on Rush Creek.

Comment D.11 (p.C26)
We recommend using average late summer flow as an indicator of the height above which contemporary vegetation is sustained instead of the 63 and 91 cfs stage heights. The shoot growth or other monitoring will presumably pinpoint this threshold (see comment above). John Bair said that it is close to the 80 cfs threshold on Rush, and on Lee Vining it is about 1/2 foot higher than the 30 cfs stage, but that is why the analysis on p.C15–16 was done. But that analysis is still relating to these arbitrary flows. The recommendation that "groundwater should be maintained within 3 feet of the floodplain surface" was derived from the conclusion that "more than 70% [of riparian vegetation] occurred within 3 feet of the projected water surface [at 63 cfs]." But 30 cfs is a 1/2 foot lower stage than 63 cfs—63 cfs would presumably be necessary to maintain groundwater within 3 feet of 70% of the vegetation.

Comment D.12 (p.C21)
In Figure C-12, a red dashed line indicates the bottom of the 5-foot riparian zone. In this location, the average late summer groundwater stage appears to be about a foot lower than the 91 cfs stage, and about 2 feet above the red line. If we draw the red line below where the average late summer flow has been in good years for growth but above bad years, it looks like a sine wave 2006-2007-2008. Would that be a more appropriate model for the bottom of the riparian zone than a straight line at 5 feet? **Also, on p.C25 please show piezometer 8-C1 stage (found on p.C22) instead of flow or please provide an additional chart with this information.**

Comment D.13 (p.41, 114)
Are there any concerns about going to 16 cfs baseflows Oct 1 in drier years? What about groundwater and vegetation—how do Oct flows affect that? The Mono Basin Synthesis Report does not appear to take into consideration necessary total annual flow volume, and we recommend that it do so. Stromberg and Patten 1992 considered maintenance of a shallow water table across the floodplain as essential for long-term maintenance of the overall riparian woody community. They showed that annual flow volume explained more variation than April–September volume, with the exception of trees 70–90 meters from the channel. Flows throughout the year contribute to the recharge of the riparian

water table. Maintenance flows for Lee Vining Creek floodplain trees were found to be 14.6 taf and attainment flows 29.2 taf. Table 6-3 on p. 114 shows the proposed SEFs meet maintenance of the riparian population in all years and attainment of high biotic potential in only 10 of the 19 years modeled. For Rush Creek, maintenance flows for floodplain trees were over 81 taf, indicating higher needs now than pre-diversion due to drought stress and channel incision. The modeling in Figure 6-3 shows this volume would be attained below the narrows in only one of the 19 modeled years, even though it would be attained in 7 years with the flows reaching the aqueduct. Population subsistence flows (associated with some loss of canopy vigor) for Rush Creek floodplain trees below the narrows would be 68.9 taf, achieved in only 5 of the modeled years. For Rush Creek channel side trees, maintenance flows were 12.2 taf above and 24.3 taf below the narrows, achieved in all modeled years. Attainment flows for channel side trees were 32.5 taf above and 48.7 taf below, achieved in 10 modeled years. Summer needs can also be found in the 1992 report on page 46. They also found that lower lows and higher highs are bad—annual fluctuations should be similar to that characteristic of free flowing streams. Data from other Eastern Sierra streams suggests reduced mortality if no lower than 0.4 times the mean (typical for undiverted streams), for example if Rush mean was set at 40.5 taf then dry year flows shouldn't drop below 16.2 taf. Table 6-3 on p.114 shows the proposed SEFs meet this criteria. They further state that real-time monitoring of plant response to various flow volumes and water availability in piezometers and soil moisture would allow refinement and testing of these relationships. We recommend further monitoring along these lines to test such postulated relationships.

Comment D.14 (p 43, 90)
Stromberg and Patten, 1990, showed that prior year growth, annual streamflow volume, and annual precipitation predicted 79% of the variation in cottonwood growth on Rush Creek. Prior year growth affected Jeffrey pine even more. They also showed a shift in growth from May to July after diversions began (the peak flow was delayed during the diversion period). We recommend determining if there is any value in shifting this growth back to the pre-diversion condition of May by delivering an earlier peak flow. Stromberg and Patten, 1990 said "reduced growth for *P. jeffreyi* during the diversion period... probably resulted, in part, from the altered seasonal hydrograph. For this species and others having a vernal growth pattern, high spring flows would optimize water-use efficiency." In a personal communication from Patten, he said the peak should occur prior to mid July, not in mid-July as shown in figure 2-7 for the wetter year-types. Much of the growth of trees comes in spring, which can be seen in both rings and shoots. Only two of the 6 wetter than normal year peaks shown in figure 5-4 occurred in July, and Appendix A-3 Figure 1 on p.A50 shows only 5 peaks in the unimpaired record occurred in the first third of July and none later, although this might be an error (see next comment). Since some of the reason for a later peak is to augment cool water temperatures and riparian growth later in the summer, yet these are less in need of augmentation in wetter years, it should be possible to move the peaks earlier so that the wettest year peaks occur in early July at the latest, as they would under natural conditions. Patten suggests that Lee Vining Creek vegetation recovering faster than Rush Creek (aside from willows) may be due to the later timing of the Rush Creek declining limb. In addition, we suggest evaluation of

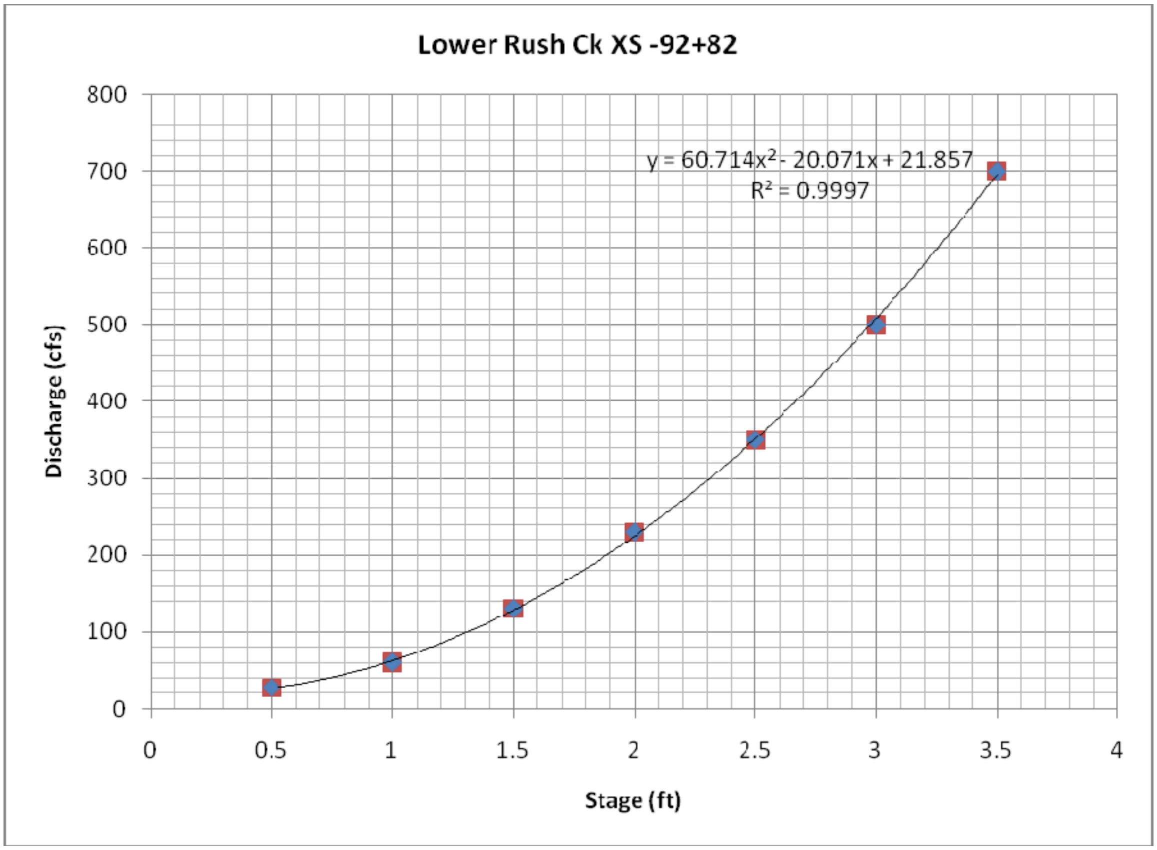
using extra water during the transition period prior to the peak to evaluate the effect of higher flows on vegetation during the spring.

Comment D.15 (p.A50)
The report Appendix A-3 Figure 1 on p. A50 shows no peaks later than the first 1/3 of July. If Figure 2 is correct, then the top graph (Fig.1) is missing at least 14 Rush at Damsite data points contained in the lower graph after early July.

Comment D.16 (p.43)
The highest peaks are in early-to-mid July in Fig. 2-7 in order to take advantage of spilling the reservoir and passing the high peak downstream. Another goal is to match up Rush Creek's peak with Parker and Walker creek peaks in order to maximize the magnitude in the bottomlands. Early June and late June are common times for these tributaries to peak, and July in some of the wettest years. Targeting the timing of seeding (p.97) should match up with the recession limb, not the peak—especially on emergent floodplains where seedlings could be washed away. Therefore, if the seeding is, for example, July 6 to August 17, then the peak should be prior to July 6 with the descending limb beginning on July 6. For emergent floodplains, this period would extend until flows drop below the 120 cfs threshold. The report seems to erroneously call for a peak during those dates, counting days above the threshold on the ascending limb as good days, which may be true for higher areas away from the channel, but would not be true for emergent floodplains.

Comment D.17 (p.A50)
It seems like overall the report does a pretty good job recommending timing in consideration of all of these factors. But Appendix A-3 Figure 1 (p.A50) shows only 5 peaks in the unimpaired record (7%) are in the first third of July with none later, which implies a natural peak should be prior to mid-July. The centroid of the distribution appears to be early June, not mid to late June as proposed. 23 of the peaks (34%) are in May and no May peaks are proposed. 39 are in June (58%) with 25 in early June and only 14 in late June. Until this graph is corrected, it is difficult to evaluate how the proposal matches up with natural timing. At this point we can say that the main concern appears to be a lack of any May and early June peaks, and perhaps the wettest year peaks might be a bit too late. A shift to earlier peaks is also likely with a warming climate—especially warmer later spring and early summer nighttime temperatures as has already been observed.

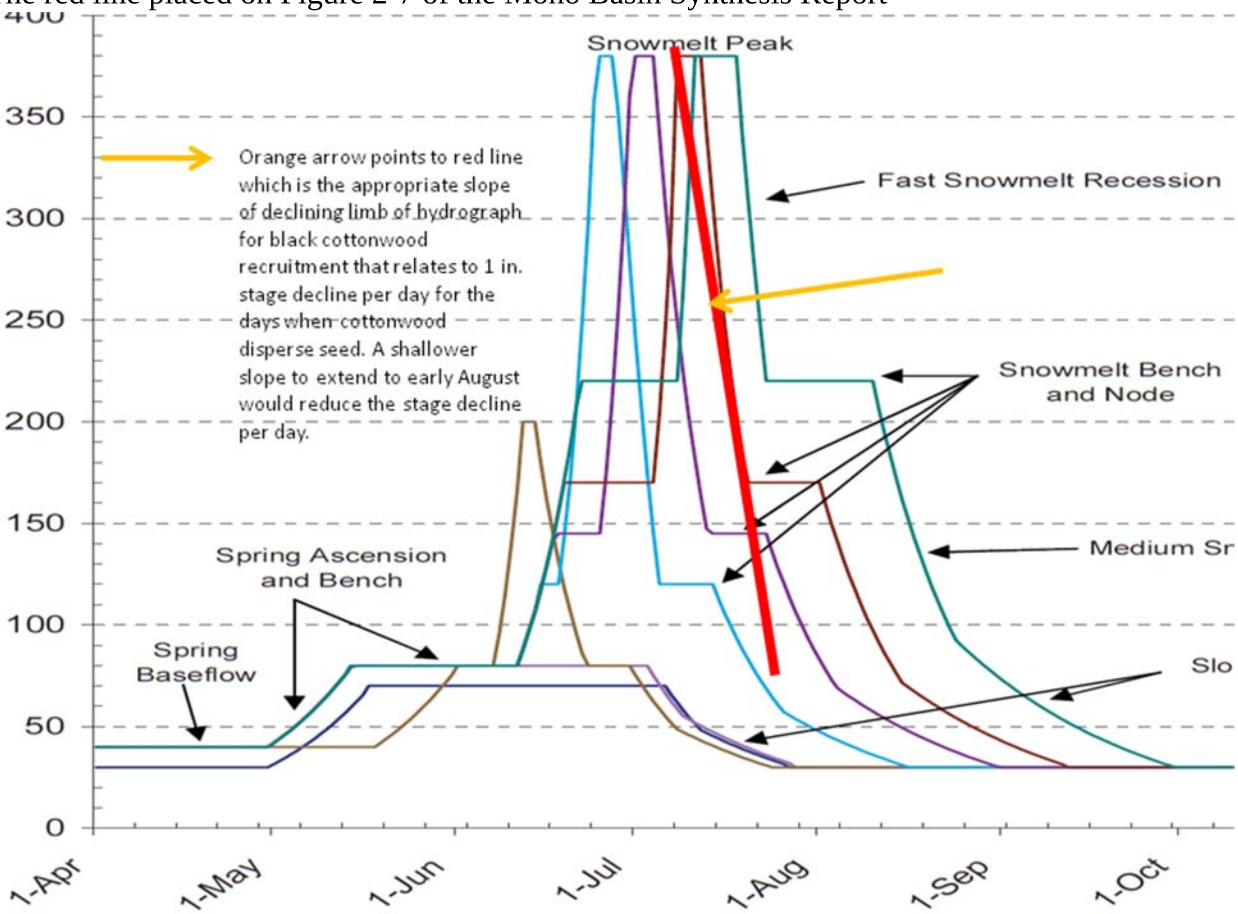
Comment D.18 (p.92)
The equation for these data on Figure 5.5 is incorrect. That equation for Lower Rush Creek is y=57.10x2.00, R2=0.96.



Using this model (the equation on the above figure) a 2.5 cm (1 in.) per day decline in stage is equal to 60.714*((1/12)*(1/12))-20.071*(1/12)+21.857 which is equal to 20.6 cfs decline per day in discharge. The use of a decline of 2.5 cm/day is based on studies by Stewart Rood and associates on the ability of cottonwood seedlings to grow roots to keep up with a declining shallow alluvial water table. A similar number for willows is about 1 cm/day.

Comment D.19 (p.43)

The red line placed on Figure 2-7 of the Mono Basin Synthesis Report



represents the appropriate discharge decline for the period July 6 to early August (ca. 35 days +/- which apparently is the cottonwood seed dispersal period) at 2.5 cm (1 inch) stage decline per day, this is equal to 21 cfs decline in discharge calculated from the equation developed in the first figure above. This line and the decline and dates is based on the "recruitment box" model concept developed by Mahoney and Rood (1998). The report should re-evaluate the recommended stage decline per day based on this information.

E. NGD Analysis

Comment E.1 (p.66)
The report needs a longer simulation period. We recommend that the 1990–2008 modeled base period be extended back to at least 1976 for the following reasons:

1) It does not include the 6 year drought that started in 1987;
2) It only includes one extreme year (1995) not two as is stated. 2006 was not an extreme runoff year;
3) The period from 1976–92 had greater and longer extremes of wet and dry than the 1990–2008 period.

Comment E.2 (p.97)

Table 5-2: The low number of good years seems to be a result of the difficulty modeling GLR spill. Please model NGD and NGY with recommended SEFs (ignoring whether the flow comes from spill or an outlet) so that we can fairly evaluate the effect of the recommended flows.

Comment E.3 (p.C8)
The proposed SEFs make a Dry-Normal I (DNI) year type go from a favorable NGD unimpaired to unfavorable for vegetation maintenance. What are the anticipated effects of this change on vegetation, especially during a several year drought?

Comment E.4 (p.97)
Table 5-2: Aggraded floodplains without side channels get only 1 NGD from the below Narrows SEF (top three numbers right hand column). This is incorrect—flows exceed the 275 cfs threshold during these dates more than once. Does below the narrows one good year in 19 years equal even less (zero) good years above the narrows? How often would a good year occur above the narrows? Please show what flows could be prescribed that would not sacrifice germination on the aggraded floodplains above the narrows. If that 1 in 19 years is missed below the narrows (e.g. due to operational difficulties), is 1 in 38 years an acceptable regeneration frequency for these species? Flows that would do better should be shown, even if they aren't recommended.

Comment E.5 (p.E35)
Table E-13: The last two columns are the SEF, but there are zero NGD for the last 3 geomorphic thresholds. This is incorrect, since they are 500 - 600 - 700 cfs events that would have occurred—and the 1995 simulated SEF on p. A25 almost reaches 700 cfs, which would give some NGD. There is no summary column for SEF with simulated "spill" or otherwise-delivered flows above 380 cfs. Please attempt to make a realistic estimate to fill in the table, despite the difficulty in modeling flows above 380 cfs.

Comment E.6 (p.93)
Normal year thresholds (also found in table 3-1) require flows > 450. P. B46 states "As expected, this release magnitude [400 cfs] appeared to be a minimum threshold for measureable fine sediment deposition on incipient floodplains." With the MGORD capacity constrained to 350 cfs (currently, may increase or decrease over time), what will the final Synthesis Report recommend above the Narrows instead of the draft report's 380 cfs? Please discuss how the normal-year recommendation, if different from these thresholds, will affect the functions that require a normal year flow exceeding 400 or 450 cfs.

Comment E.7 (p.E16)
Table E-4: SEF NGD appears to be a big improvement for fish over table E-3 (current NGD). Only three conditions decrease: Off channel connectivity (-10 days), spawning gravel mobilization (-1 day), and shallow ground water saturating emergent floodplain (-3 days) on average. This last one primarily is lost in the wetter years, especially wet-normal years (loss of two weeks). What are the implications of losing this in wet-normal years, a year-type when we presumably want to maximize vegetation growth?

F. Flow Management Recommendations

Comment F.1 (p.42)
The Rush Creek winter flows indicated in the report are incorrect as stated at the Sacramento meeting. We look forward to seeing the correct recommendation prior to the finalization of the report as well as new modeling based on the correct figures. <u>This is one of several of our comments that lend themselves to further discussion and information exchange with the stream scientists prior to their finalization of the report, and we expect those discussions to begin soon after these comments are submitted.</u>

Comment F.2 (p.95)
Table 5-1 380 cfs "recommended SEF"—p<u>lease show what the recommendation for the creek is with no assumptions made about infrastructure</u>**.** MGORD capacity could increase or decrease over time—please tell us your recommendation and run NGD analysis and discuss implications of 350 if that becomes the recommendation. The recommendation should drive the infrastructure—wherever we see 380 it looks like the infrastructure is driving the recommendation

Comment F.3 (p.44–56)
The text for all year types says "at the top of the MGORD" for the winter flow releases. All past SWRCB flow requirements have been for the stream itself, measured at the bottom of the MGORD. <u>The report should be clear if it is recommending a wholesale change in where all requirements are measured—from the bottom to the top of the MGORD, and if augmentation from another facility (such as the 5 Siphons Bypass) should be added to that measurement or if it is in addition to it.</u> The difference is often 1–2 cfs during winter—and if measured at the bottom or released through a new outlet facility, should 1–2 cfs be subtracted from the recommended flow?

Comment F.4 (p.A53)
The fifth column (below narrows unimpaired) is wrong—it incorrectly adds 6–7 cfs to the numbers in the second column (unimpaired). During peak flow Parker and Walker unimpaired add up to more than 6–7 cfs. <u>If these low Parker and Walker numbers were used elsewhere, or the results of this table entered any other analyses, those should be corrected as well.</u>

Comment F.5 (p.38)
The example of a 70 cfs release resulting in 80 cfs below the narrows is appropriate for the snowmelt bench period, however it does not include losses and may not be an appropriate example for other times of the year. Gains of 10 cfs or more only occur during the last half of May and June–July. Outside of this period, presumably 80 cfs would still be required because only 70 would make it below the Narrows at certain times of year. Appendix A-5 Table 3 (p.A62) shows from the MGORD to the 10 falls many measurements of far lower gains than 10 cfs:

Date	Gain/Loss
3/20/08	1 cfs gain
8/12/08	2 cfs loss
8/14/08	4 cfs loss
8/16/08	14 cfs loss
8/19/08	7 cfs loss
8/20/02	3 cfs loss
8/21/08	5 cfs loss
8/31/08	4 cfs loss
9/15/08	4 cfs loss
9/29/08	4 cfs loss
5/3/09	2 cfs gain
8/21/87	6 cfs loss
9/5/87	12 cfs loss
10/22/87	4 cfs loss

Comment F.6 (p.86)
An additional premise should be included about Upper Rush Creek that informs the SEF for Rush Creek. The stream scientists indicated on the March 15, 2010 phone call that Upper Rush has a different dynamic than below the Narrows including greater channel stability than below the Narrows. The report should better articulate why the SEFs are focused on the bottomlands, and why it fails to specify thresholds and flow recommendations for Upper Rush especially given the original stream scientists' recommendations (Ridenhour, 1995) for Upper Rush Creek that had higher SRF's than for lower Rush Creek.

Comment F.7 (p.79)
One of the justifications for adopting the Bypass flow approach on Lee Vining Creek in the October through March period is "much of the daily baseflow variability in the SCE regulated hydrographs between October 1 and March 31 is attributable to SCE operations rather than natural variability." Please inform us if this observation was based upon a quantitative analysis of the records, a visual analysis of the records, or a comparison to the Buckeye Creek record (i.e. the back-up for the observation should be provided).

Comment F.8 (p.40–41)
An operational rule should be provided for the relatively rare times at which the switch March 31–April 1 or Sept 30 to Oct 1 between bypass and diversion tables will result in a

unacceptably large variation in stream flow. A basic transitional ramping would be appropriate. Example: on 3/31 LV above is 100 cfs and 20 cfs is being bypassed per table 2-7; on 4/1 at above of 100 cfs, 76 cfs is left in stream per table 2-6. The ramping from 20 cfs to 76 cfs in that situation should be specified.

Comment F.9 (p.40)
There should be more explicit direction to LADWP on how diversions should be managed if Lee Vining Creek flow fluctuates around 250 cfs. In order to preserve the integrity of the snowmelt peak hydrograph, if flows go above 250 cfs during the snowmelt peak, and they are likely to be at that level or higher based upon the snowpack, and a short-term cool-down causes the flow to drop below 250 cfs, diversions would be automatically resumed, however it could be operationally desirable to not resume diversions. If so, guidelines should be developed that specify the number of days that the flow would need to be below 250 cfs before diversions resume. We recognize that LADWP will develop the operational guidelines for MBOP but we feel there should be a process to discuss this and other operational guidelines with the scientists and stakeholders before the guidelines are finalized in MBOP.

Comment F.10 (p.44)
When GLR is below 25 thousand acre feet (taf) storage in dry and dry-normal years, how much of Lee Vining Creek diversions should be augmenting Rush? Should a maximum be specified if a sudden thunderstorm or SCE release were to occur? Please provide more detailed recommendations regarding this augmentation.

Comment F.11 (p.A66)
Third paragraph on p.A66 says Convict Creek was chosen "because it is unregulated." For the record, we'd like to note that Darren Mierau (personal communication, 3-15-10) stated that now he'd probably do it differently based on what he knows. Virginia and Buckeye would tend to match Rush Creek's watershed characteristics better. We don't feel the deficiencies in the ramping analysis are severe enough to require a new analysis, however we would welcome a new analysis if the stream scientists decide it is appropriate.

Comment F.12 (p.76–77)
SCE's cooperation is "necessary" to accomplish the recurrence curve on p.76 and table 4-2 on p.77. SCE data from past years show this is operationally achievable, however a higher release from Saddlebag could impact power generation and may be difficult to achieve politically.

Comment F.14 (p.41, 82)
On page 82 the report states that one rain-on-snow event in 19 years provides "no justification" for preserving winter peaks. How often would these events be expected? What thresholds and frequencies would be justification? A summer 1984 rain-induced flood event was even larger and would indicate a recurrence of 13–19+ years, and possibly more often under a global warming scenario. Page 41 states that no specific ecological objectives are solely met by a winter flood. We would like to point out that the

groundwater recharge and channel avulsions during the January 1997 event were on a scale that has not been matched since. If SCE can't maximize summer peaks, passing rain-induced floods could be an important strategy. The report's reasoning for maximizing summer peaks (p.74 & 76) "speeding recovery" would presumably hold for passing large winter floods. The diversion table on p.77 recommends a 20 cfs increase in the 25-yr flood from 630 to 650 cfs; presumably passing a single Jan 1997 730 cfs flood (instead of diverting it) would be more effective (and possibly more achievable) in "speeding recovery" than adding 20 cfs to a summertime extreme year event. Aside from our concern about the lack of passing winter peaks, we support table 4-2 on p.77 and want to work with LADWP and SCE to encourage and assist with maximizing the peak.

Comment F.15 (p.41)
The draft report states that large events likely would bypass the conduit. This is incorrect. The conduit can shave 300 cfs off a flood. If LADWP had diverted the maximum in January 1997, 430 cfs would have passed downstream instead of 640 cfs. We recognize the importance of maintaining flexibility to divert flows of this magnitude when necessary for public safety, however even if it is not a requirement to release large winter floods, we recommend encouraging release unless public safety requires otherwise. Presumably the loss of trout reproduction in 1997 would have occurred whether or not 730 cfs or 430 cfs were passed downstream, therefore reducing large winter floods would not have any short-term fishery benefits. We suggest making the summer provision for passing flows above 250 cfs into a year-round provision in order to take advantage of these rare but valuable winter events.

Comment F.16 (p.77, 95)
Tables 4-1 and 5-1 recommend decreasing the recurrence interval of flood magnitudes, which we support. However, looking at percent of unimpaired passed results in the following table:

Recurrence	LV Above	LV Rec.	Rush Above	Rush Rec.
2	70%	80%	41%	69%*
3	71%	88%	47%	75%
5	75%	86%	53%	77%
10	75%	86%	60%	81%
25	93%	96%	64%	75%

*69% is 380 cfs; 350 cfs is only 64% of unimpaired

Note the recommendation is for passing 80-96% of Lee Vining Creek unimpaired magnitude, however the Rush Creek recommendation is for only 69*-81%. Please discuss why Rush Creek "needs" a much lower proportion of its unimpaired peak than Lee Vining Creek.

Comment F.17 (p.118)
At the February 23, 2010 restoration meeting in Sacramento, Bill Trush stated more than once that in general, as you approach diverting 30% of unimpaired flow, you start losing ecological function. Table 6-3 proposes releasing 63-115% of Rush Creek's unimpaired volume below the narrows, with an average of 73%. 7 years are below 70% with two

years in a row occurring twice. This appears to be approaching a 30% diversion—lost ecological function appears to be in the design, and <u>those functions the Rush Creek recommendations would abandon should be listed clearly along with the additional flows required for maintaining them so that the trade-offs are clear.</u> The recommendations for Lee Vining Creek result in 69–84% of unimpaired flow being passed downstream, with only two years under the 70% threshold, and an average of 77%. Intuitively, that appears to be a "safer" distance from the 30%, but <u>we would also like to see a list of Lee Vining Creek functions expected to be lost under the proposed flow regime along with additional amounts of water required to maintain them.</u>

IV. Corrections and Clarifications

The following comments note more minor matters that MLC observed in reviewing the report. In order to improve the accuracy, completeness, and clarity of the final report, the stream scientists should address these items. They are provided in order of page number for ease of reference.

A. Clarifications

p. 4

While the Mono Basin Clearinghouse contains many excellent sources for the history of land and water development in the Mono Basin, it does not contain a comprehensive listing. The reader should also be directed to original sources such as Fletcher 1982 and 1987, Hart 1996, and Vorster 1985.

p.8

"The Mono Basin monitoring program has exemplified adaptive management." This poorly-worded sentence not only is meaningless as written, but also the intent isn't necessarily true, given numerous difficulties in the adaptive management and monitoring program, e.g. LADWP's difficulty in quickly contracting for additional monitoring on short notice. We do think that there have been aspects of the program in the last 12 years that are good examples of adaptive management such as the decision by all the stakeholders to agree to numerous variances to test different high and low flow regimes, however we wouldn't characterize it as "exemplary."

p.11

- The bottomlands is not a braided stream course. It is a multiple-channel anabranching stream.

- The report should not use "relatively undisturbed" to describe the upper canyon reach of Lee Vining Creek without further explanation. The riparian vegetation in that reach was not eliminated by water diversions because of the seepage below the intake, however the existing vegetation was relatively decadent and not recruiting new vegetation during the diversion period according to Taylor, 1982.

p.11 Table 2-1

- This table and all others in the report should either define what it means by "yield" (apparently it is the measured runoff) or not use the term when referring to measured runoff since "yield" can mean the natural runoff from a watershed. We recommend using "Average Annual Measured Runoff" or "Average Annual Unimpaired Runoff." Please also show the unimpaired averages since that is the yield that nature provides.
- "Annual" should be "Average Annual"
- The average annual runoff for all the base periods used in the report should be listed here. In addition to 1941–90 (which is what the Water Board uses for determining year types) the table should include the 1990–2008 period (used in the model), 1998–2008 (the monitoring period could include 2009 since that will be available very soon). Why is 1941–2008 included? It should be replaced with the longest period of record that is available which is 1937–2008 (or 09). We recommend that footnotes explaining each base period be included.

p.12–13

Estimated Unimpaired Runoff definition: Because the unimpaired runoff is a key data set in this report we recommend that this paragraph clarify or add the following points:

- the statement "converting the storage data to reservoir inflow rates" is not clear and needs elaboration. Instead it should say that "the SCE daily acre-foot storage change is converted to a daily CFS that is combined with the measured flow at Rush Creek Damsite or Lee Vining Creek above Intake"
- Please explain that negative values can occur and how they are dealt with.
- Hasencamp probably "calculated" not "estimated" that 70% of the total runoff. Please include where the other 30% of the runoff comes from (Reversed Creek, Alger Creek)
- the following sentence is not clear "Adding the measured flow at the Rush Creek at Damsite and Lee Vining Creek above Intake gages accounts for flow from unregulated portions of the watershed."
- Is 1973 missing from the unimpaired record?
- Explain that the estimated unimpaired flows at Narrows does not account for any gains or losses between the Parker and Walker gages and Rush Creek. Parker Creek gains some of South Parker Creek below the gage. Infiltration losses on the two creeks can occur.

p.16

Table 2-3a is unnecessarily complex. There should only be two columns for flows, Apr–Sept and Oct–Mar. There is no need to list each Apr–Sept month separately because the flows are the same.

p.19
Please elaborate what is meant by "all the constructed deep [Trihey] pools have deteriorated." Have they all filled in? Are some still deep? Please provide a status update as to what the state of filling-in is.

p.32
2003 and 2008 were significantly impaired by diversions—why not 2004 or 2009, which had a lower % peak passed than 2003?

p.35–36
Mixing time periods: 3500 af diversions since 1990 should match the 16,000 af export period since 1997, which adds up to 1800 af average for the post-1997 period (which emphasizes the imbalance even more).

p.45, 47, 49, 51, 53, 55, 57

- Proposed SEF Dry in legend (this is a comment for all year types) should specify MGORD release (as opposed to Parker / Walker / 5-Siphons). Also table caption should say Above the Narrows at the top of the streamflow column. Please add a below narrows column since the thresholds in table 3-1 are for that reach and are not easily compared with the recommendations.

- The text on the facing pages says "at the top of the MGORD" for the winter flow releases. All past SWRCB flow requirements have been for the stream itself, at the bottom of the MGORD. The report should be clear if it is recommending a wholesale change in where all requirements are measured—from the bottom to the top of the MGORD. The difference is often 1–2 cfs during winter.

p.49–57
In the recommended SEF tables, should separate examples (snowmelt flood timing) from key recommendations (snowmelt bench timing).

p.60
Please clarify what is meant by "average annual diversion volumes ranging from 20,000 af up to 35,000 af." The average is 30,641 af. In what scenarios would the average be 20,000 af or 35,000 af? If you are referring to annual diversion volumes, then they range up to 66,000 af.

p.61
Regarding "Replicating the stream processes occurring before 1941," it should be made clear that directives to restore and maintain the pre-1941 fishery in Caltrout II and the Water Board orders refer to the conditions that benefitted the pre-1941 fishery, and acknowledge that not all pre-project conditions can or should be restored.

p.62
The 3/15/10 phone call confirmed the Rush Creek column is below the narrows. This should be stated clearly. Where known the thresholds above the narrows should be listed as well.

p.62
Table 3-1 should include, where appropriate, the thresholds for the "sufficient" number of good days in an annual period (e.g 50% duration threshold for a growing season is noted on P.63) and the "sufficient" number of good year thresholds.

p.65
The reader of the diagram would benefit from a clearer explanation such as that provided at the February 23, 2010 Sacramento meeting.

p.79
Instead of showing stage ht in main channel at 30 cfs, show actual gw stage ht, which is about 0.75 feet lower. Or make the groundwater data points a different color at and below 30 cfs actual flow on the date read.

p.81

- "leads to NGD's below reference conditions" should specify for non-trout goal–s—otherwise sentence is confusing.

- p.86 "trout reside in the MGORD because of better thermal conditions."—simplistic, should include better velocity and cover as well. As written this would seem to favor removing the MGORD so the favorable temperatures reach the stream directly.

- "best way" to produce more large trout is to shift size distribution—do you mean the fastest way? Best way could be to restore the forest, lwd-controlled habitat elements, and springflow

p.88
Please produce fig. 5-3 for Lee Vining Creek piezometers as well. There are no graphs in the report or the appendices for Lee Vining Creek that show gw stage vs. flow.

p.110
Table 6-1 Scenario 1b column values should be filled in for all elevations, not just spill, so they can be compared to actual

p.119
Aerial photos continue for all 4 creeks every 5 years OR after all wet and extreme-wet years—should "or" be changed to "and"? Also change under riffle crest surveys.

p.A25–A28

Caption should clarify that "simulated SEF" is without SCE coordination or simulated higher GLR spills (compare figures 9a and 9b on p.A44-45—9a reaches 850 cfs and 9b never exceeds 500 cfs—why these graphs aren't the same should be made clear—9b. should say without spills). A26 shows the 1998 simulated SEF lower than the actual SRF—this makes no sense based on the recommended SEF for a wet year. Table E-13 on p.E35 doesn't make sense for the same reason—it should state that it doesn't include spills.

p.A48
Appendix A-3 Table 1, please define modeled and computed unimpaired, e.g. modeled uses Buckeye Creek and computed uses SCE storage.

p.A62
Add a footnote for the 4-Jun 2009 column and Net loss narrows to lower Rush row (-5.3) that says "Does not add up due to rounding"

p.C9
LV Veg is in shallower gw areas possibly because of fire, soil loss, and veg die off—what about the effect of steeper slope and coarser substrate? Should these be included as well?

p.C13
Does "normal" include dry-normal and wet-normal, or are those in above/below?

p.C31

- Should show actual stage (color dots below 30 cfs a different color) for each data point. The groundwater stage height at 30 cfs appears to be about 0.75 feet lower than the main channel stage height.

- Should also plot stage vs. flow as in preceding Rush Creek graphs (no Lee Vining Creek graphs do this, yet such an analysis was essential for Rush Creek).

p.C32
Where you quote G. Reis and after, is that referring to Channel 8 or 4bii? Should make it clear—since it is in a table about Channel 8 but follows a statement about 4bii it is unclear.

p.D52
Reduce y-axis to smaller range, e.g. 64–67, so that the lines are easier to see separately.

p.D58–60
Either smooth the transitions or show on one page; it is distracting and confusing to show on 3 pages. This could be shown in 6 rows: July 1–15, July 16–31, August 1–15, August 16–31, September 1–15, September 16–30.

p.D61
Hot and Global Warming have 2008 + 1F in full Grant with No FSB, except Average—2004. Should 2008 + 1F be removed from all years with no FSB use (all full years)? Or should it be added to the Extreme Wet year type in Average—2004? As it is now, it stands out that that is the only place it is missing and it is unclear why.

B. Corrections

p.4
Lake recent high 6385.1 in July 1999 and August 2006. Might as well update recent lake level to 6382.0 on April 2010 since it is beginning of runoff year.

p.6
May 1986 was when Lee Vining Creek was permanently rewatered; October 1990 was Parker and Walker (not March 1987)

p.8
2005 was Wet-Normal, not Normal.

p.11
four tributaries to Mono Lake should say "five"

p.15

- "RY1980 to RY 1989 were available only as mean monthly flow." This statement (for both Rush at Damsite and Lee Vining Above Intake) is incorrect—the daily data is available as an input file to the 1996 GLOM and we have provided it to the stream scientists.

- "Unimpaired Parker and Walker creek flows are measured at the LADWP conduit…" This statement is incorrect for the period prior to 2004 on Walker Creek, when upstream storage was utilized, and prior to 2001 on Parker Creek, when upstream irrigation diversions removed water from the stream.

p.13, 32–33
There are numerous problems with tables 2-2, 2-3, and 2-4 that we have communicated to McBain & Trush via email. For completeness we reiterate those comments here.

<u>All three tables</u>
Runoff year types are incorrect and should be corrected. Runoff Years 2001–2005 are incorrect. They should be:

- 2001 - DNI (The May 2001 Report incorrectly says 77% when the volume works out to 74%, however it lists the requirement correctly as 200 cfs for 7 days)
- 2002 - DNII (The May 2002 Report forecast is 84%, above the 75% cutoff)
- 2003 - DNI (The May 2003 Report forecast is 74%, below the 75% cutoff)
- 2004 - DNII (The May 2004 Report forecast is 80%, above the 75% cutoff)

- 2005 - WET/NORMAL (The May 2005 Report forecast is 132%, below the 136.5% cutoff)

Table 2-2

Table 2-2 and table 6-3 numbers don't agree for above stations and Mono Basin yield.

The averages for Rush and LV Creeks need to be corrected. The numbers for the two creeks in the table are not the average of the 1980–2008 annual runoff numbers in the table while the Parker and Walker numbers represent the 1980–2008 average. The four streams average is the 1980–2008 average but the Rush and LV numbers do not add up to that. Showing the 1990–2008 and 1999–2008 average would be helpful.

Table 2-4

1999–2002 & 2005 show YES for "SRF MET?" despite flow in the conduit, which is confusing. Flow in the conduit means the peak was not passed and the SRF was not met. 2001 is the only year that should be switched to "NO" because 7.5 cfs was actually in the conduit that day. Our understanding is the 5 peaks that were diverted were:

DATE - HIGHEST ABOVE PEAK	DATE - HIGHEST SPILL PEAK	DEFICIT BELOW INTAKE	PERCENT OF PEAK PASSED
2009.06.01 - 250 cfs*	2009.05.18 - 232 cfs*	(-18 cfs), 7%*	93%*
2008.05.19,20 - 222 cfs	2008.06.17, 22, 23 - 167 cfs	(-55 cfs) 25%	75%
2004.05.05 - 155 cfs	2004.06.15 - 141 cfs	(-14 cfs) 9%	91%
2003.05.30 - 332 cfs	2003.05.31 - 317 cfs	(-15 cfs) 5%	95%
2001.05.17, - 215 cfs	2001.05.17 - 201 cfs	(-14 cfs) 7%	93%

*MLC only has preliminary 8am flows for 2009.

The conduit flows are negative, erroneous, and confusing. The "Conduit on Date of Peak" column should be clear about it being the date of the above peak (the 98-05 requirement). It is hard to tell if some years incorrectly subtract the above and below columns instead of above and below on the date of the above peak.

The negative flow in 2006 must be a measurement error, as well as the 1999 below or above flow since only 1 cfs was leaking into the conduit in 1999 according to LADWP's final data for that year (or else 10 cfs was somehow lost in the pond). A zero or minimal flow should be shown in the conduit instead of the incorrect numbers. Also, despite a 14 cfs difference between above and below on May 17, 2001, LADWP data show an average conduit flow of just 7.5 cfs that day. They were shutting down their diversion the day it peaked and they did divert some of the flow.

2009 USGS data is available and from LADWP at least preliminary data is available. We calculate (from LADWP's 8am flows, not daily average) 315 cfs unimpaired, 250 cfs above, 232 cfs below, 93% of peak passed, and 147 cfs in the conduit on the date of the above peak. Also, I think LADWP was supposed to report that event to the Water Board, so presumably the "not available" conduit flow could be found in final form in that report.

Table 2-5

- Change the requirement according to the correct year type.

- 1998 should have "NA" instead of "NO" in the "SRF met?" columns and "pre Order 98-05" in the "Reason" column (table 2-4 is correct in this regard since the order wasn't issued until September).

- 2003 should reflect "YES" under meeting requirements since the MGORD was enlarged prior to meeting that year's peak flow (given the correct year type). Reason should be changed to "MGORD Release."

- 2004 under duration met says 10 days; this should be changed to 6 nonconsecutive days (given the correct year type).

- 2009 unimpaired is available (310 cfs is our calculation)

- Note 1998 below is higher than above—is this a measuring artifact? Text below table also refers to 1998 and that year should be removed from the list.

p. 32–33

- Text needs to be updated based on the corrections in the tables as well:

- 2003 and 2008 significantly impaired by diverisons – it should also list 2001, 2004, and 2009 which had a lower % passed than 2003 (see table above).

- 7 of 11 years meeting Lee Vining requirements needs to be updated based on new conduit calcs. By our calcs it is 6 of 11 years.

- Five runoff years following 98-05 peak requirements were not met should be changed to four

- Four of the past six runoff years should be changed to five of the past six

- No SRF was required in RY2009 not because Grant fell below 11,500 af (it exceeded this level on April 10th and was rising rapidly), but because delivering the SRF could have lowered it below this level.

p.33

In 2009 no SRF was required NOT because Grant fell below 11,500 af, but because delivering the SRF could have lowered it below this level.

p.13, 32–33, 85, 113, 114, A48, A49
Year type problems recur throughout the document—should be measured when discussing unimpaired, and forecasted when discussing requirements and past management. Table 6-2: 2005 should be "Wet-normal"

p. 36, 42, 61, 94, 95
Max capacity of MGORD is not 380 cfs but 350 cfs, according to LADWP, and was managed that way in 2008. It was only tested once at 380 cfs in 2004 and almost failed. It has never delivered 380 cfs for 5 days—the Normal year peak flow required by Order 98-05. This error recurs throughout the document.

p.37
"For both Lee Vining Creek and Rush Creek, specific opportunities for SCE and the USFS to improve annual hydrographs by enhancing spill magnitudes are identified." These opportunities were never identified in Chapters 4 and 5.

p. 48–49
Text says 3–6% max ramping down but table says 10% for fast recession. Phone call on 3/15/10 confirmed table is correct when it conflicts with text.

p.60, 115
The stream plan is referred to in more than one place as Ridenhour 1996, however the draft "work plan" is Ridenhour 1995 and the final stream plan is LADWP 1996 (see chapter 9 where they are listed correctly).

p.66
The historic low elevation of GLR did not occur in June 2009 when storage ranged from 20,000–32,000 af. It's lowest point in 2009 occurred in February at less than 6,500 af. The historic low occurred in Jan–Feb 1960 when it reached 1597 af of storage.

p.67
Zeros at the beginning of the "actual" line should be removed (as Ali mentioned at the Sacramento meeting it is confusing).

p.70
winter icing evaluation also should list RY2009

p.74

- Table 4-1: The bottom number in column B should be 3.12 instead of 0
- Table 4-1: The bottom number in column C should be 3.12 instead of 0
- Table 4-1: Column D should be titled "below intake" instead of "above intake"
- Table 4-1: The bottom number in column D should be 251 instead of 0

p.94
"owens diversions" should be changed throughout the document to "exports" for consistency

p.110
In first paragraph, 83 days GLR full should be changed to 20 days

p.112
Second sentence under 6.2 reads Only local precip and runoff were excluded—"and 5-siphons-bypass" should be added (although in our technical comments we recommend including this flow—if that were the case this statement would be correct).

p.A1
Add Parker and Walker Runoff (estimated unimpaired) to the list of “primary gaging locations.”

p.A2, A50, A51
Parker and Walker above are not unimpaired. The unimpaired stations which should be used instead are Parker and Walker Runoff. These may not be available for recent years since recent management changes have made above equal to unimpaired, however this is not the case prior to 5–10 years ago.

p.A8–A10
1998–2006 graphs show regular fall–winter fluctuations in unimpaired—should be smoothed or processed like data prior to 1998.

p.A10
2008 Rush Runoff shows a zero on March 1st. This data point should be removed.

p.A14–A18
Caption should not say "unimpaired." You can see (esp. p. A16 1998–2001) when Walker Lake was emptied in December, and in 1999–2000 when it was filled in June.

p.A19–A23
Lee Vining Creek Runoff always (except 1999 and 2003) hits zero on March 1st. This erroneous data point should be removed from all graphs.

p.A23, A30–33
LVC above intake hits zero on March 1, 2009 and also often on pages A30-33. This erroneous data point should be removed. According to daily reports flow was 21–27 cfs all that week (in 2009).

p.A28
2008 simulated SEF incorrectly changes the 2008 Runoff Year to a dry-normal requirement which is why the lines are so different—The SEF is not for a Normal year as it should be. Other years where forecasted runoff and unimpaired runoff resulted in

different year types should be checked as well and the SEF should be consistently shown for the forecasted year type.

p.A35, A37

- Fig. 1: Unimpaired 2008 data (green line) show an uncharacteristically vertical increase in early February and then a sustained flow much higher than any other year. This is not shown on Fig. 3A below narrows. It appears to be an error.

- A blue line increases vertically above all other lines (except 2008) and ends in Feb. on both Fig 1 and 3a. Missing data? Incorrect?

p.A49
Measured year type should be used instead of forecasted since it is an unimpaired flow analysis.

p.A17
In the 2006 row, the below number can't be higher than above. This is a measurement error and should not be reproduced here. See previous comments on table 2-4.

p.A59
The four columns on the right incorrectly have 122,124 at the bottom.

p.A61

1) April 1 Runoff Forecast column is incorrect. It is a mix of April (most) and May (1995, 2001, 2006) forecasts. We recommend changing it to "Final" instead of April 1 or else show both as separate columns, as well as correcting the numbers to those below:

    May 1996=116
    April 1997=121
    May 1998=133
    April 1999=94
    May 2000=97
    May 2002=82
    May 2003=74
    April (final) 2004=80 (Since 2004 the only year with a May update is 2006).
    April 2006=147

2) The forecast error column incorrectly (and unfairly) compares an unimpaired forecast to a measured inflow. The forecast should be compared to unimpaired runoff. In fact, the presence of the Actual (measured) Runoff column is inappropriate in this table.

3) The two year-type columns should be labeled “Final” and “Measured,” respectively.

p.A63, Appendix A-5

- o Table 4: Unimpaired should be used instead of above – October–November flows could be inflated by the draining of Walker Lake.

- o Table 4: First column shouldn't be labeled "year" but "Runoff Year. Bottom of that column should say "runoff" instead of "water" year and delete "type"

- o Table 4: Caption for the table—should delete "and losses."

- o Table 4: Wet/normal at the bottom should say 3 years instead of 2 (and use median instead of average which excludes that high figure in 1996).

p.A65–67, Appendix A-6
For the following errors in this 2002 memorandum, we suggest listing them in an errata sheet at the front:
p. A65 - middle paragraph, 71% should be 76%.
p. A66 - highest "natural" ramping rates - wrong word, use impaired.
p. A66 - last paragraph, selected 2-day average for Convict as median - actually, median 0.775 is halfway between Convict and Parker.
p. A67 - Error in second to last sentence of second to last paragraph - 0.6 and 0.7 ft per day should be 0.06 and 0.07.

p.A68
Last sentence, 20% outside range of natural—should add "except within a day or two of the peak," based on graph on A72.

p.C5

- o RC channels rewatered since 1995 don't include 1A and should include 3A and 3B. LVC should also include A-1, B-1, and B-2, however no channels were rewatered since 1995. A-2, A-3, and A-4 were maintained open as was the left side channel below County Rd.

- o Description of the 8 Channel opening process (last paragraph) should be consistent that the entrance "evolved" in 2006 as stated in table C-2 (significant work was done on it in August 2006 following that year's peak flow).

p.C19–C20
Caption should say 2008 and 2009 Runoff Years (instead of 09–10)

p.C28
Caption year cut off—is this graph showing RY 2005 (blue dots according to legend) or RY 2006 (red dots)? If the dots all fall within RY 2006, then the legend is incorrect—the blue dots should say Jan–Mar 2007.

p.D39–41
Legend and title are correct at 30–120 but caption says 30–90 cfs and should say 30–120 cfs.

p.D47
Figure D-4.16 caption says SRF flows are held near 44 cfs—this should say "D1631 baseflows" instead of SRF flows, since SRF refers to 98-05 which did not order changes in baseflow.

p.F10
This is the only graph in appendix F with the correct spillway storage—all others should be corrected.

Typographical Errors

Page Numbers	Typographical Error and Correction
4, A2	Saddlebag (not Saddleback) lake
6	principle should be principal
56	Ramping 20% on chart, but text says peak snowmelt recession rates of 10% above 220 cfs. 3/15/10 phone call confirmed this typo "above" should read "below."
59	Not "pre" transition, just "transition"
75	The y-axis labels are cut off
83	A period is needed at the end of the "Premise No.2." paragraph. Also consistent spacing before the number in the underlined paragraph titles.
89, 91	the word "alder" should be removed from the document
95	Table 5-1 should change the last number in the "Rush Creek Unimpaired" column from 100 to 1000
A49	Extreme wet column "Rys" should be "yrs"
C1	Change comma to a period after "(May 1 to September 30)."
D25	Middle of third paragraph, "GLR was near empty in during the summer" should remove the word "in."

V. Bibliography

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