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Volume II

Final
Environmental Impact Report
for the Review of
Mono Basin Water Rights
of the City of Los Angeles

Volume 1

Lead Agency:

California State Water Resources Control Board
Division of Water Rights
901 P Street, 3rd Floor
Sacramento, CA 95814
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2600 V Street, Suite 100
Sacramento, CA 95818-1914
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916/737-3000

September 1994

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Volume 2

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Chapter 1. Introduction

This document is intended to serve as the final environmental impact report (EIR) as required under the California Environmental Quality Act (CEQA) for the review of the Mono Basin Water Rights of the City of Los Angeles. This final EIR consists of the draft EIR, comments on the draft EIR, responses to comments, and errata for incorrect information in the draft EIR. As provided for by law, the draft EIR is not being revised and republished.

PUBLIC REVIEW OF THE DRAFT EIR

On May 28, 1993, a Notice of Availability of a Draft Environmental Impact Report for the review of the Mono Basin Water Rights of the City of Los Angeles was filed with the Secretary for Resources and the draft EIR was distributed to the public.

Copies of the report were provided to 242 individuals and groups, based on a list of parties so requested during and after the public scoping process. Another 41 copies were transmitted to local, state, and federal agencies as required by law. More than 80 copies were provided to public and university libraries. The availability of the draft EIR was publicized in newspapers across the state and announcements were mailed to several hundred parties on a mailing list, which was compiled during and after the scoping process.

A 90-day review period was established, extending from May 28, 1993, to August 30, 1993. Readers of the draft report were asked to submit comments on its adequacy in writing by the close of the review period. Public hearings were not held on the EIR because they would have duplicated the water rights hearings that commenced on October 4, 1993. The first 3 days of the hearing, however, involved a public review of the draft EIR.

COMMENTERS ON THE DRAFT EIR

By the close of the comment period, a total of 4,075 letters had been received by the California State Water Resources Control Board (SWRCB). The letters were of two types. Approximately 4,000 letters contained recommendations to SWRCB concerning choice of alternative and related actions or approaches to the water rights issue. These letters did not comment on the adequacy or accuracy of the draft EIR. These recommendations have been brought to the attention of SWRCB.

A total of 74 letters were identified as containing comments on the accuracy and adequacy of the draft EIR. Some of these letters also contained recommendations. The sources of these letters were:

- water rights permittee (Los Angeles Department of Water and Power [LADWP]),
- two federal agencies,
- four state agencies (in addition to the State Clearinghouse),
- six local and regional agencies,
- 12 environmental organizations and their attorneys,
- seven other organizations, and
- 41 individuals.

These commenters are listed below, along with the number assigned by SWRCB to each commenter's letter.

Water Rights Licensee

Los Angeles Department of Water and Power 1
James F. Wickser, Assistant General Manager - Water
August 27, 1993 - letter
Los Angeles, CA

Federal Agencies

U.S. Fish and Wildlife Service, Ecological Services 2
Craig Faanes, Field Supervisor
August 27, 1993 - letter
Ventura, CA

U.S. Forest Service, Inyo National Forest 3
Dennis W. Martin, Forest Supervisor
August 30, 1993 - letter
Bishop, CA

State Agencies

California Department of Fish and Game 4
John L. Turner, Chief - Environmental Services Division
August 30, 1993 - letter
Sacramento, CA

California Department of Parks and Recreation 5
Donald W. Murphy, Director
August 25, 1993 - letter
Sacramento, CA

California Department of Water Resources 6
Robert G. Potter, Chief Deputy Director
August 26, 1993 - letter
Sacramento, CA

California Governor's Office of Planning and Research 7
Christine Kinne, Deputy Director, Permit Assistance
August 25, 1993 - letter
Sacramento, CA

State Lands Commission 8
Mary Griggs, Environmental Review Section - Division of Environmental Planning and Management
August 30, 1993 - letter and two attachments (includes comments from Scott Stine, Ph.D.)
November 9, 1993 - letter of clarification
Sacramento, CA

Local and Regional Agencies

California Regional Water Quality Control Board, Lahontan Region 9
Harold Singer, Executive Officer
August 30, 1993 - letter and three attachments
South Lake Tahoe, CA

City of Cerritos 10
Ann Joynt, Mayor Pro Tem
August 26, 1993 - letter
Cerritos, CA

County of Mono, Board of Supervisors 11
Andrea Lawrence, Supervisor, District 5
August 26, 1993 - letter
Mammoth Lakes, CA

County of Mono, Planning Department 12
Scott Burns, Planning Director
August 30, 1993 - letter
Bridgeport, CA

Great Basin Unified Air Pollution Control District 13
Ellen Hardebeck, Control Officer
August 24, 1993 - letter and two attachments
Bishop, CA

Metropolitan Water District of Southern California 14
Duane L. Georgeson, Assistant General Manager
August 27, 1993 - letter and one attachment
September 17, 1993 - letter of clarification
Los Angeles, CA

Environmental Organizations

California Native Plant Society, Bristlecone Chapter 15
Carla R. Scheidlinger, Conservation Co-Chair
August 27, 1993 - letter
Bishop, CA

California Trout 16
Jim Edmondson, Vice President
August 30, 1993 - letter and six attachments
San Francisco, CA

Defenders of Wildlife 17
Richard Spotts, California Representative
August 23, 1993 - letter
Sacramento, CA

Desert Fishes Council 18
Edwin P. Pister, Executive Secretary
August 22, 1993 - letter
Bishop, CA

Environmental Defense Fund 19
Thomas J. Graff, Senior Attorney
August 27, 1993 - letter
Oakland, CA

Mono Lake Foundation 20
David Marquart, President
August 26, 1993 - letter
Lee Vining, CA

Morrison & Foerster, Counsel for the National Audubon Society and the Mono Lake Committee 21
F. Bruce Dodge, Patrick J. Flinn, and Bryan J. Wilson, Attorneys
August 30, 1993 - letter
Palo Alto, CA

Natural Heritage Institute, Counsel for California Trout 22
Richard Roos-Collins, Cynthia Koehler, and Michelle Schwartz, Attorneys
August 27, 1993 - letter and four attachments
San Francisco, CA

Natural Resources Defense Council 23
Everett DeLano, Staff Attorney, NRDC Urban Program, and
Hamilton Candee, Senior Staff Attorney, NRDC Western Water Project
August 30, 1993 - letter
San Francisco, CA

Sierra Club Legal Defense Fund 24
Laurens H. Silver, Counsel
August 27, 1993 - letter and one attachment
San Francisco, CA

The Desert Protective Council, Inc. 25
Douglas W. Allen, President
August 22, 1993 - letter
Valley Center, CA

Western Hemisphere Shorebird Reserve Network 26
Julie M. Sibbing, Program Manager
August 17, 1993 - letter
Manomet, MA

Other Groups

Committee to Save Crowley Lake 27
Randy Witters, President
August 24, 1993 - letter
Crowley Lake, CA

Haselton Associates, representing John Arcularius 28
Frank L. Haselton, Principal (and signed by other ranching interests)
August 25, 1993 - letter
Anaheim, CA

Inaja Land Company, Ltd. 29
Millard G. Reed, President
August 30 and September 8, 1993 - letters
Reno, NV

League of Women Voters of California 30
Marilyn Hempel, Natural Resources Director
August 23, 1993 - letter
Claremont, CA

Mono Lake Indian Community 31
William J. Andrews, Chairman
August 19, 1993 - letter
Lee Vining, CA

Trihey & Associates, representing the Planning Team of the Restoration Technical Committee 32
E. Woody Trihey, P.E.
August 30, 1993 - letter
Concord, CA

Yosemite Park and Curry Co. 33
Edward C. Hardy, President
August 18, 1993 - letter
Yosemite National Park, CA

Individuals

Except for the last three, individuals on this list are given in alphabetical order.

Mark Bagley 34
August 30, 1993 - letter
Bishop, CA

Dan Bean, Ph.D. 35
August 26, 1993 - letter
Chapel Hill, NC

Laurie, Jack, and Chris Trefry 69
August 26, 1993 - letter
June Lake, CA

Elden H. Vestal 70
August 7, 1993 - letter
Napa, CA

Peter Vorster 71
August 30, 1993 - letter
Oakland, CA

Walt Anderson 72
August 16, 1993 - letter
Prescott Valley, AZ

Howard C. Arcularius 73
August 29, 1993 - letter
Bishop, CA

Catherine A. Toft 74
August 13, 1993 - letter
Davis, CA

EVALUATION OF COMMENTS

Identifying Major Issues

All EIR comment letters received were read by SWRCB staff and consultants. Individual comments were identified and enumerated within each letter, and each comment was assigned to a resource topic or legal issue. Specialists read all comments on topics for which they were responsible and, by grouping the comments, formulated statements of the 88 major issues that had been raised. Each major issue was carefully analyzed. These major issues are listed in Table 1-1 and are summarized and responded to in Chapter 4. Although recurrence of an issue was considered grounds for considering the issue "major", a single comment sometimes raised a major issue.

Responding to Other Issues

Some comments were not considered major and were responded to individually. These miscellaneous responses appear in Chapter 5 following reproductions of the comment letters. Still other comments were determined not to require a response, primarily if they were recommendations, opinions, or advice, but also for other reasons noted below.

Coding of Comments and Responses

Comment Enumeration

To facilitate the response effort, codes to track individual comments, and responses to them, were written in the left and right margins of each comment letter.

The comment enumeration code consists of two parts: the first number, shown on the upper right-hand corner of each page, is the comment letter number and the second number, shown in the left margin of the letters, is the particular comment, usually in the order that it appears. In some cases, however, a comment is introduced and then explained more fully later in the letter. In these cases, the same comment number is used and "(cont)" indicates this situation.

Response Codes

The response codes, given in the right margin of the letters, are interpreted in Table 1-1. As shown in the table, some codes indicate major legal issues. Other major issues are organized by resource topic area, employing the same topic lettering system used in the draft EIR. Miscellaneous comments needing an individual response are coded with an asterisk following the topic letter.

Certain comments require special responses. These are given "Y" and "Z" response codes. The Y responses are useful to:

- acknowledge a recommendation or opinion,
- accept a factual correction,
- refer the commenter to a discussion in the draft EIR that already answers the comment,
- identify a request for information that is not germane to the SWRCB's decision, or
- identify a comment that was not understood.

The Z response code indicates a rhetorical comment.

In many cases, more than one response code appears in the right margin, indicating that the comment is responded to in more than one way.

CONTENT AND ORGANIZATION OF FINAL EIR

This two-volume final EIR consists of responses to comments on the draft EIR and presents a revised version of one of the environmentally superior alternatives. This alternative was addressed in detail in the draft EIR. The modifications are intended primarily to mitigate adverse effects related to loss of Mono Basin exports.

Each chapter is dedicated to this approach as follows:

Volume 1

- Chapter 2 is a summary of the proposed project, project objectives, and project alternatives considered in the draft EIR.
- Chapter 3 is a summary of major conclusion drawn from the environmental analyses. It was developed from summary tables that appeared in the draft EIR, as modified by pertinent information submitted in the comment process.
- Chapter 4 contains a discussion of the major issues raised during the review process and SWRCB's response to those issues.
- Chapter 5 is a presentation and discussion of the Modified 6,390-Ft Alternative.

Volume 2

- Chapter 6 contains copies of all letters commenting on the draft EIR with response codes shown in the margins; it also presents responses to the miscellaneous comments not considered in Chapter 4.
- Chapter 7 is the errata to the draft EIR, based on the foregoing comments and responses.
- Chapter 8 is a list of preparers of the final EIR.
- Chapter 9 is a bibliography of printed references and personal communications cited in the report.

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Chapter 2. Proposed Project and Project Alternatives

PROPOSED PROJECT AND PROJECT OBJECTIVES

The proposed project evaluated in this EIR consists of:

- the establishment and maintenance of instream flow requirements in the Mono Lake tributaries from which the City of Los Angeles diverts water; the instream flow requirements will be established in compliance with California Fish and Game Code Sections 5937 and 5946 and a court mandate to release sufficient water to reestablish and maintain fisheries that existed in these streams prior to the city's diversions; and

- the establishment and maintenance of water elevation requirements in Mono Lake to provide appropriate protection for public trust resources and beneficial uses of Mono Lake.

SWRCB will incorporate the appropriate instream flow requirements, lake-level requirements, and mitigation measures into the City of Los Angeles' water rights licenses for diversions from Mono Basin.

PROJECT ALTERNATIVES

This EIR evaluates the full range of water rights alternatives, each of which represents a lake level target and projected volume of water export based on assumed stream diversion rules. The alternatives range from imposing no new restrictions on diversion to ending all diversions. The definition of alternatives is based primarily on differing lake levels rather than on the quantity of water needed to provide instream fishery flows. Whatever fishery flows are eventually determined by the SWRCB to be appropriate will be associated with some net quantity of inflow to Mono Lake and a corresponding lake level. The range of alternatives defined in the EIR is sufficiently broad to cover any potential level of inflow that would result from those fishery flows.

Seven alternatives have been defined. The No-Restriction and No-Diversion Alternatives define the full range of possibilities, but the No-Restriction Alternative cannot meet the project objectives. Five intermediate alternatives have been formulated that can meet project objectives to varying degrees. Lake-level, water-export, and streamflow regimes that would result under each alternative were simulated for the EIR using the Los Angeles Aqueduct Monthly Planning (LAAMP) model developed by SWRCB consultants. Version 2.0 of LAAMP was used for the data presented and used in the draft EIR. In response to several comments raised during the review period (see the responses to Comments A1 and A2 in Chapter 4A), Version 3.3 of LAAMP was developed and applied to some of the alternatives. The results of the two versions are similar and validate the assumptions used in the draft EIR (see response to Major Issue A1 in Chapter 4). Data from LAAMP 2.0 runs and revised drought scenarios (see response to Major Issue A5) are used in the following alternatives characterization:

- No-Restriction (No-Project) Alternative - No new restrictions would be placed on the diversions of water by the city under its water rights licenses; minimum streamflows and lake levels would not be required. The lake surface would be expected to gradually fall to an average elevation of about 6,355 feet and fluctuate about 21 feet, depending on actual runoff. Approximately 85 thousand acre-feet per year (TAF/yr) (73%) would be exported from Mono Basin and 32 TAF/yr (27%) would be released to Mono Lake from the four streams, on average.

- 6,372-Ft Alternative - This target elevation corresponds to the lowest lake level that the lake has reached in historical time, occurring at the end of 1981 after 40 years of streamflow diversions. The lake surface would normally fluctuate about 6.5 feet in elevation, depending on actual runoff, and would have an average elevation of 6,375 feet. Occasionally, the lake surface would rise as high as about 6,379 feet. During extreme drought, the lake surface might fall as low as about 6,370.6 feet. Approximately 64 TAF/yr (51%) would be exported from Mono Basin and 61 TAF/yr (49%) would be released to Mono Lake, on average.

- 6,377-Ft Alternative - This target elevation corresponds to that level beneath which no diversions are currently allowed under the court's preliminary injunction. It is the interim minimum target lake level, intended to maintain the status quo until action can be taken by SWRCB. The lake surface would normally fluctuate about 6.5 feet in elevation, depending on actual runoff, and would rise to an average elevation of 6,379 feet. Occasionally, the lake surface would rise as high as about 6,383 feet. During extreme drought, the lake surface might fall as low as about 6,373 feet. Approximately 52 TAF/yr (41%) would be exported from Mono Basin and 74 TAF/yr (59%) would be released to Mono Lake, on average.

- 6,383.5-Ft Alternative - This target elevation corresponds to the midpoint of the range of lake levels (6,390-6,377 feet) recommended by the USFS in its management plan for the Mono Basin National Forest Scenic Area. The lake surface would normally fluctuate about 6 feet in elevation, depending on actual runoff, and would eventually rise to an average elevation of 6,385.7 feet after 5-10 years. Occasionally, the lake surface would rise as high as about 6,389 feet. During extreme drought, the lake surface might fall as low as about 6,377 feet. Approximately 44 TAF/yr (35%) would be exported from Mono Basin and 82 TAF/yr (65%) would be released to Mono Lake, on average.

- 6,390-Ft Alternative - This target elevation corresponds to the upper lake level recommended in the U.S. Forest Service (USFS) management plan. The lake surface would normally fluctuate about 6 feet in elevation and would eventually reach an average elevation of 6,391.6 feet. Occasionally, the lake surface would rise as high as 6,395 feet and, during extreme drought, fall as low as 6,382 feet. After equilibrium was attained, exports would be approximately 37 TAF/yr (29%) and lake releases would be 89 TAF/yr (71%).

- 6,410-Ft Alternative - This target elevation corresponds to an intermediate elevation between the 6,390-Ft Alternative and the No-Diversion Alternative, providing an alternative that could reflect substantial streamflows if required by SWRCB to protect public trust resources. The lake surface would normally fluctuate about 7 feet in elevation, depending on actual runoff, and would eventually reach an average elevation of 6,410.8 feet in about 80 years. Occasionally, the lake surface would rise as high as 6,415 feet and, during extreme drought, fall as low as 6,398-6,399 feet. After equilibrium was attained, exports would be approximately 22 TAF/yr (17%) and lake releases would be 104 TAF/yr (83%).

- No-Diversion Alternative - Diversions of the four tributary streams would be entirely curtailed. Streamflow and lake level would be determined by natural weather events and patterns, and the lake surface would rise toward or beyond the prediversion level. After a transition period of more than 100 years, the lake surface would eventually reach an estimated average elevation of about 6,425 to 6,430 feet and would normally fluctuate about 10 feet in elevation thereafter, depending on actual runoff. No water would be exported from Mono Basin.

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Chapter 3. Summary of Major Conclusions

MAJOR CONCLUSIONS BY TOPIC AREA

Effects on Fisheries

The California Court of Appeals directed SWRCB to amend the City of Los Angeles' water right licenses to require the city to release sufficient water into the diverted tributary streams from its dams to reestablish and maintain the fisheries that existed in them prior to its diversion of water.

None of the alternatives can restore and maintain pre-1941 fishery conditions within less than 50 years and these conditions may never be fully restored. Major geomorphic alterations are simply too great to allow restoration of the complex habitat functions present in lower Rush and Lee Vining Creeks in the pre-1941 period. Successful restoration efforts now will require proper instream flows while channel, riparian, and instream habitat conditions are stabilized and restored. The most extensive information on the amount of fishery habitat available at different levels of flow is presented in the California Department of Fish and Game Stream Evaluation Reports. The information in those reports and other evidence presented at the water right hearing provide sufficient basis for establishing instream flows for restoration and maintenance of fisheries similar to that which existed in 1940.

Other Major Conclusions

Other major conclusions can be summarized as follows.

Water Quality

- None of the alternatives would cause a significant reduction in the quality of water delivered to the Los Angeles Aqueduct.
- None of the alternatives would result in a significant increase in nutrient levels in the Upper Owens River or in Lake Crowley reservoir.

- Mono Lake qualifies for designation as an Outstanding National Resource Water by SWRCB or the Lahontan Regional Water Quality Control Board, pursuant to the federal Clean Water Act. Designation of Mono Lake as an Outstanding National Resource Water would require maintenance of lake levels of approximately 6,379 feet.

Tributary Riparian Vegetation

- Geomorphic changes resulting from past streamflow diversions by the City of Los Angeles have caused an irreversible loss of riparian habitat.

- The 6,383- and 6,390-Ft Alternatives would result in no further significant adverse impacts.

- Lower lake-level alternatives would involve significantly reduced potential for the high seasonal streamflows needed for vegetation recovery, and the 6,372-Ft and lower lake-level alternatives would likely cause significant channel erosion from channel incision during spills.

- The 6,410-Ft and higher lake-level alternatives would also cause channel erosion and would inhibit recovery of the degraded aquatic/riparian habitats because of the frequent high snowmelt flows.

- Throughout the range of most of the alternatives, the vegetation growth effects of higher water tables from higher streamflows under the higher lake-level alternatives would be offset by the acreage inundated by the rising lake.

- None of the alternatives would fully restore the riparian vegetation that existed during the prediversion period. Riparian restoration efforts can restore a major portion of the losses.

Lake-Fringing Vegetation and Aquatic Habitats

- The acreage of existing vegetated wetlands that have developed on the relicted lands would be significantly reduced under the 6,383-Ft and higher lake-level alternatives, particularly under the 6,410-Ft and higher lake-level alternatives. Nonetheless, only under the No-Restriction Alternative would wetland acreage be less than existed in the prediversion period.

- Freshwater and brackish water lagoons around the lake, now a small fraction of their prediversion amount, would begin to increase in number and acreage with the 6,383-Ft Alternative and would increase to the prediversion amount at lake levels of about 6,400 feet, or above those of the 6,390-Ft Alternative.

- The conversion of more than 5,000 acres of productive aquatic habitat (see "Aquatic Productivity") to exposed alkali lakebed during the diversion period can be reversed by 90% under the 6,383-Ft Alternative and almost completely under the higher lake-level alternatives. (Under the highest levels, the complete loss of alkali lakebeds might have an adverse affect on snowy plover nesting; see "Wildlife".)

Upper Owens River Vegetation

- The relative instability of the Upper Owens River channel would significantly worsen only under the No-Restriction Alternative; restoration of prediversion stability could be accomplished under the 6,410-Ft or higher lake-level alternatives or under other alternatives if a better flow-change ramping schedule were adopted.

- The extent of marsh and meadow would diminish significantly only under the No-Diversion Alternative.

- Both flow augmentation and livestock grazing have probably reduced the extent of woody riparian habitat (willows); the reduction would be maintained under all alternatives except the 6,410-Ft and higher lake levels, but could be eliminated by habitat restoration and control of livestock access.

- Willow growth rates would be slightly suppressed under alternatives with either large exports or no exports, but that effect is not biologically significant.

Aquatic Resources of the Tributary Streams

- All the alternatives except the No-Restriction Alternative would increase fish habitat over the point-of-reference conditions, but none of the alternatives would approach the prediversion conditions without stream and riparian habitat restoration efforts. Predicted increases in brown trout habitat from the point of reference are of similar size but increase with lake levels ranging from the 6,372-Ft Alternative to the No-Diversion Alternative.

- Benefits of increasing physical habitat because of higher average streamflows would be countered by impact on the fishery caused by peak streamflows, which could recur up to 10% of the years under the 6,410-Ft and No-Diversion Alternatives.

Aquatic Resources of the Upper Owens River

- The 6,377-Ft and higher lake-level alternatives would result in increasingly significant losses of trout habitat because of the reduced Mono Basin exports.
- Because of reduced flow augmentation, the 6,383-Ft and higher lake-level alternatives would also entail significantly higher stream temperatures and greater effects from water quality degradation below Hot Creek.
- Effects on aquatic resources are partially or substantially mitigable depending on Grant Lake reservoir operations and ramping rate criteria.

Aquatic Resources of Grant Lake and Lake Crowley Reservoirs and Middle Owens River

- No significant impacts or benefits would occur to fisheries in these water bodies under any alternative (except for Grant Lake reservoir under the No-Diversion Alternative, where the fishery would be enhanced if the reservoir were always kept full).

Mono Lake Aquatic Productivity

- Total brine shrimp production is primarily a function of salinity and lake surface area, both dependent on lake level. A significant reduction in brine shrimp production from the point-of-reference would occur under only the 6,372-Ft and lower lake-level alternatives. Brine shrimp production under prediversion conditions was not estimated, but, under the 6,377-Ft and 6,383-Ft Alternatives, production would be significantly lower than production under the 6,390-Ft Alternative and would probably also be lower than production during the prediversion period.
- Total alkali fly production depends primarily on salinity and on the amount of hard substrate for pupae attachment in the lake's littoral zone. Production is at a maximum for lake levels between 6,385 feet and 6,391 feet. A significant reduction in alkali fly production from the point-of-reference would occur only under the No-Restriction Alternative.
- Alkali fly production under prediversion conditions is uncertain, and therefore effects of the highest lake-level alternatives (6,410-Ft and higher) cannot be reliably predicted (and the relationship of predicted conditions under all alternatives to the prediversion condition cannot be described with certainty).

Wildlife

- Gull nesting capacity at Mono Lake's islands, which is dependent on physical conditions, biological requirements, and the effects of predation during land-bridging, diminished an estimated 60% during the diversion period. Under the 6,372-Ft and lower lake-level alternatives, capacity would decrease significantly. Under the 6,377-Ft Alternative, capacity would generally be well above the prediversion level, except that significant predation would continue to occur at Negit Island and possibly the Negit Islets during drought periods. Under the 6,383-Ft and 6,390-Ft Alternatives, capacity would also be substantially higher than under the prediversion level, and, for even higher alternatives, capacity would be similar to the prediversion conditions.

- A significant reduction in invertebrate food for water birds using Mono Lake, reflected in a restricted phalarope foraging area, would probably occur under the 6,372-Ft and lower lake-level alternatives. Under the 6,377-Ft Alternative, reductions might occur only during drought periods.

- Migratory duck populations decreased substantially during the diversion period but would decrease further only under the No-Restriction Alternative. Duck habitat would increase under the 6,383-Ft Alternative and would gradually increase further under higher lake-level alternatives, essentially reaching prediversion levels under the 6,410-Ft and higher lake-level alternatives (see "Lake-Fringing Vegetation and Aquatic Habitats", "Lagoons", above).

- Potential habitat for the snowy plover, a candidate for listing as an endangered species, may have been relatively low during the prediversion period, but its historical status is unknown. The species now nests at Mono Lake, and habitat acreage is presently large because the plover utilizes exposed alkali lakebeds and a variety of other barren habitats. Habitat losses would constrain the present population significantly under the No-Restriction Alternative and also under the highest lake-level alternatives (6,410-Ft and higher); surplus habitat is available under the intermediate lake-level alternatives.

- Wildlife values of Mono Lake shoreline habitats would significantly diminish under both the No-Restriction Alternative and lake levels corresponding to the 6,390-Ft and higher lake-level alternatives due to inundation of vegetated wetlands (see "Lake-Fringing Vegetation and Aquatic Habitats", "Vegetated Wetlands"). However, this loss would probably be compensated by the creation of new freshwater, high-value habitats around the lakeshore as lake level rose.

- None of the alternatives would fully restore the wildlife habitat value along the tributary streams compared to the prediversion period, although a portion of the riparian habitat could be restored in conjunction with stream restoration habitat for fisheries (see "Tributary Riparian Vegetation" above).

Land Use

- Grazing on LADWP lands in Mono Basin was reduced by about 50% during the diversion period and may be further reduced with new limitations on water diversion.

- Reductions in grazing under all but the No-Restriction Alternative would potentially result in some disposal of land by LADWP; under the No-Diversion Alternative, land disposal would be certain and development by some purchasers could be extensive.

Air Quality

- Extensive salt deposits have formed on portions of the lakebed exposed by lake-level lowering during the diversion period; these salt deposits are prone to episodes of significant wind erosion, resulting in periodic dust storms that cause significant violations of state and federal standards for suspended particulate matter (PM10).

- Measured PM10 concentrations have exceeded the federal standard by more than a factor of three and have exceeded the state standard by a factor of nearly 10. Most violations of the state and federal PM10 standards have been recorded in the sparsely populated areas north and east of Mono Lake.

- Using an appropriate air quality model with data and assumptions developed for Mono Basin, one can predict that federal PM10 standards would be met at all major public use areas and monitoring stations at average lake levels of the 6,390-Ft or higher lake-level alternatives once dynamic equilibrium was reached. The more stringent state PM10 standards would be met most of the time, but a few limited violations might still occur (1-2 events per average year).

- Under the 6,383-Ft Alternative, the severity and extent of dust storms would decrease significantly from the point of reference, and the frequency of such events would decrease modestly. Modeling procedures indicate that PM10 concentrations exceeding the federal threshold would be expected to occur more often than once per year (the federal standard). Occasional violations of the more stringent state PM10 threshold would be expected (more than 1-2, but fewer than 10, events per average year).

- Under the 6,377-Ft and lower lake-level alternatives, 10-15 or more dust storms per average year would occur with PM10 concentrations exceeding state and federal standards over extensive areas.

Visual Resources

- Restoring the lake levels to the 6,383-Ft or higher lake-level alternatives would diminish the tufa resource at Mono Lake. Under the 6,383-Ft and higher lake-level alternatives, sand tufa formations (less well-known than the other tufa formations) would be destroyed (Stine pers. comm.) (applicability to the 6,383-Ft Alternative was erroneously omitted from the draft EIR). At lake levels corresponding to or above the 6,390-Ft Alternative, significant toppling of tufa towers from wave action and significant inundation of other tufa formations would occur, increasing in magnitude with lake level.

- Under the 6,372-Ft and lower lake-level alternatives, the number of gulls nesting at the lake would be diminished and foraging phalaropes would be largely restricted to the remote east side of the lake where most visitors would not be able to view them.

- Under the 6,383-Ft and higher lake-level alternatives, seasonal reservoir drawdown at Lake Crowley reservoir during wet years would substantially increase (from 4 feet to 7-9 feet), exposing a larger barren zone around the shoreline.

Recreation Opportunity and Use

- Recreation opportunity at Mono Lake itself would decline significantly under the 6,410-Ft and higher lake-level alternatives because of the loss of visible tufa. A significant reduction in recreation use of Mono Lake and the tributary streams would occur under the No-Diversion Alternative. Use would increase the most for the 6,383-Ft Alternative: an estimated 6% for Mono Lake and 60% for the tributary streams.

- The shoreline of Mono Lake would significantly recede from developed access points under the 6,372-Ft and lower lake-level alternatives, but accessibility could be regained by extending access roads and developing new parking and sanitary facilities.

- For lake levels corresponding to the 6,377-Ft Alternative and higher lake-level alternatives, the upper Grant Lake reservoir, Grant Lake boat ramp, and the Lake Crowley reservoir waterski course would become inaccessible or unusable significantly more frequently (for the latter, the effect would also occur under the 6,372-Ft Alternative), but these effects could be mitigated through facilities reconstruction or adopting specific lake operation rules.

- Use of Grant Lake and Lake Crowley reservoirs would be somewhat reduced under most alternatives, but a significant reduction (12%) in use would occur only at Lake Crowley reservoir under the 6,410-Ft and higher lake-level alternatives.

- Because of reduced habitat and higher stream temperatures attributable to reduced flow augmentation, fishing opportunities along the Upper Owens River between Hot Creek and Lake Crowley reservoir would decline significantly under the 6,383-Ft and higher lake-level alternatives. Impacts could be lessened by scheduling exports from Mono Basin to increase uniformity of flows in the Upper Owens River.

Cultural Resources

- The highest lake-level alternatives (6,410-Ft or higher) would inundate at least two known cultural resource sites, and unknown sites around the lake above the prediversion lake level could be periodically inundated under the No-Diversion Alternative. Information of value from these sites could be recovered prior to inundation, however, if surveys are undertaken.

- Native American activity sites are thought to be widespread along the diverted tributary streams, and some of them are likely to be disturbed under any alternative through recreation activity, stream restoration activity, or channel erosion. A cultural resources treatment plan could be developed to avoid or minimize such impacts under all alternatives.

Los Angeles Water Supply

- Under all alternatives except the No-Restriction Alternative, water supply for the City of Los Angeles would decrease; this decrease would be significant for the 6,383-Ft and higher lake-level alternatives because of the estimated replacement cost (15-25% increase in the cost of its total water supply). The city would also have a supply shortfall of about 4% in an average of 1 additional year over a 20-year period.

- Potential cost increases could be mitigated if the city develops additional water reclamation projects using Assembly Bill (AB) 444 funds, pursues water transfers from agricultural users as provided by House of Representatives (HR) Bill 429, develops reclaimed water with Congressional funding under HR 429 or other funding sources, participates fully in Metropolitan Water District (MWD) rebate programs, continues to develop demand-side reductions, pursues recycling and reclamation programs, and increases conservation of local runoff.

Los Angeles Power Supply

- Most of the alternatives would result in a slight decrease in power generated by the City of Los Angeles' aqueduct hydroelectric power plants, resulting in higher fuel costs for replacement power. The maximum estimated cost increase (for the No-Diversion Alternative) is 1.2% annually, which is considered less than significant.

Economic Cost/Benefit

- An assessment of economic costs and benefits, considering the replacement cost of water supply and power generation and the public's estimated willingness to pay for recreation opportunities and preservation of the Mono Lake ecosystem, indicates positive net economic benefits compared to the point of reference for the mid-lake-level alternatives (6,377-Ft, 6,383-Ft, and 6,390-Ft Alternatives), with the higher lake-level alternatives within this range having the larger benefits.

- Higher lake-level alternatives (6,410-Ft and higher) would have negative net economic benefits because the estimated recreation and Mono Lake preservation benefits are substantially outweighed by the water supply and power generation replacement costs.

- The public's willingness to pay for improving the Mono Lake ecosystem is highest for the 6,390-Ft Alternative, more than twice the estimated cost for replacing lost water and power supplies for the City of Los Angeles.

- A substantial public value is associated with avoiding lake-level declines below the point-of-reference, as indicated by expressions of willingness to pay.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Identification of the environmentally superior alternative is required by CEQA. This identification does not entail a balancing of the public trust values with water needs for other purposes; it only distinguishes which alternative would be superior in terms of impacts on the physical environment. The physical environment includes "land, water, atmospheric conditions, aquatic ecosystems, plant and wildlife communities, and objects of historical and aesthetic significance".

Environmentally Superior Alternative Relative to the Point of Reference

The draft EIR identified the 6,383-Ft Alternative as the environmentally superior alternative with respect to avoiding adverse changes in the physical environment present under point-of-reference conditions. However, additional information available following completion of the draft EIR established that the adverse impacts on sand tufa that were identified for the 6,390-Ft Alternative would also occur at the upper end of lake levels under the 6,383-Ft Alternative. The draft EIR also assumed that the DFG flow recommendations would be satisfied at the 6,383-Ft Alternative, but additional evidence presented at the water right hearing established that this is not the case. Finally, since the preparation of the draft EIR, the U.S. Environmental Protection Agency designated Mono Basin as a moderate nonattainment area for the federal PM10 air quality standard. Compliance with the federal air quality standard would require an average lake level of approximately 6,391.6 feet.

The Water Quality Control Plan for the South Lahontan Basin (which includes Mono Lake) was adopted by the California Regional Water Quality Control Board, Lahontan Region, and approved by the SWRCB in 1975. The water quality objective for salinity set by the 1975 plan is 76 g/l. The beneficial use designations and water quality objectives set by the 1975 plan have been approved by the U.S. Environmental Protection Agency as water quality standards for Mono Lake. The water quality objective of 76 g/l is considerably below the present salinity of Mono Lake and would correspond to a lake level of approximately 6,386 feet.

Therefore, of the alternatives evaluated in the draft EIR, the 6,390-Ft Alternative is now considered to be the environmentally superior alternative relative to the point of reference.

Environmentally Superior Alternative Relative to Prediversion Conditions

Considering the potential to restore public trust uses by evaluating alternatives relative to prediversion conditions, the 6,390-Ft Alternative also appears to be environmentally superior. It would offer substantially less lake-fringing aquatic habitats to migrating ducks than the higher 6,410-Ft Alternative, although habitat restoration could compensate for a portion of the lost waterfowl habitat. Additionally, the 6,410-Ft Alternative would nearly eliminate the public use of South Tufa Grove, which has the highest public use of all the lakeshore visitor sites.

Of the lower lake level alternatives, the 6,383-Ft Alternative would entail continued occurrence of dust storms that violate federal air quality standards and a reduction in brine shrimp productivity. The losses of lake-fringing aquatic habitats would be greater than for the 6,390-Ft Alternative. Under even lower lake levels, these effects would be more intense and additional impacts would occur.

The 6,390-Ft Alternative would result in flows closer to DFG's recommendations. Adoption of the 6,390-Ft Alternative would be consistent with the Mono Basin management regime recommended by the U.S. Forest Service, the Department of Parks and Recreation, and the State Lands Commission at the water right hearing. Additionally, the Great Basin Unified Air Pollution Control District also recommended at the water right hearing that the 6,390-Ft Alternative would provide reasonable assurance for compliance with federal air quality standards for PM10. Adoption of the 6,390-Ft Alternative would better restore and maintain public trust resources and be more consistent with applicable air and water quality standards.

MITIGATION MEASURES

Most of the significant impacts identified in Table 3-1 are not significant adverse changes in the existing physical environment that would result from adopting the 6,390-Ft Alternative. The impacts, which are discussed in the draft EIR as cumulative impacts, represent changes relative to prediversion conditions that the SWRCB will consider in determining what requirements should be adopted to restore and maintain public trust uses. For the significant impacts that are identified for the 6,390-Ft Alternative, potential mitigation measures are identified in Table 3-1.

Because SWRCB is considering adoption of a modified 6,390-Ft Alternative, impacts applicable to the 6,390-Ft Alternative are indicated in the table by asterisks. SWRCB will develop a specific mitigation plan for its selected alternative based on this information and information in Chapter 5, "Modified 6,390-Ft Alternative".

List of Acros

List of Refs

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Chapter 4. Major Issues and SWRCB Responses

INTRODUCTION

Many major legal and technical issues were raised during the review period. As noted in Chapter 1, 88 major issues were identified. In this chapter, each major issue is stated, a summary of the comments is presented, and SWRCB's response is given. In most cases, the analyses in the draft EIR were not successfully challenged during the comment period and the conclusions remain unchanged. In the few instances where the appropriate response requires some revision to the analysis in the draft EIR, the requisite changes are described in the major issue responses in this chapter and added to the errata in Chapter 7.

LEGAL ISSUES (X)

X1. Points of Reference Are Not Appropriate or the Project Is Improperly Defined

Summary of Comments

Comments about project definition and appropriate points of reference addressed several issues, questioning whether:

- the proposed project is the review and amendment of water rights licenses or the diversion of water, and therefore whether SWRCB or LADWP is the project proponent responsible for mitigation;
- the prediversion period or 1989 is the proper point of reference for assessing project impacts, especially considering that impacts on public trust values are being assessed;
- the 1989 conditions used in the analysis accurately represented typical conditions at that time and the use of both actual 1989 conditions and the point-of-reference scenario distorts impacts;

- the nonsustainability of point-of-reference conditions (diversion rate and lake level) distorts impact assessment; and

- the prediversion reference for cumulative impacts requires that past impacts be mitigated under CEQA.

Project Definition. Rather than consider it a license revision, some commenters characterize the project as the diversion of water. They base this characterization on the fact that diversions have been suspended, no vested rights to continued diversions exist, and prior diversions were unlawful in failing to protect public trust resources from needless harm. This view leads to the need for only a prediversion point of reference, as discussed below, and suggests that LADWP rather than SWRCB is the project proponent and is ultimately responsible for needed mitigation.

Point of Reference for Project Impacts. Considerable disagreement was expressed about the appropriateness of each of two points of reference used in the EIR.

LADWP believes that a cumulative impact analysis is not required because the purpose of the project is to reduce impacts on public trust values and the environment. This view holds that project effects cannot possibly compound impacts of past actions, thus a cumulative impact cannot possibly occur. This perspective obviates the prediversion point of reference.

Other commenters argue that because the objective of this particular project includes license modification to protect public trust values that may have been affected by the past diversions, only the prediversion frame of reference is valid for any meaningful impact assessment.

Other commenters consider the 1989 date for a point of reference as meaningless: an arbitrary point in a series of court-required injunctions. Some commenters noted that the court-mandated stream restoration program has already modified some of 1989 conditions.

Several commenters contend that the use of the 1989 point of reference distorts impacts. They note, for example, that the EIR considers high lake-level alternatives to have project impacts on the Upper Owens River fishery and argue that these effect are actually cumulative impacts of a degraded channel system. In general, they also hold that use of the 1989 point of reference allows some alternatives to be considered as having beneficial effects that would actually continue to promote degraded conditions.

Another view, expressed by DFG, is that use of either prediversion or 1989 as the point of reference unlawfully accepts fisheries degradation caused by prediversion irrigators as the baseline condition for assessing and mitigating impacts. This implies the need for a prehistorical point of reference.

Representativeness of 1989 Conditions. Some commenters hold that the point-of-reference scenario, rather than resource conditions in August 1989, should have been used in all topic areas to more accurately characterize point-of-reference conditions. They believe that the actual conditions in 1989, especially because a prolonged drought was occurring, do not accurately represent the typical point-of-reference condition. Others, however, faulted the EIR for using post-1989 resource data to help characterize point-of-reference conditions.

Some commenters accepted the precise date of the point of reference but pointed out that at that time no water was being exported from Mono Basin as a result of a court injunction. They go on to note that this "incorrect" point-of-reference characterization leads to the "erroneous" conclusion that most of alternatives result in diminished water supply to the City of Los Angeles.

Nonsustainability of Point-of-Reference Conditions. Commenters point out the point-of-reference resource conditions were not sustainable, given the point-of-reference streamflow requirements. In particular, the lake level used to characterize the point of reference would fall substantially if point-of-reference streamflow requirements remained in effect. Thus, they contend, the draft EIR found most alternatives to have adverse effects on water supply but not any corresponding beneficial ecological effects from preventing lake level lowering.

Implications for Mitigation Requirements. Some commenters believed that the EIR's discussion of the means to mitigate significant cumulative impacts is irrelevant. They hold that, even if the prediversion conditions are the appropriate baseline for assessing cumulative impacts, CEQA confers no authority for requiring mitigation of past projects contributing to a significant cumulative impact of the proposed project. LADWP also contends that the SWRCB lacks authority to require LADWP to mitigate any significant adverse environment impacts resulting from amendment of LADWP's water rights licenses because these impacts are the result of the SWRCB's amendment of the licenses and not the result of LADWP's diversions.

Response

The ongoing debate about an appropriate point of reference first surfaced in the responses to the Notice of Preparation for this project. For purposes of the EIR, SWRCB staff took a very straightforward approach to accommodating this complex and contentious debate. They identified impacts from both of the major perspectives represented by these comments. Impacts of each alternative measured from 1989 conditions are described. Impacts of each alternative measured from prediversion conditions are also described. This approach provides the fullest disclosure possible. The reader, including the SWRCB, is provided the widest informational basis from which judgments can be drawn.

SWRCB continues to believe that the project, insofar as CEQA is concerned, is the amendment of the city's water rights licenses. This assumption does not shift any mitigation responsibility under CEQA. It also does not relieve the City of Los Angeles of any responsibilities it may have to restore public trust values needlessly lost during the diversion period.

The formulation of the most representative resource conditions to represent the 1989 point of reference is complicated, but the approach taken in the EIR remains the most appropriate. Actual resource conditions were used for resources not directly dependent on the pattern of annual runoff. For most resource use, particularly water supply, power production, and recreational activity, use of the 1989 hydrologic record alone would have made drought conditions the baseline, an illogical basis for assessing impacts. The point-of-reference scenario was generated to remove the drought effects and give a representation of resources under average conditions.

When characterizing actual resource conditions in 1989, the EIR preparers also took some latitude in using data from a period of several years. Aerial photography and field surveys, for example, were performed when the EIR was prepared, sometime after 1989. Some data files were found for observations in slightly earlier or later years. The draft EIR preparers examined the potential use of each such piece of data and determined whether, in the context to be used, its inclusion was proper and if adjustments were necessary.

The fact that no water was being exported from Mono Basin on August 22, 1989, while true, is not germane to establishing a useful point of reference. The point of reference is intended to present the general or average environmental conditions after 48 years of stream diversions at or about the time the court found it necessary to review the water rights licenses and notified the SWRCB of this decision. Minimum streamflow requirements were in effect for Rush and Lee Vining Creeks, but large diversions were generally allowable and the level of Mono Lake continued its decline. SWRCB staff understood the potential problem of a moving baseline and selected the point of reference as a way to establish a window for assessing the general existing conditions.

The EIR seeks to fully disclose the environmental effects of the proposed amendment of the city's water rights licenses. An analysis of environmental impacts, for the purposes of CEQA, focuses on changes in existing conditions that would result from the project under consideration. To the extent that the current streamflows are the result of a preliminary injunction (setting requirements that apply only temporarily, unless they are later adopted as part of the SWRCB's water right decision or a permanent injunction), it would not be appropriate to incorporate these conditions into the point of reference. Under such an approach, temporarily imposing instream flow requirements without preparing environmental documentation under CEQA would eliminate the impacts of those requirements from being considered when environmental documentation is prepared to consider applying those requirements on a permanent basis. Such an approach could understate the impacts of the SWRCB's decision. In the interest of full disclosure of impacts, the EIR evaluates the effects of amending the city's licenses as compared with diversions that occurred under the licenses before amendment, instead of limiting review to the impacts of *further* reductions in diversion beyond those necessary to comply with the preliminary injunction.

The SWRCB recognizes that point-of-reference conditions are not sustainable. If the city's diversions were to continue at the levels that have occurred, the level of Mono Lake would not be maintained. If the level of Mono Lake is to be maintained, diversions at historical levels cannot be continued. In the interest of full disclosure, however, and consistent with CEQA's focus on changes from existing conditions, neither the impacts of declining lake levels nor the impacts of reductions in allowable diversions should be ignored. The point of reference used in this EIR serves to disclose both types of impacts. The unsustainability of the point of reference makes it infeasible to fully avoid both types of impacts, but this does not justify a failure to disclose either type of impact for the SWRCB's consideration under CEQA.

Where possible, the EIR process should be combined with the SWRCB's process for considering amendment of the city's water rights licenses. As part of its decision, the SWRCB must consider two types of environmental impacts: adverse changes in the environment, for purposes of CEQA, and effects on the public trust, for purposes of applying the public trust doctrine and the reasonableness doctrine which govern diversion and use of water. The two types of environmental impacts overlap to a substantial extent, but the focus of impacts analysis differs for the two types of impacts. CEQA review focuses on the action proposed to be undertaken and changes in existing physical conditions that will be caused by the proposed action (in this case, amendment of the city's licenses). For purposes of public trust analysis, on the other hand, the SWRCB must also look objectively at the public trust impacts of the city's diversions. The focus of public trust review must be on the impacts of the city's licensed diversions.

For purposes of both CEQA and public trust analyses, cumulative impacts must be considered as well. That is, in addition to considering the impacts of the specific project or water right under review, the SWRCB must consider how that project or water right interacts with other projects or water rights. Because of the difference in the focus of CEQA and public trust analyses, however, adverse public trust impacts may not necessarily be considered adverse environmental impacts for purposes of CEQA. Where proposed water rights license amendments are beneficial for public trust uses, the impacts of those amendments on public trust uses are not considered adverse for purposes of CEQA. To the extent that the water rights under review have individually or cumulatively harmed public trust uses, however, those impacts must be considered in applying the doctrines of public trust and reasonableness, even if the water rights amendments ultimately adopted by the SWRCB do not make those public trust impacts any worse.

In its comments on the draft EIR, LADWP observes:

> Under CEQA, the purpose of examining the cumulative impacts of "closely related past, present, and reasonably foreseeable probable future projects" (CEQA Guidelines, Section 15355) is to determine whether and how the proposed project will compound or increase the environmental impacts of other projects.

Insofar as the EIR is used to identify significant adverse impacts of amending the city's water rights licenses, this comment is correct. The impacts of another project and the proposed water rights license amendments being considered by the SWRCB are not cumulative impacts of the proposed amendments for purposes of CEQA unless the proposed amendments would add to or otherwise jointly contribute to the impacts of the other project.

The city's diversions since 1941 are a closely related project. Thus, a lake surface elevation of 6,417 feet, streamflows partially diverted for local irrigation, and prediversion resource conditions constitute the basis of the major portion of the cumulative impacts assessments in the EIR. As LADWP points out, the proposed project is intended to reduce the impacts of LADWP's diversions. It should not be assumed, however, that because a project is intended to have a beneficial effect, it cannot possibly have any adverse impacts with respect to elements of the physical environment. Analysis of the overall effects of the proposed project and the city's diversions since 1941 is still appropriate to ensure that the two projects will not interact jointly in a manner that contributes to any adverse impacts. The EIR indicates that, in one respect, the proposed project and the city's diversions since 1941 may in fact jointly contribute to an adverse impact. Depending on future decisions of LADWP, project effects could contribute to an earlier loss of acreage irrigated for grazing in Mono and Inyo Counties during the diversion period.

The EIR identifies as cumulative effects the combined effect of the project being considered by the SWRCB and the city's diversions since 1941. With the possible exception of impacts on grazing lands, however, these cumulative impacts are either insignificant or less severe than the impacts that would occur if the city's diversions continued in accordance with the city's water right licenses without amendment. Thus, for purposes of CEQA analysis, these cumulative impacts either are less than significant or beneficial. CEQA does not require the SWRCB to adopt alternatives or mitigation, or make findings of infeasibility, for these impacts, nor does CEQA provide an independent source of authority to mitigate these impacts. The impacts identified as cumulative are very important, however, for purposes of public trust analysis, and the public trust and reasonableness doctrines provide authority to modify the city's licenses to address these impacts. As part of its water right decision, the SWRCB will evaluate these cumulative impacts (giving consideration to both their significance and their potential to be reversed or mitigated as set forth in the EIR) and protect public trust uses to the extent feasible.

The EIR is intended to identify potential mitigation measures. The ultimate determination of the feasibility of specific mitigation measures that would avoid significant adverse impacts will be made by the SWRCB as part of its water right decision. As part of that decision, the SWRCB will review both its legal authority to require mitigation and the appropriateness of imposing mitigation requirements on LADWP as part of the water right decision. In cases where the SWRCB has discretionary authority over what conditions may be placed in the licenses and mitigation is required under CEQA, SWRCB may also have authority to impose any necessary mitigation requirements. Even in cases where mitigation is not required under CEQA, as with most cumulative impacts, the public trust doctrine may provide a basis for requiring mitigation of adverse effects on public trust uses as a condition of the water rights licenses.

Some of the key points made in this response should also be added to the summary and Chapter 2 of the draft EIR. See Chapter 6, "Errata to the Draft EIR", referencing pages S-7 and 2-27.

X2. Environmentally Superior Alternative Is Improperly Identified

Summary of Comments

LADWP, characterizing the "environmentally superior alternative" as the "recommended alternative", contends that the identification of an environmentally superior alternative required under CEQA applies to project impacts alone; cumulative impacts are not an element of this determination. LADWP goes on to address some of the impact conclusions considered in the EIR determination of the environmentally superior alternatives, arguing that:

- DFG recommendations are based on restoration of an optimal fishery, which far exceeds the standard required by law;
- air quality issues should not be considered because other agencies have regulatory authority;
- all current nesting grounds of the Caspian Tern would be eliminated under the environmentally superior alternative;
- all of the impacts of securing alternative water supplies have not been evaluated:
- the benefits of providing water supply are understated and the costs of replacing them are underestimated.

Other commenters contend that only changes from the prediversion condition, or the cumulative impact assessment, can be used in identifying the environmentally superior alternative. As noted for the previous major issue, these commenters believe consideration of effects of diversions on public trust values requires use of the prediversion baseline.

The U.S. Fish and Wildlife Service (USFWS) notes that recent experiments show that salinities associated with the prediversion lake level provide nearly optimum productivity of Mono Lake brine shrimp and suggest that this fact was not considered in the determination of the environmentally superior alternative.

One commenter maintains that only the No-Diversion and 6,410-Ft Alternatives are environmentally superior because only they will reestablish public trust values of prediversion lake-fringing vegetation resources. Another argues that any losses of plants or wildlife due to inundation at higher lake levels should not be factored into the identification of the environmentally superior alternative.

Other commenters allege that the emergence of visible tufa should not be figured into the choice of the environmentally superior alternative. Several commenters argue that the increased potential for channel erosion at higher streamflows is wrong, or can be avoided by restoration work, and should not be considered in this determination.

Another commenter notes simply that only the No-Diversion Alternative is the environmentally superior alternative because it is closest to the natural condition.

Finally, one commenter notes that the environmentally superior alternative, by whatever definition, need not be the alternative selected by SWRCB.

Response

SWRCB agrees that CEQA does not require that the alternative identified as "environmentally superior" be chosen for implementation. As discussed in the EIR, the environmentally superior alternative was identified considering only physical environmental impacts and not resource utilization needs. Such a balancing is the responsibility of SWRCB in coming to its water rights decision.

In response to the other comments, SWRCB has reexamined the weighing of each of the questioned resource effects used in the draft EIR determinations of "environmentally superior" and the identification of two environmentally superior alternatives. Only one such alternative is now identified; see Chapter 3. Our determinations:

- are not based on optimizing fisheries;
- must consider effects on air quality;
- cannot possibly consider all possible impacts of LADWP's future decisions to acquire or develop alternative water supplies;
- do not consider the benefits of water supply to the City of Los Angeles and the approximate costs of replacing it but, at the discretion of SWRCB, information about this socioeconomic effect is provided in the EIR;
- are based in part on the recent experimental data about salinity effects on Mono Lake brine shrimp;
- appropriately consider changes in lake-fringing vegetation conditions and wildlife habitat among the lake levels of the alternatives;
- consider differences in tufa visibility because tufa viewing and photography is a significant recreation attraction and activity at the lake;

- assume that significant differences in channel erosion potential among the alternatives exist and cannot be ignored, noting that in-channel restoration efforts will be impeded more often by longed periods of higher flows under the higher lake-level alternatives; and

- recognize the fact that a return toward natural conditions in Mono Basin would be accompanied by a loss of tufa accessibility and recreational use of South Tufa and, at least in the near term, with an increased potential for tributary stream channel erosion.

SWRCB also notes that Caspian terns would not be adversely affected by choice of any alternative.

X3. EIR Analyses Do Not Meet Scientific Standards

Summary of Comments

A few commenters, exasperated by a scientific projection beyond known data in the EIR, criticize some analyses as being speculative and therefore inappropriate for a scientific evaluation. LADWP criticized the entire document in this regard, further declaring over one issue that "applying untested speculation is unscientific; when done to support a preconceived conclusion it is advocacy."

LADWP's specific criticisms of the EIR include:

- using anecdotal information, especially historical recollections ("in equal parts nostalgia and speculation") that have little value if not supported by historical records;

- using information not previously subjected to refereed peer review (journal publication);

- projecting trends beyond ranges of data collection;

- hesitating to project results of the aquatic productivity model beyond ranges of data collection to high lake levels because of contradictory indications of historical observations;

- not disproving all potential counter-theories (e.g., unobserved predation of alkali flies by unidentified organisms);

- using material developed by Mono Lake researchers when the researchers were only undergraduates in the process of achieving doctorates in aquatic biology;

- discussing factors that are not completely understood (e.g., biological values of soft and hard substrates in the lake) and assuming unproven relationships to permit comparative impact assessment between the alternatives;

- drawing conclusions based on relative extents of suitable habitats; and

- drawing qualitative conclusions after acknowledging that impacts cannot be accurately estimated (e.g., cumulative land use effects).

Response

SWRCB or its consultants do not advocate any particular resolution of Mono Basin water rights in the EIR. SWRCB's responsibility is to consider the various alternatives advocated and to judge them against legal mandates. LADWP's allegation to the contrary is inappropriate.

CEQA imposes a different standard on impact analysis than that of the scientific literature. Commenters are referred to Sections 15144 and 15145 of the State CEQA Guidelines, which state:

> Drafting an EIR . . . necessarily involves some degree of forecasting. While foreseeing the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can.
>
> If, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact.

In contrast to the scientific method of strict deductive logic, SWRCB is required to extend its analyses as far as is reasonably possible based on information that is available or can be developed within the required decision period. SWRCB has considered all of the models and analyses reported in the EIR and has considered expert testimony presented during the water rights hearing. SWRCB believes that the analyses provide reasonable forecasts. The EIR discusses the nature of data sources and SWRCB's confidence in each of the forecasts. SWRCB did not embrace model predictions when they appeared to conflict with observational data.

X4. Other CEQA Provisions Are Not Met

Summary of Comments

A variety of comments questioning compliance with CEQA have been expressed, in addition to Comments X1 through X3, which are responded to above.

LADWP comments that the EIR inadequately describes the *benefits* of the proposed water exports, including economic, social, and environmental benefits. LADWP and California Trout (Caltrout) also contend the EIR does not document the marked recovery of the tributary streams over the past several years of stream rewatering.

DFG argues that the EIR does not adequately address the means, schedule, and extent of mitigation measures for cumulative wildlife impacts.

State Lands Commission (SLC) contends that inappropriate alternatives have been selected because they do not address a range of instream flow requirements or DFG-recommended streamflows. SLC also asserts that the EIR presents resource values and environmental impacts in such a way as to lead to erroneous conclusions, in particular by implying that lakeshore habitats are as significant as the lake's aquatic habitats and by addressing issues that are not a part of public trust values in Mono Basin. SLC also faults the document for not adequately addressing the relationship between short-term uses and long-term productivity of the environment as required by CEQA.

Another commenter notes that the size and resulting reproduction costs raise the suspicion that the public is not actively encouraged to be part of the CEQA process, contending that the sheer bulk makes the entire document inaccessible. Another notes that citations to the literature do not give page numbers as CEQA requires and complains that where no citations are given, it is unclear whether the conclusions are those of the EIR preparers.

Response

The purpose of an EIR is to identify significant adverse impacts of proposed projects. EIRs clearly are not required to weigh the adverse consequences of an action with the social benefits of the action; that action is the "balancing" that the SWRCB must subsequently perform based not only on the EIR but on evidence brought forward during the hearing process.

Because the proposed action involves an assessment of effects on public trust values, however, the analyses in the draft EIR *do* address relative resource benefits under each alternative. This approach is also helpful given the 1989 point of reference (see the response to Comment X1 above) because many of the predicted resource changes would be beneficial rather than adverse. The draft EIR describes in several places the changes that are occurring because of stream rewatering and, in Chapter 3C, assesses the ultimate recovery of the riparian system that can be expected. LADWP's complaint appears to have more to do with the scope of a brief characterization of the major problems associated with the historical diversions appearing in the introduction chapter of the EIR than with the thorough assessments of impacts and benefits in each topic area that follow.

SWRCB believes the document presents a mitigation or resource-recovery plan for vegetation and wildlife resources at an appropriate level of detail for a EIR. The needed mitigation and recovery actions can be identified in detail only after a lake-level alternative is chosen. CEQA embodies this approach (Section 21081.6), providing that such a plan needs to be a part of the project decision but need not appear in the EIR. Even at the project decision stage, CEQA's specific requirement for a mitigation reporting and monitoring program applies only where the EIR identifies a significant adverse impact of the project and the lead agency finds that the mitigation measure incorporated into the project would mitigate or avoid that impact.

The issue of alternative instream flow requirements is addressed in the response to Comment A4. Simply put, DFG-recommended streamflows were not available when the draft EIR was prepared.

SWRCB rejects the contention that the draft EIR presents resource values and environmental impacts in such a way as to lead to erroneous conclusions. The draft EIR does not assert that lakeshore habitats are more or less important than aquatic habitats; it fully discloses impacts on each and leaves it to the reader to make value judgments. The fact that the EIR addresses impacts on resources other than public trust resources in Mono Basin, while clearly required by CEQA, does nothing to diminish the importance of the public trust in the decision-making process.

SLC's arguments about the necessity to elaborate further on the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity are unconvincing. The issue at Mono Lake is not one of extracting a resource in the short term at the expense of long-term environmental quality. It is, as the EIR asserts, a question of two competing long-term uses. In any event, this issue seems academic; the real issue is whether the draft EIR describes in detail the values that will be lost under each lake-level alternative. SWRCB believes that it does.

SWRCB apologizes for the sheer bulk of the EIR. It resulted from the long history of controversy and the intense level of scientific scrutiny that has been cast over Mono Basin. Many issues therefore needed to be addressed in detail. CEQA allows for charging of reproduction costs, but, by distributing copies to libraries, SWRCB provided access for those individuals unable to pay those costs. SWRCB is not aware that any interested person was unable to obtain a copy of the EIR during the review period.

Any conclusion in the draft EIR unaccompanied by a citation is the responsibility of SWRCB staff. Many citations in the draft EIR refer not to specific pages, but to entire bodies of work. Page numbers would have been too unwieldy to report systematically. The EIR preparers are available, however, to provide specific page or section references for particular citations on request.

X5. Public Trust Issues Are Inadequately Addressed

Summary of Comments

Several commenters presented briefs tracing the history of court cases construing the public trust doctrine in relation to Mono Basin water diversions and setting forth their interpretations of these legal mandates.

Some commenters point out that tributary streamflows must be determined so as to satisfy state law independent of the public trust balancing required for lake-level determination. One commenter also maintains that neither application of the public trust doctrine nor California Fish and Game code permit degradation of Mono Basin resources for the purposes of enhancing conditions outside of the basin, such as the Owens River fisheries.

Some commenters believe the EIR does not clearly point out that SWRCB has an affirmative duty to protect public trust uses whenever feasible.

Another commenter declares that the formulation of alternatives in the EIR poorly addresses lake levels for public trust protection because the prediversion point of reference was used for project impacts. This commenter also maintains that the EIR confuses public trust resources in Mono Basin with other resources in and beyond the basin, potentially confusing SWRCB's public trust balancing. Another commenter contends that air quality is a public trust value and must be considered in the balancing regardless of the U.S. Environmental Protection Agency's regulatory authority over this resource.

Other commenters allege that an analysis of the feasibility of restricting exports of water from Mono Basin is absent from the EIR, noting the "feasibility" under the Audubon decision is different from "feasibility" under CEQA.

Response

SWRCB generally agrees with most of these comments on its responsibility for protecting public trust resources. However, the draft EIR more than adequately addresses this issue. The function of the EIR is perhaps more limited than countenanced by these commenters. The EIR function is not to serve as SWRCB's staff analysis or decision document. It is not a vehicle to present SWRCB's understanding of implications of the public trust doctrine to Mono Basin. Its primary function is much more limited: to clearly describe the environmental impacts of different required streamflows and different management lake level. The EIR clearly provides this information.

SWRCB is aware of its duty to resolve streamflow requirements under California Fish and Game Code prior to balancing protection of public trust resources against the need for water and power. SWRCB's responsibility for public trust resource in general also requires that it prevent unnecessary harm to resources in the Upper Owens River basin, if feasible. Possible benefits of Mono Lake exports for public trust uses in the Upper Owens River cannot provide a basis for overriding California Fish and Game Code requirements for Mono Lake tributary flows sufficient to restore and maintain the historic fishery. Impacts on public trust uses of the Upper Owens River may be considered, however, in determining what additional level of protection should be provided for public trust uses in Mono Basin. The California Fish and Game Code does not require that any minimum level of exports to the Upper Owens River be maintained.

The draft EIR does not confuse public trust resources in Mono Basin with other resources, but, under CEQA, SWRCB has an affirmative duty to consider impacts on all resources before making a decision. Air quality is a public trust resource (see the response to Comment X7). SWRCB strongly disagrees that the EIR fails to examine the feasibility of restricting water exports from Mono Basin. Chapter 3L, "City of Los Angeles Water Supply", examines this issue in detail, illuminating the possibilities under any definition of "feasibility".

X6. Fisheries Laws, Rules, and Regulations Are Inadequately Considered or Applied; Recommendations of the California Department of Fish and Game Must Be Adopted

Summary of Comments

One commenter notes the DFG recommendations for minimum streamflows are based on optimizing fisheries, which is not required under California law. DFG states, however, that its recommendations are those streamflows required to keep fish in good condition, which is required by law. Several commenters reminds us that the court in the Caltrout decision noted that the requisite administrative expertise for determining such streamflows resides principally with DFG. They ask that the EIR commit to adopting DFG recommendations.

Some commenters contend that the alternatives selected are inappropriate because they do not address a range of instream flow requirements or do not embody DFG-recommended flows.

As described in the response to Comment X5, some commenters point out that tributary streamflows must be determined so as to satisfy state law independent of the public trust balancing required for lake-level determination.

One commenter asks why the project objective does not include protection of the Upper Owens River fishery because, as formulated, several alternatives would present significant adverse impacts on the Upper Owens River fishery. Among the alternatives, increments of benefits to Mono Basin fisheries are considerably less than increments of degradation to the Owens River fishery. Because the channel of the Upper Owens River has adjusted to basin exports, it is argued, some continuing export is needed to maintain the new fishery habitat conditions.

DFG also notes that none of the alternatives embody fishery flows in the presently dewatered reach of Rush Creek below the dam to the Return Ditch, noting that the dewatered condition represents continuing violation of law.

Although the comment (4-164) was difficult to interpret, DFG apparently notes that the EIR does not address fishery effects of fluctuating streamflows due to upstream power generation.

One commenter asked why Mill and Wilson Creeks were not included in the cumulative fishery impact analysis because they too are diverted, although within the basin.

Another commenter asks why the EBASCO Environmental report on the Upper Owens River fishery was not utilized more fully, especially to set a maximum export flow of 200 cubic feet per second (cfs) rather than 300 cfs.

Response

California law requires that fisheries remain in good condition below LADWP's diversions; this law has been construed by the court for Mono Basin streams to require restoration of the prediversion fishery. The Restoration Technical Committee, appointed by the El Dorado County Superior Court, has based its restoration planning on an assumption that this mandate requires it to attempt to restore the conditions that benefitted the prediversion fishery. The EIR concludes that complete restoration of prediversion conditions is probably impossible because of irreversible geomorphic changes. DFG's use of the term "optimal" presumably refers to streamflows that would come closest to restoring the preproject fishery.

SWRCB will give great weight to the recommendations of DFG. The analysis in the EIR accepted the major conclusions of all of the stream evaluation reports providing the basis for these recommendations. None of the comments submitted on the EIR have successfully rebutted these conclusions (see the response to Comment D3 in this chapter).

The issue of alternative instream flow requirements and use of DFG-recommended flows is addressed in the response to Comment A4 in this chapter. DFG-recommended streamflows were not available when the draft EIR was prepared, but the impacts of the entire range of possible streamflows and lake levels is evaluated in the draft EIR.

As noted in the response to Comment X5, SWRCB is aware of its aware of its duty to resolve streamflow requirements under California Fish and Game Code prior to balancing protection of public trust resources against the need for water and power.

The purpose of the proposed project is to ensure that continued export of surface waters from Mono Basin by LADWP conforms to state law, including legal requirements to restore and protect public trust resources. This involves setting tributary flow and Mono Lake elevation requirements to protect Mono Lake and its tributaries. As with any project subject to CEQA, it is also intended to avoid or mitigate adverse impacts on the environment where feasible. Review under CEQA makes it unnecessary to expressly include as a project purpose the protection of environmental resources that might be adversely affected by the project. Impacts on the Upper Owens River fishery resulting from changes in Mono Basin exports will be considered without modifying the project objective. Expanding the project purposes to include protection of Upper Owens fisheries would also require evaluation of factors unrelated to LADWP's diversions from Mono Basin, unnecessarily delaying resolution of Mono Basin public trust issues.

Construction and operation of LADWP's Mono Basin diversion facilities have effectively relocated the channel of Rush Creek in a reach downstream of Grant Lake. Releases below Grant Lake now flow through the Mono Gate 1 return channel, which provides good-quality fish habitat when flows are sufficient. DFG-recommended instream flow for Rush Creek is based, in part, on the additional adult brown trout habitat provided in the Mono Gate 1 return channel at higher flows. The California Fish and Game Code does not require LADWP to provide flows to maintain fish in good condition in both the prediversion channel and the relocated channel.

The analysis of fishery impacts of the alternatives is based on the historical flow regime of the tributary streams. Flows were regulated upstream for power production during this period. Thus, the impact assessment of the alternatives addresses the combined streamflow effects of this upstream power generation and LADWP stream diversion. On the other hand, this EIR in no way attempts to evaluate the fishery impacts of the streamflow regulation in the reaches upstream of LADWP's diversions.

Impacts on fisheries in Mill and Wilson Creeks were not evaluated in the EIR because water diversions in those streams are not part of the relicensing action comprising the proposed project, and, furthermore, those diversions are not closely related projects.

DFG's stream evaluation report for the Upper Owens River was considered to the degree possible in the EIR; its completion was long delayed and was not made available to SWRCB in time to be fully used in the draft EIR. DFG's report was completed well after the period during which it was necessary to simulate alternatives (see the response to Comment A4).

The DFG-recommended maximum streamflow in this report for the Upper Owens River has subsequently been used in formulating a refined alternative for possible adoption (see Chapter 5).

X7. California Air Quality Law (Health and Safety Code Section 42316) Prohibits Interference with LADWP Water-Gathering Activities and Represents a Legislative Balancing of Water Rights and Air Quality Public Trust Values

Summary of Comments

One commenter contends that California Health and Safety Code Section 42316 prohibits the Great Basin Air Pollution Control District (GBAPCD) from taking actions that affect LADWP's water-gathering activities and represents a legislative balancing of public trust issues to favor LADWP water rights over air quality issues in Mono Basin. The commenter concludes that air quality issues are therefore not germane to the SWRCB water rights action.

Response

The interpretation of Health and Safety Code Section 42316 presented in this comment is not supported by any judicial interpretation or by the statute's legislative history. Furthermore, the commenter's interpretation is contradicted by the plain language of the statute.

As noted in the draft EIR, Section 42316(a) expressly authorizes GBAPCD to "require the City of Los Angeles to undertake reasonable measures, including studies, to mitigate the air quality impacts of its activities in the production, diversion, storage, or conveyance of water. . . . The mitigation measures shall not affect *the right* of the city to produce, divert, store, or convey water" (emphasis added). There is no reference anywhere in the statute to any restriction of GBAPCD authority over "the water gathering activities of LADWP". The substantive restriction on the authority of GBAPCD is carefully phrased in terms of the city's water rights, not in terms of the manner in which those rights are exercised.

The legislative history of Senate Bill 270 (1983), which added Health and Safety Code Section 42316, indicates that the legislature rejected LADWP's request that the language of the statute be revised to read: "The mitigation measures shall not affect the City's water rights, water gathering and production operations, or the quantities of water produced, diverted, stored or conveyed by the City." The restrictive language of the statute remained specific to water rights aspects only.

The plain language of the statute and its intent are clear: GBAPCD does not have, and probably never had, any authority to unilaterally change or modify water rights assigned to the City of Los Angeles by SWRCB. The statutory proviso that mitigation measures required by the GBAPCD shall not affect LADWP's water rights reflects a deference to, and not a limitation on, the water right authority of the SWRCB.

The most significant aspect of Section 42316 is the express authorization for GBAPCD to require that the City of Los Angeles mitigate the indirect air quality effects produced by the exercise of the city's water rights within the jurisdictional boundaries of GBAPCD.

Section 42316 is found in Part 3 (Air Pollution Control Districts), Chapter 4 (Enforcement), Article 1 (Permits) of the Health and Safety Code. This portion of the Health and Safety Code addresses the air quality permitting authority of air pollution control districts and air quality management districts. Section 42316 applies expressly to the GBAPCD, not to SWRCB or any other state or local agency.

Section 42316 contains no reference whatsoever to public trust issues or the balancing of public trust issues. Additionally, the legislative counsel's digest to the legislation, which added Section 42316 as an urgency statute (Senate Bill 270 [1983]), contains no reference whatsoever to public trust issues or public trust balancing.

This commenter has stated in writing that "Air quality in Mono Basin has been determined by the Board to be one of the public trust values which must be considered in the balancing process." (July 2, 1993 letter to U.S. Environmental Protection Agency [EPA] requesting an extension of the deadline for commenting on the proposed PM10 nonattainment designation for Mono Basin).

X8. Water Quality and Environmental Impacts of Developing Alternative Water Supplies Are Not Evaluated

Summary of Comments

One commenter notes that, in the Audubon case, the court stated that SWRCB must weigh the environmental impacts of obtaining alternative water supplies against preserving the public trust values of Mono Lake and points out that the draft EIR does not assess impacts of acquiring alternative supplies. Potential impacts mentioned by the commenter include endangered species in the Sacramento-San Joaquin Delta and elsewhere. The commenter contends that the contingent value household survey was flawed because it did not let respondents know about replacement water impacts.

Other commenters contend that the substitution of water from the Delta or elsewhere may have significant water quality implications and require LADWP to change its water treatment facilities or systems to conform to drinking water standards.

Another commenter faulted the EIR for not evaluating the environmental and economic impacts and benefits of transferring water now used for irrigation of LADWP lands in the Owens River basin to the city's water supply.

Response

CEQA requires that SWRCB forecast effects of reduced water supply, using its best efforts to find out and disclose all that it reasonably can, but requires that SWRCB should not speculate beyond a reasonable evaluation. The evaluation of water supply alternatives in the EIR conforms to these criteria.

SWRCB considered LADWP's potential options for acquiring replacement water supplies for reductions in Mono Basin exports that would occur under the alternatives and reported this information in detail in the EIR. The response to Comment L3 responds to comments criticizing that evaluation.

Although SWRCB was able to assess the range of reasonable options for alternative supplies, it concluded that the actual mix of supplies actually utilized, together with an assessment of the resulting water quality and environmental impacts, would be highly speculative. Many variables are involving in formulating the future mix of replacement sources and many alternatives are possible.

SWRCB can only speculate on how LADWP will meet its future water supply challenges. This extreme uncertainty renders impossible a meaningful evaluation of future water quality and environmental effects of using new water supplies. The decisions regarding future water supply acquisitions or decisions to develop new alternative water supplies are the responsibility of LADWP. However, the draft EIR did evaluate the effect on drinking water quality of supplies delivered from Mono Basin and the Owens River basin to the LA Aqueduct. No significant impacts were identified for any of the alternatives.

The decision to transfer irrigation water used by LADWP or its lessees in Mono or Inyo Basins for use in the City of Los Angeles is the responsibility of LADWP. That decision will be made based on pertinent economic and political factors.

X9. Effects of the Alternatives on the Threatened or Endangered Status of Mono Lake Brine Shrimp Are Not Addressed

Summary of Comments

USFWS alleges that the EIR failed to address the status of the Mono Lake brine shrimp as a Category 1 candidate species for federal listing as endangered or threatened.

The agency advocates that if SWRCB adopts an alternative that would result in a significant cumulative effect on the brine shrimp (i.e., the 6.383.5-Ft Alternative or lower lake level alternatives), listing as threatened or endangered may be warranted. USFWS asks SWRCB to discuss this issue in the final EIR.

Response

The status of the Mono Lake brine shrimp as a candidate species (Category 1) for federal listing as endangered or threatened under the Endangered Species Act was noted in Appendix E of the EIR (see page E-1 and Table E-1).

The impact assessment for brine shrimp in the draft EIR predicted significant reductions in brine shrimp production from estimated prediversion values for all lake level alternatives below the 6,390-Ft Alternative. However, except for the No-Restriction Alternative, there is no evidence that persistence of the brine shrimp population would be threatened under any of the alternatives.

The predicted salinity for the No-Restriction Alternative, 133 grams per liter (g/l), approaches salinities that caused complete hatching failure of brine shrimp cysts in experiments (see Appendix J, page J-4). Complete hatching failure of cysts would cause extinction of the brine shrimp population. Hatching success at the predicted salinity for the 6,372-Ft Alternative, 92 g/l, was about the same as that at lower salinities (Herbst and Embury 1993). Therefore, the continued survival of the brine shrimp population would probably be threatened only at the No-Restriction Alternative lake elevation.

If the brine shrimp is listed, commercial harvesting of the shrimp may be prohibited (Brown pers. comm.). However, a special rule may be invoked to allow continued harvesting. This rule can be used if the species is listed as threatened, but not if it is listed as endangered.

X10. An Antidegradation Threshold for Outstanding National Resource Waters Is Improperly Formulated

Summary of Comments

LADWP claims that considering 85 g/l to be a federal antidegradation threshold is irrelevant in the context of a saline lake and is biologically and limnologically meaningless.

The Lahontan Regional Water Quality Control Board asserts that the antidegradation policies apply to any water quality standard, not just salinity.

Another commenter contends that an increase in a constituent above a standard cannot be considered as necessarily constituting degradation of water quality; rather, use must be impaired, such as number, types, and characteristics of key aquatic organisms.

LADWP also claims that the federal antidegradation regulation applies to Lake Crowley Reservoir: increased eutrophication caused by reduced Mono Basin exports has already degraded beneficial uses.

Response

The biological implications of different Mono Lake salinities are described in Chapter 3E, "Aquatic Productivity", of the draft EIR (also see the responses to Comments E1 through E5). The EIR does report that lake level alternatives lower than the 6,390-Ft Alternative would result in significant reduction of brine shrimp productivity from the prediversion condition. The productivity continues to diminish as the lake level falls. This impairment of use provides a biological basis for limiting the degradation of Mono Lake's waters.

LADWP's assertion that an antidegradation threshold is inappropriate is based on arguments about saline lakes in general and not on conditions specific to Mono Lake. In making this assertion, LADWP ignores one of the central purposes of antidegradation policies: to address unique or site-specific conditions that are not adequately addressed by standards applicable to general categories of water bodies. The 85-g/l value of an antidegradation threshold is based on Mono Lake's salinity and would apply to no other lakes; therefore, the charge of irrelevance is incomprehensible.

The potential for eutrophication of Lake Crowley Reservoir is discussed in the response to Major Issue B2. The federal antidegradation policy and SWRCB Resolution No. 68-16 apply to water quality constituents or characteristics in addition to salinity. The EIR's evaluation of impacts on salinity also serves to illustrate impacts on other water quality parameters that are conserved in Mono Lake and affected by LADWP's diversion. The antidegradation policies apply only to reductions in water quality. Whether the reduction impairs beneficial uses is a factor to be considered in applying the policies. Under the federal antidegradation policy, reductions from the water quality that existed when the policy was adopted in 1975 cannot be permitted if instream beneficial uses would be impaired or the quality of outstanding national resource waters would be impaired.

The federal antidegradation regulation applies to all surface waters. In contrast to Mono Lake, however, Lake Crowley Reservoir does not appear to have the exceptional recreational or ecological significance that would support designation as an outstanding national resource water. The federal antidegradation policy's stringent prohibition against reductions in the quality of outstanding national resource waters does not apply to Lake Crowley Reservoir. Also in contrast to Mono Lake salinity, changes in LADWP's diversions from Mono Basin do not have a significant impact on phosphorus concentrations in Lake Crowley Reservoir.

X11. Impact Assessments of Project-Related Irrigation and Grazing Changes Are Absent

Summary of Comments

DFG demurs that an analysis of benefits and impacts of anticipated changes in irrigation and grazing on LADWP lands along the diverted tributary streams did not appear in the draft EIR. Furthermore, it urges SWRCB to include an analysis of opportunities to reduce conflicts between livestock grazing and important habitat for riparian and upland wildlife species through modification of past grazing management practices.

Another commenter complains that the draft EIR erroneously attributes losses of riparian vegetation or fishery habitat to grazing along the Upper Owens River and requests that a thorough assessment of the effects of current grazing practices along the Upper Owens River be included in the EIR.

Response

Impacts of grazing on LADWP lands along the diverted tributary streams have been considered in formulating a refined alternative for possible adoption (see Chapter 5). Livestock grazing on LADWP property in the riparian corridors downstream of LADWP's points of diversion for export would be prohibited for a minimum of 10 years.

The EIR should address impacts of the project alternatives on current land use practices to the degree that speculation is not required. Should imposition of a lake level/ streamflow alternative affect irrigation practices and livestock management, predictable impacts must be identified.

In this case, the selection of a particular alternative will not result in predictable changes in irrigation and grazing, except as specified in the refined alternative formulated for possible adoption. Under the alternatives set forth in the draft EIR, LADWP has discretion to alter its irrigation or grazing management practices and, in fact, has been instituting such changes (see, for example, page 3G-24 of the draft EIR), but these changes are not directly related to imposition of a particular feasible lake level/streamflow alternative.

The No-Restriction Alternative, as formulated in the draft EIR, is a benchmark alternative intended to represent continuation of former practices of LADWP; thus it was simulated assuming continuation of historical patterns of irrigation diversions. This alternative does not meet the project objectives. All feasible alternatives are simulated with an assumption that historical irrigation will not continue on the Cain Ranch below the Lee Vining conduit but will continue on LADWP lands along the Upper Owens River, reflecting LADWP's most recently described management policies.

Grazing management practices on LADWP, private, or other public lands, such as choice of animal species, locations of herding and bedding areas, pasture rotation schemes, and timing of irrigation, are also subject to the landowner's discretion. Except as specific requirements for grazing are incorporated into an alternative (e.g., the alternative proposed for possible adoption), these grazing management practices are not related to the choice of a lake level/streamflow alternative.

The issue of irrigation and grazing impacts along the Upper Owens River is also addressed in the response to Comment 28-5.

HYDROLOGY AND FORMULATION OR CHARACTERIZATION OF ALTERNATIVES (A)

A1. LAAMP Model Was an Erroneous or Inadequate Basis for Impact Assessments

Summary of Comments

Several comments on the draft EIR concerned the development and application of the Los Angeles Aqueduct Monthly Program (LAAMP) model for determining the potential effects of alternative lake levels and streamflow conditions that were analyzed in the draft EIR.

Version 2.0 of the LAAMP model (LAAMP 2.0), which was used for the draft EIR simulations, was distributed in April 1992 and has been used subsequently by LADWP staff and consultants, SWRCB staff, Mono Lake Committee (MLC) staff and consultants, and other interested parties. During their review of the draft EIR, these users identified several coding errors, which were reported to the SWRCB consultants who designed the model.

Staff and consultants of SWRCB and LADWP and other interested parties met on September 20, 1993, to discuss the coding errors in LAAMP 2.0 and the suggested changes to the assumed aqueduct operations and corresponding LAAMP model inputs, calculations, and output variables. This meeting effectively reactivated the Aqueduct Modeling Technical Advisory Group (TAG) that was initially established by SWRCB staff at the beginning of the draft EIR effort in 1989. A task description and budget were approved by SWRCB and LADWP staff for the model changes by SWRCB consultants, and the corrections and changes were completed and reviewed by the TAG and submitted as part of the water rights hearings in Version 3.3 of the LAAMP model (LAAMP 3.3). A slightly modified version of LAAMP 3.3, called LAAMP 3.31, was used for the water rights decision.

Summary Response

LAAMP 3.3, as revised by the Aqueduct Modeling TAG concurrently with the water rights hearing, is a useful tool for analyzing Mono Basin water management effects and aqueduct water supply impacts of the alternatives identified in the draft EIR documents, variations of these draft EIR alternatives, and various instream flow recommendations. All identified errors have been corrected.

The differences between the simulation results of LAAMP 2.0 and LAAMP 3.3 are relatively small. The results for LAAMP 3.3 have been generally confirmed by comparison with historical LADWP operations for 1970-1989. The errors identified in LAAMP 2.0 and corrected in LAAMP 3.3 are discussed in the following "Detailed Response" section.

The results of LAAMP 3.3 are very similar to the results presented in the draft EIR. The monthly allocation of water from Mono Lake tributaries to instream flows and Mono Lake level management releases, and to seasonal storage in Grant Lake reservoir for export through West Portal to the Upper Owens River, remain essentially as simulated by LAAMP 2.0 in the draft EIR. Although several additional constraints of the Los Angeles (LA) Aqueduct system in the Owens Valley have been included in LAAMP 3.3, the basic results in the Owens Valley are also essentially similar to those simulated by LAAMP 2.0 in the draft EIR.

The results of LAAMP 3.3 for the No-Restriction Alternative are quite similar to the actual operation of the LA Aqueduct system for 1970-1989, when the second aqueduct barrel was completed between Haiwee Reservoir and Los Angeles. The historical verification indicates that many of the essential features of the aqueduct system have been simulated accurately with LAAMP 3.3 for the No-Restriction Alternative. The historical verification suggests that LAAMP 2.0 results for the draft EIR alternatives and for other simulated water management alternatives can be used with confidence for further analyzing environmental and water supply impacts.

Detailed Response

Comparison of LAAMP 3.3 results with the LAAMP 2.0 results demonstrates that the corrections and changes included in LAAMP 3.3 do not substantially change the LA Aqueduct simulations that provided the basis for many impact assessments in the draft EIR. Both LAAMP 2.0 and LAAMP 3.3 results for the No-Restriction Alternative follow the historical aqueduct patterns observed during the 1970-1989 period, when both barrels of the LA Aqueduct were in operation.

The corrections and revisions in LAAMP 3.3 were accomplished concurrently with the water rights hearing, beginning October 25, 1993. The revised LAAMP model was submitted to the Aqueduct Modeling TAG members for their review and testing. Some remaining errors were identified and additional changes were suggested in a series of meetings and telephone calls. Several intermediate versions of LAAMP were tested by the Aqueduct Modeling TAG members. The most recent meeting was held on January 19, 1994, to discuss appropriate input values for the latest version of LAAMP, designated

LAAMP 3.3. All the identified errors have been corrected, and the requested revisions are now giving expected results.

Most of the required corrections to LAAMP 2.0 (used for draft EIR simulations) involved either aqueduct capacity constraints or water budget terms in the Owens Valley that may have indirectly influenced the simulated West Portal exports from Mono Basin. Revisions were also necessary to eliminate excess Mono Basin exports when the specified lake release was not satisfied because of streamflow deficits later in the year. LAAMP 3.3 results for the No-Restriction Alternative were used to demonstrate historical confirmation and to compare annual and monthly results from LAAMP 2.0 that were analyzed in the draft EIR.

The major corrections in LAAMP 3.3 are as follows:

- Stream Flushing Flows. Although this portion of LAAMP was not used for the draft EIR alternatives, corrections were made to properly account for stream habitat flushing flow requirements during multiple-year flushing cycles. Stream flushing flows, when not required each year, are satisfied only by a "wet-year" flushing volume in months since the last runoff year with a flushing flow.

- Aqueduct Capacity Constraints. The capacity constraints at Tinemaha, Pleasant Valley, and Long Valley reservoirs were corrected to provide accurate simulations of storage and outflow during periods of excess runoff. Aqueduct capacity constraints were added for Long Valley and Pleasant Valley reservoir spilling and for Lower Owens River spill below the aqueduct intake.

- Tinemaha and Haiwee Reservoirs. Evaporation at the two reservoirs (9,000 af/yr [9 TAF/yr]) was inadvertently neglected. The aqueduct transit gains between Tinemaha and Haiwee reservoirs (9.3 TAF/yr) were improperly subtracted as transit losses. The specified minimum operational spilling (6 TAF/yr) was also inadvertently ignored. The net effect of these three water budget errors was that a loss of about 3 TAF/yr greater than the actual loss was simulated for the Owens Valley, out of a total of about 200 TAF/yr of simulated uses and losses. These water budget terms were corrected to properly include the maintenance spilling and aqueduct gains.

- Owens Valley Groundwater. The maximum monthly and annual groundwater pumping limits were slightly exceeded in some situations. Additional checks were added to satisfy the pumping limits at all times. These pumping limits were corrected to prevent the last month from overshooting annual limits.

- Lee Vining, Rush, and Bishop Creek inflows had been obtained from LADWP regressions of monthly runoff that accounted for Southern California Edison upstream storage, but did not always yield accurate estimates of historical flow in these three creeks. LAAMP 3.3 uses "actual" flows for these creeks from the LADWP-adjusted "Totals and Means" monthly database. Lee Vining, Rush, and Bishop Creek model inputs were corrected with LADWP data.

- Streamflow target deficits were calculated and used to more accurately estimate annual lake release and export target values.

The No-Restriction Alternative provides an opportunity to determine the overall effects of the corrected water budget terms and aqueduct constraints. This alternative is also the most appropriate for comparing the LAAMP 3.3 results with historical operations of the LA Aqueduct system.

Table 4-1 gives an average annual summary of the major hydrologic terms included in LAAMP 3.3 for the No-Restriction Alternative. These terms include inflows, pumping, gains, uses, losses, and exports for Mono Basin and the Owens Valley. The general magnitude of each term is given, although the year-to-year and seasonal variations are not shown in Table 4-1. The changes between LAAMP 2.0 and LAAMP 3.3 are relatively small. The largest changes were in water budget terms for Long Valley gains and Tinemaha to Haiwee area losses.

Table 4-2 gives a summary of the aqueduct capacity constraints that were specified for LAAMP 2.0 and LAAMP 3.3. The Aqueduct Modeling TAG review did not identify any major errors in the LAAMP 2.0 aqueduct constraint values, but several constraints have been added in LAAMP 3.3 that were not considered in LAAMP 2.0. The added capacity constraints include spill thresholds for Long Valley, Pleasant Valley, Tinemaha (aqueduct intake), and Haiwee reservoirs. Most of these capacity constraints are specified as inputs, so the effect of these new constraints on LAAMP 3.3 results can be directly determined.

The most important change in the aqueduct capacity constraints is the specified aqueduct capacity from Haiwee reservoir to Los Angeles. LAAMP 2.0 assumed a full capacity of 800 cubic feet per second (cfs) for all months, and LAAMP 3.3 uses the value of 750 cfs, as recommended by LADWP. This change reduced the simulated Haiwee exports during the first 6 months of each runoff year (April-September) by about 3 TAF/month, which generally caused increased reservoir storage and spreading during these runoff months. The monthly Haiwee export target values for October-March were correspondingly increased by 3 TAF/month to maintain the same annual export targets for each year type, as observed during 1970-1989.

A second important change in the capacity constraints was the minimum reservoir storage targets for Grant Lake and Lake Crowley reservoirs. The draft EIR simulations used a relatively high Grant Lake reservoir minimum storage of 20 TAF whereas LAAMP 3.3 uses a minimum storage of 11.5 TAF for the No-Restriction Alternative. Similarly, the draft EIR simulations used a Lake Crowley reservoir minimum storage of 120 TAF for all year types whereas, for the No-Restriction Alternative, LAAMP 3.3 specifies a minimum storage of 120 TAF for wet years, 100 TAF for normal years, and 80 TAF for dry years. The net effect of these changes was to allow increased storage fluctuations in both Grant Lake and Lake Crowley reservoirs that reduced spilling from the reservoirs during some wet years and therefore increased Mono Basin and Haiwee exports by an average of about 4 TAF/yr.

Table 4-3 compares LAAMP 3.3 and LAAMP 2.0 simulated results for the No-Restriction Alternative, point-of-reference condition, 6,377-Ft Alternative, 6,383.5-Ft Alternative, and 6,390-Ft Alternative, as described and analyzed in the draft EIR. The most important variables for comparison of LAAMP results are releases to Mono Lake, exports from Mono Basin, Owens Valley groundwater pumping (held constant once simulated for the No-Restriction Alternative), spreading, spilling, Haiwee exports, and deliveries to Los Angeles. Irrigation uses in Mono Basin, the Mono Lake median (exceeded 50% of the time) and ending elevations, and total Owens Valley uses are also given in Table 4-3.

No-Restriction Alternative. Figure 4-1 shows the simulated Mono Lake elevation for the No-Restriction Alternative. The comparison with historical lake levels is for reference only because the assumed starting elevation for the No-Restriction Alternative was 6,376.3 feet, not the historical elevation of 6,417 feet. Some of the effects of hydrologic variations, however, can be seen in both the historical and simulated lake level fluctuations.

The results indicate that although the simulated No-Restriction Alternative exports are greater than the historical exports, the lake level does not decline as much in the simulation as during the historical period because the lake surface area is smaller and lake evaporation is thus much more nearly balanced by the combined Mono Lake inflows. The simulated lake level declines to about 6,350 feet before increasing during the wet years near the end of the historical record.

The LAAMP 3.3 simulated lake levels are slightly lower than the draft EIR levels for the No-Restriction Alternative because LAAMP 3.3 simulated exports that averaged about 3 TAF/yr greater than LAAMP 2.0 simulated exports.

Figure 4-2 shows the annual simulated exports from Mono Basin for LAAMP 3.3 compared with LAAMP 2.0 results, with the historical annual exports shown for reference. No-Restriction Alternative exports averaged 85 TAF/yr, while the LAAMP 3.3 simulated exports averaged 87.9 TAF/yr. Almost all of this increase (3 TAF/yr) can be explained by the lower Grant Lake and Lake Crowley reservoir minimum storage targets specified in LAAMP 3.3 that reduce the spills from Grant Lake reservoir.

Figure 4-3 shows the simulated pattern of Mono Basin exports as a function of Mono Basin runoff for the No-Restriction Alternative, with the historical exports shown for comparison (indicated by runoff year number). When the available runoff is less than about 120 TAF/yr (about the average Mono Basin runoff), all the available runoff was simulated to be exported. As the available runoff increased, however, not more than about 140 TAF/yr was simulated to be exported. As the available runoff increased beyond 200 TAF/yr (1967, 1969, 1982, and 1983), the simulated export decreased substantially because of downstream aqueduct conditions limiting the need for Mono Basin exports. This simulated pattern reproduced the historical pattern of Mono Basin exports during periods of high runoff.

Figure 4-4 shows the simulated LAAMP 3.3 and LAAMP 2.0 patterns of annual groundwater pumping in the Owens Valley for the No-Restriction Alternative, along with the historical pumping volumes. Historical groundwater of about 20 TAF/yr before 1970 was generally from artesian "flowing wells" rather than from pumping because of the limited aqueduct capacity from Haiwee to Los Angeles. Groundwater pumping increased after 1970 to help supply water for the second aqueduct barrel between Haiwee and Los Angeles. Several pumping restrictions and annual agreements between Inyo County and Los Angeles have contributed to the differences between the simulated and historical values. Nevertheless, the similarity between LAAMP 2.0 and LAAMP 3.3 results and the historical fluctuations during the 1970-1989 period is apparent.

The simulated No-Restriction Alternative pumping pattern was used in all subsequent simulations of draft EIR alternatives and other water management alternatives. Consistent use of this pattern prevents any simulated loss of Mono Basin exports from causing increased simulated groundwater pumping in the Owens Valley. The long-term average groundwater pumping with LAAMP 3.3 was about 107 TAF/yr, only slightly less than the 111 TAF/yr simulated with LAAMP 2.0 for the draft EIR alternatives. Both simulations are close to the 1970-1989 historical pumping that averaged 107 TAF/yr.

Figure 4-5 shows the relationship between LAAMP 3.3 and LAAMP 2.0 simulated groundwater pumping and Owens Valley runoff. As runoff increases, the need for groundwater pumping to supply the aqueduct exports decreases. However, the minimum specified pumping of about 40 TAF/yr necessary for uses in the Owens Valley is simulated even in wet years. The greatest pumping, of about 190 TAF/yr, is simulated in normal years with reduced runoff, not dry years, because the export targets are sufficiently reduced in dry years to limit the need for groundwater pumping. Both LAAMP 2.0 and LAAMP 3.3 simulations of Owens Valley groundwater pumping follow the historical 1970-1989 pattern quite well.

Figure 4-6 shows the simulated Haiwee exports for both versions of LAAMP, with the historical values shown for reference. The large historical increase between 1969 and 1970 was the result of completion of the second aqueduct barrel from Haiwee Reservoir to Los Angeles. The match with historical exports from 1970 to 1989 for both LAAMP 2.0 and 3.3 simulations is quite good. The LAAMP 3.3 simulated average was 469 TAF/yr, and the historical 1970-1989 average was 468 TAF/yr. The year-to-year differences between the simulated and historical values are attributable to differences in the historical and simulated carryover storage.

All the LAAMP 3.3 revisions would be expected to contribute to simulated differences at Haiwee because Haiwee reservoir is the downstream end of the simulated aqueduct system. The LAAMP 3.3 simulated Haiwee exports for the No-Restriction Alternative were about 23 TAF/yr higher than LAAMP 2.0 results. Because Mono Basin exports were slightly greater (3 TAF/yr) and Owens Valley groundwater pumping was slightly less (3 TAF/yr), the simulated differences at Haiwee were likely caused by the corrected water budget terms in LAAMP 3.3. As Table 4-1 indicates, gains in Long Valley and transit gains between Tinemaha and Haiwee account for the largest changes. The net effect of all corrections and revisions between LAAMP 2.0 and LAAMP 3.3 produced an increase in Haiwee exports of about 23 TAF/yr.

The delivery of aqueduct water to Los Angeles is less than the simulated Haiwee exports because of transit losses between Haiwee reservoir and Los Angeles. The assumed value of transit losses in LAAMP 2.0 was 10.3 TAF/yr and the corrected value used in LAAMP 3.3, which includes Bouquet reservoir evaporation and fish flow releases, is 15.1 TAF/yr.

The following figures show LAAMP 3.3 simulated No-Restriction Alternative and historical monthly patterns for several important aqueduct flows and reservoir storage volumes for 1970 through 1989. These results confirm the general capability of LAAMP 3.3 to accurately simulate seasonal and year-to-year fluctuations in aqueduct operations.

Figure 4-7 shows the simulated and historical monthly flows in Lee Vining Creek. The periods of excess runoff when historical releases were made to Mono Lake were generally matched with the No-Restriction Alternative LAAMP 3.3 simulations. These results are similar to those for LAAMP 2.0 shown in Auxiliary Report 18.

Figure 4-8 shows the simulated and historical monthly flows in Rush Creek below Grant Lake reservoir. The periods of excess runoff when historical releases were made to Mono Lake were generally matched with the No-Restriction Alternative simulation. These results are similar to those for LAAMP 2.0 shown in Auxiliary Report 18.

Figure 4-9 shows monthly simulated and historical Grant Lake reservoir storage. The LAAMP 3.3 simulated storage pattern is quite simple because the excess runoff is stored in Grant Lake reservoir for later export. Spills to Mono Lake are simulated only if Grant Lake reservoir storage is exceeded before exports are needed downstream to satisfy Haiwee export targets.

Figure 4-10 shows the monthly simulated and historical West Portal exports. Differences between the simulated and historical Grant Lake reservoir storage and West Portal export patterns are directly related. Periods of reduced simulated exports result in increased simulated Grant Lake reservoir storage. Periods of increased simulated exports produce lower Grant Lake reservoir storage.

Figure 4-11 shows the monthly simulated and historical flows in the Upper Owens River below East Portal. Both the historical and simulated monthly flows fluctuate rapidly in response to available water in Grant Lake reservoir and downstream aqueduct conditions.

Figure 4-12 shows monthly simulated and historical Long Valley reservoir storage. The historical storage pattern is more variable than the simulated pattern because actual operations involve more flexible storage changes in anticipation of runoff and in response to unusual drought conditions.

Figure 4-13 shows the monthly simulated and historical Long Valley reservoir outflows. Only one period of spill is simulated. A spill likely would not occur because actual reservoir operations would include more flexible operations in anticipation of high runoff periods.

Figure 4-14 shows monthly simulated and historical Haiwee exports to Los Angeles. LAAMP 3.3 was successful in matching the seasonal fluctuations in the exports between the "runoff" months of April-September and the "pumping" months of October-March. The reduced simulated exports during dry years was also well matched with historical patterns. The monthly patterns simulated with LAAMP 2.0 were generally similar, with a slightly greater seasonal fluctuation because of the different export targets.

Many additional graphs are available in LAAMP 3.3 output spreadsheets to demonstrate historical confirmation for the individual areas of the Owens Valley simulated by LAAMP 3.3. Both annual and monthly graphs are available for comparison. These annual and monthly comparisons between LAAMP 3.3 No-Restriction Alternative simulation and the historical patterns suggest that while many of the features of historical 1970-1989 aqueduct operations can be simulated, results for each month of each year cannot be expected to match with the historical aqueduct operations.

Point-of-Reference Scenario. The LAAMP 3.3 point-of-reference scenario differs from the No-Restriction Alternative only by addition of minimum streamflows of 5 cfs in Lee Vining Creek and 19 cfs in Rush Creek. The annual water requirement for these minimum flows is approximately 17 TAF/yr. After an average Mono Basin runoff of about 125 TAF/yr and irrigation diversions of about 8.7 TAF/yr, an average of approximately 100 TAF/yr for possible export is left.

The simulated LAAMP 3.3 exports averaged 75.6 TAF/yr, approximately 3 TAF/yr more than simulated LAAMP 2.0 exports, primarily because of the lower minimum Grant Lake reservoir storage that eliminated some reservoir storage spills. Nevertheless, spills from Lee Vining Creek and Grant Lake reservoir averaged 24.4 TAF/yr, and net evaporation from Grant Lake reservoir averaged 2 TAF/yr.

LAAMP 3.3 simulated Owens Valley uses were about 3 TAF/yr greater, spreading was about 3 TAF/yr greater, and aqueduct operational spilling was about 6 TAF/yr greater than the corresponding values in LAAMP 2.0 results. Nevertheless, Haiwee exports simulated with LAAMP 3.3 were about 24 TAF/yr more than LAAMP 2.0 results reported in the draft EIR.

6,377-Ft Alternative. Several changes in the LAAMP 3.3 No-Restriction Alternative inputs are required to simulate the other draft EIR alternatives. Irrigation in Mono Basin is reduced to 0.7 TAF/yr (USFS's O-Ditch diversion only). The maximum Upper Owens River streamflow was reduced from 400 cfs to 300 cfs. The minimum Grant Lake reservoir storage was increased from 11.5 TAF to 20 TAF. The minimum Lake Crowley reservoir storage was increased to 120 TAF/yr for all year types. Uniform monthly West Portal export targets were specified.

Table 4-3 indicates that LAAMP 3.3 simulation of Mono Basin exports for the 6,377-Ft Alternative was 40 TAF/yr, about 11.8 TAF/yr less than draft EIR results. This difference was apparently caused by the revised logic for Mono Basin exports. In LAAMP 2.0, the maximum allowable export was simulated by specifying both the minimum and the maximum Upper Owens River flow target at 300 cfs. All available water was exported up to the 300-cfs limit in the Upper Owens River, which resulted in the maximum possible Mono Basin exports and also minimized the fluctuations in the level of Mono Lake during wet years.

In LAAMP 3.3, the export targets are calculated as a specified monthly fraction of the available annual export volume. Because several comments on the draft EIR suggested that an even monthly export pattern would be ideal for the Upper Owens River, this pattern was used for LAAMP 3.3 inputs. The calculated monthly export target is almost always less than the 300-cfs minimum used as the export target in LAAMP 2.0. Because of this revision in export calculation, it is understandable that LAAMP 3.3 would simulate less Mono Basin exports than LAAMP 2.0 for the 6,377-Ft Alternative. The simulated Mono Basin exports can likely be increased by specifying a variable monthly export target, with greater exports allowed during high runoff months. Simulated exports can likely be increased with lower minimum or seasonal Grant Lake and Long Valley reservoir storage targets.

LAAMP 3.3 simulated slightly reduced spreading (-2.6 TAF/yr), reduced pumping (-3.6 TAF/yr), increased spilling (+3.7 TAF/yr), and increased uses (+3.8 TAF/yr). Nevertheless, the average Haiwee exports simulated by LAAMP 3.3 were about 14.6 TAF/yr more than draft EIR results for the 6,377-Ft Alternative because of changes in the water budget terms described above. The LAAMP 3.3 simulated deliveries to Los Angeles averaged 9.8 TAF greater than the draft EIR reported.

The simulated spreading and spilling are perhaps less reliable than other modeled variables because the actual spreading and spilling patterns would be better managed during actual operations with runoff forecasts and modified reservoir operations and pumping patterns. Nevertheless, the LAAMP model provides a framework for comparative analysis of the magnitude of these "excess" terms for various proposed water rights decisions and aqueduct capacity restrictions.

6,383.5-Ft Alternative. Table 4-3 indicates that LAAMP 3.3 simulation of Mono Basin exports for the 6,383.5-Ft Alternative was 29.9 TAF/yr, about 7.8 TAF/yr less than draft EIR results. This difference was expected because of the revised logic for Mono Basin exports explained above. Because most of the difference in exports occurred during wet years, the LAAMP 3.3 simulated Mono Lake elevation was 5.8 feet higher at the end of the first 50 years than the draft EIR simulation.

The LAAMP 3.3 simulation of Haiwee exports for the 6,383.5-Ft Alternative was about 14.2 TAF/yr more and the Los Angeles deliveries averaged 9.4 TAF/yr more than the draft EIR simulation using LAAMP 2.0. This difference is a relatively small percentage (3%) of the total average Haiwee exports of about 390 TAF/yr as simulated by LAAMP 3.3.

Because greater lake releases are required in the early period of the simulation to raise Mono Lake to above the lake level triggers, a second 50-year simulation was made, starting at the ending elevation of the first 50-year simulation. The average Mono Basin exports increased from 29.9 to 40.2 TAF/yr, which is about 3.3 TAF/yr less than the draft EIR results for the second 50-year simulation of the 6,383.5-Ft Alternative.

6,390-Ft Alternative. Table 4-3 indicates that LAAMP 3.3 simulation of Mono Basin exports for the 6,390-Ft Alternative of 23 TAF/yr for the first 50-year period was about 6.8 TAF/yr less than draft EIR results. The LAAMP 3.3 simulation of Haiwee exports for the 6,390-Ft Alternative of 411.2 TAF/yr was about 12.6 TAF/yr more than the draft EIR simulation with LAAMP 2.0. The LAAMP 3.3 simulation of Los Angeles deliveries averaged 396.1 TAF/yr, 7.8 TAF/yr more than draft EIR results.

Table 4-3 indicates that the LAAMP 3.3 simulation of Mono Basin exports for the 6,390-Ft Alternative increased to 34.8 TAF/yr from the first to the second 50-year period, with a starting elevation of 6,395.2 feet. These simulated exports were 2.2 TAF/yr less than the corresponding LAAMP 2.0 export reported in the draft EIR.

A2. LAAMP Model Results Were Inappropriately Applied for Impact Assessments

Summary of Comments

Several of the draft EIR review comments and water rights testimony about the application of the LAAMP model for simulating draft EIR alternatives suggested different assumptions that might be considered by SWRCB as more appropriate for planning the future management of Mono Lake and the operation of the aqueduct system, including allowable diversions from the Mono Lake tributaries.

Several other comments stated that the LAAMP 2.0 results were used without due consideration to the uncertainty in the simulations and that additional interpretation of the model results was warranted.

Summary Response

The majority of the different operational assumptions recommended in the comments could have been simulated by specifying different inputs for LAAMP 2.0, without any model code changes. However, several of the suggestions involved management conditions that had not been anticipated during the development of LAAMP 2.0 for simulation of draft EIR alternatives.

The following suggested revisions have been included in LAAMP 3.3 to respond to these comments:

- LAAMP as a Planning Model. "Planning" has been added to the name of the LAAMP model. LAAMP was designed to support relative comparisons among water rights alternatives, not as a basis for day-to-day aqueduct operations.

- Monthly Mono Export Patterns. A monthly target distribution of available exports has been added as the basis for calculating monthly Mono Basin exports.

- Mono Lake Water Budget. Cain Ranch rainfall and the unmeasured inflows can now be adjusted with specified factors to provide a modified water budget for comparative simulations.

- Lake Crowley Reservoir Storage Capacity. An output variable to explicitly document spill from Lake Crowley reservoir has been added. Spill above the specified Pleasant Valley outlet capacity is also explicitly modeled.

- Owens Gorge Target Flows. Monthly Owens Gorge target flows for each year type and the assumed Gorge transit loss can now be specified.

- Lower Owens Target Flows. Monthly Lower Owens River target flows for each year type and the aqueduct intake capacity are now specified. Spills to the Lower Owens River and operational spilling from the aqueduct gates are now reported separately.

- Aqueduct Capacity at Haiwee Reservoir. Aqueduct capacity from Haiwee reservoir to Los Angeles is now specified in the input file along with the Haiwee export targets.

- Haiwee and Tinemaha Reservoirs. Minimum and maximum monthly target storage values can now be specified for Tinemaha and South Haiwee reservoirs. North Haiwee reservoir is simulated with a constant specified volume. Evaporation is simulated from the three reservoirs. A maximum change in storage in South Haiwee can be specified to simulate the limited inflow capacity.

- Output Spreadsheets. Output spreadsheets have been revised to provide a complete water budget for each area of interest. Many of the spreadsheet graphs have been revised as suggested by reviewers.

- Historical Aqueduct Data. LADWP data have been included in the output spreadsheets so that monthly values for 1970 to 1989 and annual values for 1940 to 1989 can be compared with LAAMP simulations. These data provide the necessary information for historical verification of LAAMP 3.3 results.

- Groundwater Pumping. The option to use a previously calculated pumping pattern has been incorporated into LAAMP 3.3, without the need for a second LAAMP model.

- Hydrologic Data for 1990-1992. LADWP has supplied the required hydrologic data for runoff years 1990 to 1992.

- Hydrologic Input File. A new input spreadsheet was developed to allow any selected sequence of 50 years to be used as the hydrologic input for LAAMP.

LAAMP is a planning model that can demonstrate the likely effects of increasing constraints on the allocation of water from the Mono Lake tributaries. The LAAMP results may be used to assist in reaching the water rights decision, but cannot simulate the actual day-to-day operations of the LA Aqueduct system. Several necessary simplifying assumptions within the monthly model contribute to the remaining level of uncertainty in the results. The LAAMP model is most useful as a comparative tool for describing likely effects of incremental changes in the set of constraints imposed on the Mono Lake tributary stream diversions.

Detailed Response

Comparative Simulations. Several comments on the draft EIR suggested modified target streamflows, Mono Lake elevation trigger conditions, target reservoir storage levels, and other selected LAAMP input assumptions. Many of these recommended aqueduct constraints and operational conditions could have been simulated using LAAMP 2.0, and almost all of the suggested changes in aqueduct operations can now be simulated with LAAMP 3.3. However, a full set of comparative simulations using different aqueduct constraints or lake management conditions have not been made by SWRCB staff or consultants. Copies of LAAMP 3.3 have been distributed during the water rights hearings, and additional copies can be obtained from SWRCB staff by interested parties.

Those conditions and constraints which are under consideration by SWRCB for inclusion in the water rights order may be simulated using LAAMP 3.3 during SWRCB staff analyses period. Examples of comparative simulations that can be made with LAAMP 3.3 include:

- Currently recommended DFG streamflows for Mono Basin streams, Upper Owens River, Owens Gorge, Middle Owens River, and Lower Owens River.

- The LADWP Mono Lake Management Plan, introduced during the Mono Basin water rights hearings.

- Mono Lake level triggers can be adjusted to allow more exports in dry and normal years relative to wet years. This will likely increase lake level fluctuations and reduce the total Mono Basin exports but may provide greater water supply benefits to Los Angeles.

- Drought analyses can be performed using the input spreadsheet INPHYD.WK1 to select a sequence of years that includes 1987-1992, for example. Adjustments in the unmeasured inflow and rainfall terms are possible.

- Additional sensitivity and historical calibration simulations can be made. The historical data provided in LAAMP 3.3 output spreadsheets will facilitate these comparisons.

- The effects of different hydrologic sequences can be determined by rearranging the historical record using the INPHYD.WK1 spreadsheet. This will allow the uncertainty in the likely lake level changes during the transition period to a new protected lake level to be determined.

Two comparative simulations using LAAMP 3.3 that will be described in this response to comments include the currently recommended DFG streamflows, and the DFG-recommended streamflows in combination with the 6,390-Ft Alternative lake level triggers. Two 50-year simulations of each alternative will be reported because the transition period to reach the dynamic equilibrium lake levels requires many years.

DFG Streamflow Recommendations. LAAMP 3.3 has been used to simulate the DFG streamflow recommendations, including the suggested maximum Upper Owens River flow of 200 cfs. Table 4-4 shows the assumed DFG streamflow values for each year type as input to LAAMP 3.3, with flushing flows added each year to the June streamflow recommendations.

The results of the simulation are shown in Table 4-3. Because the DFG recommendations were not simulated in the draft EIR, no comparison values for LAAMP 2.0 are given. The LAAMP 3.3 simulated Mono Basin exports with the DFG flows averaged about 27.5 TAF/yr. The simulated exports during the second 50-year simulation did not change, although the Mono Lake elevations were higher, fluctuating between about 6,390 and 6,400 feet.

The DFG-recommended streamflows require an average of about 94 TAF/yr (Table 4-4). This leaves approximately 30 TAF/yr for possible exports from Mono Basin. However, because Mono Basin exports may not be required in wet years, some of this available water is released to Mono Lake. Because the specified even monthly export targets with a maximum Upper Owens River streamflow of 200 cfs, some spills from Grant Lake reservoir occur in normal years. A lower minimum Grant Lake reservoir storage target and a variable export target may allow some additional water to be exported to the LA Aqueduct system, but not more than 30 TAF/yr is available as a long-term average.

The Haiwee exports simulated with LAAMP 3.3 for the DFG- recommended streamflows averaged 415.8 TAF/yr, with Los Angeles deliveries of 400.7 TAF/yr.

DFG Streamflows with 6,390-Ft Alternative Lake Level Triggers. A second example of the possible combinations of streamflow requirements and lake level triggers was simulated with LAAMP 3.3. The DFG streamflows were combined with the 6,390-Ft Alternative lake level triggers. The lowest lake trigger condition, for lake levels below 6,391 feet, allowed no export in dry years, 15% in normal years, and 30% in wet years.

Table 4-3 shows the results of the first and second 50-year LAAMP 3.3 simulation with these conditions. For the first 50-year simulation, Mono Basin exports averaged about 19.6 TAF/yr. The average Mono Basin exports increased to 27.5 TAF/yr during the second 50-year simulation, with a starting elevation of 6,398.1 feet.

As the No-Diversion Alternative has shown, the rise of Mono Lake level will be a relatively slow process even with no allowable exports, unless extremely wet hydrological conditions, such as occurred in the 1980s, reappear. Both the DFG-recommended streamflows and the 6,390-Ft Alternative lake level triggers provide some available water for Mono Basin exports. For the simulated cases with DFG-recommended streamflows, the rise in Mono Lake level requires more time but will likely reach 6,390 feet within 50 years, regardless of the hydrologic sequence (as long as the long-term average Mono Basin runoff remains about 125 TAF/yr).

Neither LAAMP 2.0 simulations used in the draft EIR nor LAAMP 3.3 simulations are sufficiently accurate to control actual daily operation of the LA Aqueduct system. However, both LAAMP 2.0 simulations used in the draft EIR and LAAMP 3.3 simulations can be used as reliable guides for comparing the effects of water rights alternatives on the LA Aqueduct system.

LAAMP results were not directly used in draft EIR impact assessments without interpretation by the impact assessment staff. Many different methods for summarizing and interpreting the LAAMP results were used. The 50-year monthly simulations produced a range of likely monthly average conditions caused by seasonal and year-to-year hydrological fluctuations. However, variations within the month caused by daily streamflow patterns were recognized by those staff performing the impact assessments. In addition, possible inaccuracies in the monthly LAAMP results were recognized and considered by staff performing the impact assessments. Commenters may differ in their perception of the magnitude of these errors and uncertainties, but the SWRCB consultants attempted to include these factors in all impact assessment methodologies that used LAAMP results.

A3. Mono Lake Water Balance Model Was Erroneous

Summary of Comments

Some commenters stated that the Mono Lake water budget model, as described in Appendix A and used in the LAAMP model to simulate the likely fluctuation in Mono Lake elevation with different recommended streamflow and lake level triggers, was inaccurate and provided poor predictions of likely future Mono Lake levels.

In particular, the assumed annual and monthly pattern of evaporation, the assumed average and monthly pattern of rainfall, and the assumed average and monthly pattern of unmeasured inflow terms were each disputed. Several other comments indicated that portions of the Mono Lake water budget description in Appendix A were unclear or improperly explained.

Summary Response

Opinions differ on the relative magnitude of the three "unmeasurable" terms in the Mono Lake water budget, which are lake-average evaporation, lake-average rainfall, and unmeasured inflows (in addition to releases from the four LADWP diverted tributaries). Potential errors exist in the measured releases from the four LADWP diverted tributary streams. However, despite differences of opinion and possible errors, the water budget model presented in Appendix A provides an empirically accurate match with historical lake level fluctuations and is therefore an adequate model for judging the relative differences in Mono Lake level fluctuations that would likely result from alternative recommended streamflows and lake level controls.

Detailed Response

The only historical source of rainfall data for 1940-1989 is the LADWP Cain Ranch station. The draft EIR water budget for Mono Lake used unadjusted Cain Ranch rainfall that averaged 11 inches per year although some estimates of lake-average rainfall are as low as 8 inches per year. The choice of which average rainfall value to use cannot be resolved with the historical lake level pattern because the assumed evaporation and the residual unmeasured inflow terms will compensate for whatever choice of rainfall is selected. Unadjusted Cain Ranch measured rainfall was one of the appropriate choices, and the remainder of the water budget is consistent with this choice.

The determination of the assumed annual and monthly pattern of evaporation is described in the "Evaporation and Precipitation" section of Appendix A of the draft EIR. The match of the measured surface temperatures with DYRESM simulations using various evaporation coefficient values provided the best estimate of 48 inches per year, as shown in Figure A-5. This selected evaporation rate already includes an adjustment in freshwater evaporation to account for salinity effects and is largely independent of the assumed average rainfall because little rain falls during the period of maximum evaporation. Therefore, the assumed evaporation rate of 48 inches, which was derived from the heat-budget portion of the DYRESM model, is an adequate estimate for the Mono Lake water budget.

Additional information in Auxiliary Report 14 indicates that the DYRESM temperature model results confirmed the seasonal pattern of evaporation in Mono Lake although LADWP suggested that a seasonal evaporation pattern is obvious and needed no confirmation. Perhaps the surprising result was that the simple monthly residual analysis described in Appendix A of the draft EIR yielded a strong seasonal evaporation pattern, as shown in Table A-2. The seasonal pattern was assumed to be independent of the specified annual rate, so a constant monthly fraction of the annual evaporation rate is assumed in LAAMP.

The unknown annual evaporation rate is properly treated as a model assumption, with the value specified by the user, as was allowed in LAAMP. Auxiliary Report 5, which describes the LAAMP model logic, provides the method used to allow the user-specified evaporation rate to be incorporated into the "unmeasured inflow" term of the Mono Lake water budget.

LADWP objected to the explanation of the unmeasured inflow term given in Appendix A. The unmeasured inflow term was estimated from regression of the residual difference between the observed change in Mono Lake volume and the measured monthly releases from Lee Vining and Rush Creeks, the measured monthly Cain Ranch rainfall, and the assumed monthly evaporation terms. The unmeasured inflow was estimated as a constant (2.915 TAF/month) and a fraction (22.8%) of measured monthly runoff of the four tributary streams.

LADWP objected to describing the constant term, estimated to be approximately 3 TAF/month, as entirely groundwater inflow and the fraction of runoff as entirely surface inflow. However, the main point in Appendix A was to provide some reasonable confirmation of the estimated unmeasured inflow terms. Because Mill and DeChambeau Creeks were included in the "unmeasured inflow" term and account for 18% of the runoff from the four LADWP diverted tributaries, the actual unmeasured runoff term is about 3 TAF/month plus 5% of runoff from the four tributary streams. Therefore, the maximum possible groundwater inflow, consistent with the assumed evaporation of 48 inches per year, is about 3 TAF/month plus 5% of runoff from the four tributary streams. LADWP is correct, however, in stating that the groundwater component is not measured and cannot be determined from the regression analysis.

Peter Vorster, in his comment letter, suggested that the LAAMP model simulates higher lake levels than simulated by his annual lake model for the same level of Mono Basin exports. One possible explanation is that the unmeasured inflow term of the LAAMP model water budget was estimated without any Walker or Parker Creek releases because these releases were assumed to be totally used for irrigation. However, some of this water may have entered Mono Lake and so would have been included in the "unmeasured" inflow term. Because LAAMP accounts for streamflow releases to Mono Lake from Walker and Parker Creeks, the unmeasured inflow term may cause the model to "double count" the portion of the Walker and Parker Creek water that historically made it into the lake. This amount of water is probably less than 3 TAF/year. Because this possible error affects each alternative lake level simulation, the possible effect on the differences between alternatives is much smaller than the possible effect on the magnitude of releases required to maintain the lake at a selected elevation.

A4. Alternatives Were Not Formulated Using DFG-Recommended Streamflows

Summary of Comments

Several parties objected that alternatives were not formulated using DFG-recommended streamflows and that the LAAMP model did not assume DFG-recommended streamflows as the minimum flows in simulating alternatives. Specific concerns were expressed about the assumed specified minimum streamflows and ecosystem maintenance flows (i.e., channel maintenance and flushing flows) for the Mono Lake tributaries and the use of a 300-cfs flow as the maximum streamflow in the Upper Owens River below East Portal.

Summary Response

DFG's minimum instream flow recommendations were not incorporated into the LAAMP modeling nor were alternatives formulated based on DFG's recommendations because final recommendations were not available in time to be incorporated in the draft EIR. SWRCB intended to conduct LAAMP simulations incorporating DFG's recommendations once they were finalized, but the recommendations were not received until after the draft was prepared. The final LAAMP runs have been completed and presented as part of the water rights hearings. None of the minimum flow criteria, ecosystem maintenance flows, or maximum Upper Owens River flows presented in the draft EIR are based on DFG's recommendations; they serve only as reasonable assumptions to use in operating LAAMP. SWRCB will decide how to incorporate these recommendations in its order.

SWRCB recognized potential Upper Owens River channel impacts and assumed a maximum 300-cfs Owens River flow below East Portal in LAAMP. DFG's Upper Owens River Stream Evaluation Report was unavailable even in draft form at the time that LAAMP assumptions were finalized. SWRCB recognizes that it may adopt other management rules after development of DFG instream flow recommendations or other identified requirements or limit maximum instantaneous exports through East Portal. LAAMP 3.3 allows monthly target exports that may assist in setting appropriate conditions for the Upper Owens River.

Detailed Response

As noted above, DFG's minimum instream flow recommendations were not available in time to be incorporated in the draft EIR. The LAAMP modeling was a fundamental portion of the EIR, and nearly every topic area relied on the LAAMP modeling output to develop appropriate impact assessments and mitigations. To meet project deadlines, LAAMP modeling assumptions were finalized in April 1992 to allow sufficient time to run LAAMP and provide output to the other topic areas for impact assessment.

SWRCB decided not to attempt to predict possible DFG streamflow recommendations. SWRCB still believes this decision was proper because DFG's final report for Rush Creek was transmitted to interested parties by letter dated June 21, 1993, and DFG's final reports for Lee Vining Creek, Parker Creek, Walker Creek, and the Upper Owens River were transmitted to interested parties by letter dated September 1, 1993. These final recommendations could not be used in LAAMP and still allow the project schedule to be met. Draft DFG recommendations were available on Rush and Lee Vining Creeks during finalization of LAAMP assumptions but were changed by DFG when the final reports were distributed. SWRCB had to specify minimum flow criteria because otherwise the LAAMP model would occasionally simulate dewatering of the streams for export diversions.

SWRCB took a hydrologic approach for developing the minimum flow criteria that were used in LAAMP. As stated on page 2-12 of the draft EIR, minimum flow criteria were set at levels equivalent to a 90% frequency of occurring in each month. Ecosystem maintenance flows were set at a level corresponding to the median June flow above the diversions during the historical 1940-1989 period. The goal was to intentionally set the minimum flow criteria at moderate levels so that they would not limit the range of potential lake level alternatives.

Using only DFG flows to determine alternatives would have unfairly biased SWRCB's analysis and full disclosure requirements. DFG recommendations were properly evaluated by experts representing several of the parties involved in the water rights hearing. SWRCB staff has reviewed the evidence and testimony and has made recommendations as to appropriate streamflow releases.

Mono Lake levels, not minimum flow criteria, drove the LAAMP-modeled streamflows. This factor was evident in LAAMP model output because minimum flow criteria used in LAAMP were typically exceeded by additional streamflow releases that were needed to keep the Mono Lake surface above selected target elevations associated with each alternative. Consequently, the minimum flow criteria assumed for the LAAMP simulations became less of a determining factor as the target lake elevation increased and were not a factor under the No-Restriction Alternative.

Several commenters questioned the rationale for assuming a maximum 300-cfs Owens River flow below East Portal of the Mono Crater Tunnel. The maximum flow of the Upper Owens River downstream of East Portal currently is limited to 400 cfs, reflecting a current operational constraint adopted by LADWP to prevent channel damage. Peak flows exceeding 400 cfs in the Upper Owens River below East Portal can, however, damage the channel. After consultations about channel damage with several of the major landowners and land managers on the Upper Owens River (see page 3C-45 of the draft EIR), a maximum flow of 300 cfs was selected.

A constant export rate, as recommended by DFG, could not be modeled explicitly because changes would be required in simulated Grant Lake reservoir operations. This rate can now be simulated with LAAMP 3.3. As stated on page 2-14 of the draft EIR, SWRCB recognizes that it may adopt other management rules after DFG instream flow recommendations or other identified requirements are developed.

A5. The Drought Analysis Was Erroneous and Improperly Applied for Impact Assessment

Summary of Comments

Some commenters suggested that the drought analysis presented in Appendix H of the draft EIR was erroneous and improperly applied to assess impacts of possible declines in Mono Lake during periods of extended drought. In particular, the assumed runoff, release flows, and rainfall values were questioned.

Summary Response

The first-year release factors (i.e., percent of runoff released to Mono Lake) were incorrectly calculated in the draft EIR; full release of all runoff (at a release factor of 1) is a more appropriate assumption to account for minimum streamflow requirements. However, this error for the first year of a multiple-year drought does not significantly affect the results of the drought analysis.

Droughts are likely to occur and to persist in Mono Basin for an uncertain duration, and the relative inflow terms (i.e., runoff, rainfall, and unmeasured inflow) are likely to remain at about 60% of average for the duration of a drought. Because evaporation remains relatively constant during a drought, the lake level will decline the most at highest lake levels and, for all alternatives, would eventually reach equilibrium (i.e., have an inflow approximately equal to evaporation) at an elevation of about 6,370 feet with no diversions.

Detailed Response

In addition to noting the first-year error in the drought analysis, LADWP reviewers contend that the best estimate of the duration of a drought with a 1% chance of occurring is 10 years rather than the 8 years used in the draft EIR. For purposes of the final EIR, the drought simulations of Appendix H were revised using release factors of 1 in the first year, to approximate minimum streamflow requirements, and using a 10-year drought duration. These simulations appear in the errata, Chapter 7, as revised Tables H-6 through H-12 of the draft EIR. The results have also been used to describe the project alternatives in Chapter 2.

The changes in minimum lake levels resulting from these revisions are minor for most alternatives. Under the 6,372-Ft Alternative, the resulting lake level is 0.2 foot higher than estimated in the draft EIR. For the 6,377-Ft Alternative, the resulting lake level is 0.1 foot lower.

The revised scenarios result in appreciably lower lake levels compared to the draft EIR estimates for the higher lake-level alternatives and for the No-Restriction Alternative. For example, under the 6,390-Ft Alternative, the revised estimate is 1.2 feet lower; for the No-Restriction Alternative, it is 3.7 feet lower.

A review of conclusions drawn in each of the topic areas using the results of the drought analysis reveals that no significant changes are warranted as a result of the revised estimates.

LADWP reviewers also disputed the estimate of the fraction of normal runoff that would be experienced during a drought period. The estimate in the draft EIR, 60%, is based on actual experience during the recent 7-year drought. These reviewers argue that a figure of 65% is more appropriate. Rather than presenting a critique of that estimate, we simply note that a difference of 5% is within the range of uncertainty of this estimate and that the effect of that difference on the conclusions based on the simulations is minor. Other detailed criticisms offered by LADWP reviewers, if accepted, would likewise result in relatively minor changes to the simulations.

WATER QUALITY (B)

B1. Mono Lake Salinity Characteristics Were Not Properly Described

Summary of Comments

Several comments concerned the draft EIR description of Mono Lake salinity and dissolved mineral characteristics. Because the salinity of Mono Lake is an important ecological variable that is directly affected by the lake level alternatives, it should be properly and clearly discussed in the draft EIR. Several of the draft EIR assumptions about the chemical composition of Mono Lake were also questioned.

Summary Response

Chapter 3B, "Water Quality", and Appendix A, "Mono Lake Water Budget", in the draft EIR and Auxiliary Report 17, "Water Quality Data Report", contain descriptions and assessments of available historical Mono Lake water quality data and discuss likely changes in salinity and other water quality parameters that would occur under each lake level alternative.

The draft EIR used salinity as a general term for the mass of total dissolved solids (TDS) within a unit volume of Mono Lake water, with units of g/l. Assumptions in the draft EIR that a constant mass of solids (approximately 285 million tons) will remain in Mono Lake regardless of lake volume (a known function of lake elevation), and that all major minerals will remain dissolved, without significant precipitation of minerals at salinities as high as 150 g/l, appear to be valid.

Measurement of Mono Lake salinity as field or laboratory electrical conductivity (EC), specific gravity, or gravimetric (dried and weighed) TDS values will always involve some errors and will continue to require assumed conversion factors for comparison of these different types of measurements. Nevertheless, the general agreement between the various approaches to salinity measurement indicate that the TDS estimates used in the draft EIR provide an adequate representation of the magnitude and likely fluctuations in Mono Lake salinity for each alternative.

Detailed Response

The draft EIR used salinity as a general term for the mass of TDS within a unit volume of Mono Lake water (concentration), with units of g/l. Various methods for measuring and expressing mineral composition, such as parts per million, require conversion factors to standardize. Table 3B-2 of the draft EIR gives results from Auxiliary Report 17 to describe the chemical composition of Mono Lake water, standardized to a salinity value of 100 g/l.

Auxiliary Report 17 compares all available historical Mono Lake mineral measurements. These data suggest that the chemical composition of Mono Lake water has remained generally constant (within the errors of these historical laboratory chemical analyses). When normalized by the EC value or chloride concentration, the chemical concentration of each mineral is about the same for each sample. Several samples from the LADWP evaporation ponds indicate that the chemical composition remains constant to at least 150 g/l (Figures 6 to 8 of Auxiliary Report 17). The estimated TDS values based on lake volume generally are similar to the laboratory TDS measurements for these LADWP mineral samples collected between 1975 and 1989.

LADWP estimated the total salt content of Mono Lake to be about 285 million tons (LADWP 1987). The calculated salinity (in g/l) for the historical changes in Mono Lake volume indicate that the salinity has doubled from 42 g/l at a volume of 5 million acre-feet (MAF) at elevation 6,427 feet to about 84 g/l at a volume of 2.5 MAF at elevation 6,380 feet (Figures 3, 4, and 5 of Auxiliary Report 17). Because most salinity measurements have been made since 1975, direct verification of low salinity estimates cannot be obtained. However, the historical salinity fluctuations observed during the rapid rise in Mono Lake between 1983 and 1986 generally confirm the volumetric dilution of Mono Lake salinity.

University of California (UC) Santa Barbara staff measured salinity stratification of about 15 g/l in Mono Lake during the meromixis between 1983 and 1987. These observations indicate that salinity may not be uniform throughout Mono Lake, although mixing processes will tend to produce uniform salinity during periods with stable lake elevations.

Measurement of Mono Lake salinity as field or laboratory EC, specific gravity, or gravimetric (dried and weighed) TDS values will always involve some errors and will continue to require assumed conversion factors for comparison of these different types of salinity measurements. LADWP experiments, as well as field data, suggest that Mono Lake specific gravity increases with salinity as:

$$\text{Specific Gravity} = 1.004 + \text{TDS (g/l)} * 0.00076$$

The estimated Mono Lake TDS and specific gravity values for each elevation are given in Table A-1 in Appendix A to the draft EIR. Footnote "e" gives an incorrect equation for estimating specific gravity from TDS.

Other researchers may use different measurements and/or conversions to index Mono Lake salinity. Nevertheless, the general agreement between the various approaches to salinity measurement indicate that the TDS (g/l) estimates used in the draft EIR provide an adequate representation of the magnitude and likely fluctuations in Mono Lake salinity for each alternative.

B2. Upper Owens River and Lake Crowley Reservoir Water Quality Effects Were Not Adequately Considered

Summary of Comments

Several comments suggested that the effects of reduced Mono Basin exports on Upper Owens River and Lake Crowley reservoir were not adequately described. More attention to the possible impacts of increased temperatures and increased phosphorus concentrations on these aquatic and fisheries resources should have been provided in the draft EIR. There was confusion about the measurement units for phosphorus described in the draft EIR.

Summary Response

The units of measurement for phosphorus were total or dissolved milligrams per liter of elemental phosphorus (mg/l-P). The average calculated inflow concentration at Lake Crowley reservoir during the point of reference, about 0.2 mg/l-P, is considerably higher than the inflow criteria of 0.05 mg/l-P suggested by the EPA. The expected behavior of phosphorus in lakes or reservoirs is to be adsorbed by particulates and settle to the sediment, so that the reservoir outflow concentration is often less than half the inflow concentration. This behavior accounts for the difference between the estimated inflow and measured outflow concentrations of total phosphorus for Lake Crowley reservoir.

The likely increase in phosphorus in average Lake Crowley reservoir inflow was determined to be less than significant because the point-of-reference condition was already much greater than the threshold for possible eutrophication control of phosphorus. The draft EIR reported that the average inflow concentration would increase to 0.3 mg/l-P under the No-Diversion Alternative.

The likely effects of increased temperature in the Upper Owens River and Lake Crowley reservoir were described in Chapter 3D, "Fisheries". The draft EIR described these habitats as important elements in the Owens River basin fisheries and provided adequate information for independent assessment of their importance relative to the Mono Lake tributary streams.

Detailed Response

Considerable discussion of the Upper Owens River and Lake Crowley reservoir temperatures and phosphorus concentrations, as well as other minerals with possible geothermal sources (boron, fluoride, arsenic) are contained in the draft EIR in Chapter 3B, "Water Quality"; Chapter 3D, "Fisheries"; Appendix K, "Water Quality Assessment Model"; and Auxiliary Report 17, "Water Quality Data Report".

The units of measurement for phosphorus were not clearly stated in the draft EIR. The units were total or dissolved mg/l of elemental phosphorus (mg/l-P), although the historical LADWP measurements were originally reported as mg/l of phosphate (mg/l-PO_4). These units are those normally used in eutrophication nutrient analyses. The average calculated Lake Crowley reservoir inflow concentration, of about 0.2 mg/l-P, is considerably higher than the suggested EPA inflow criteria of 0.05 mg/l-P.

The Long Valley module of the water quality assessment model (Appendix K of the draft EIR) described the monthly mass-balance analysis of available historical measurements of phosphorus in the Upper Owens River and tributaries to Lake Crowley reservoir.

Phosphorus concentrations in Big Springs and Hot Springs are very high, and the average inflow concentration to Lake Crowley reservoir is several times higher than established thresholds for eutrophication control. These high inflowing phosphorus concentrations are sufficient to eliminate any possibility of phosphorus limitation, and this condition was the basis for determining that likely increased phosphorus concentrations from various lake level alternatives would not be viewed as significant impacts.

The expected behavior of phosphorus in lakes or reservoirs is to be adsorbed by particulates and settle to the sediment, so that the reservoir outflow concentration is often less than half the inflow concentration. This is generally confirmed by the available historical Lake Crowley reservoir outlet measurements, which average about 0.1 mg/l-P (Figure K-12). This accounts for the difference between the estimated inflow and measured outflow concentrations of total phosphorus.

Although higher lake level alternatives would provide less Mono Basin exports (with a phosphorus concentration of less than 0.05 mg/l-P) for dilution of Upper Owens River and Hot Creek phosphorus concentrations, the likely increase in average Lake Crowley reservoir inflow phosphorus was determined to be less than significant. The draft EIR reported that the average inflow concentration would increase to 0.3 mg/l-P under the No-Diversion Alternative.

More detailed study of the effects of phosphorus in Lake Crowley reservoir, and the benefits of possible control of these nutrient sources, may be appropriate. However, the direct effects of the Mono Basin water rights decision on these historical sources of phosphorus were not determined to be significant.

The possible effects of increased temperature in the Upper Owens River and Lake Crowley reservoir were described in Chapter 3D, "Fisheries". The draft EIR described these habitats as important elements in the Owens River basin fisheries and provided adequate information for independent assessment of their importance relative to the Mono Lake tributary streams.

B3. City of Los Angeles Drinking Water Quality Effects Were Not Adequately Considered

Summary of Comments

Several comments suggested that the discussion of likely effects on City of Los Angeles drinking water was not adequate. The indirect effects of blending more MWD water sources from the Colorado River and the Sacramento-San Joaquin River Delta should have been quantified and included in the determination of significant effects. The possibility that some drinking water standards (i.e., for arsenic and dissolved organic carbon) might change in the near future should have been factored into the determination of significance, and water quality standards should not be used as the only measure of significance.

Several comments referred to the water quality assessment model (Appendix K) as an unreliable method for determining the effects of possible reduced Mono Basin exports on City of Los Angeles drinking water quality.

Summary Response

The draft EIR used existing drinking water criteria for evaluating the significance of the simulated increases in monthly average concentrations at the LA Aqueduct filtration plant. However, the simulated pattern of monthly concentrations for each alternative were described so that independent judgment of the significance of calculated increases in the selected parameters can be made.

The secondary changes caused by blending additional replacement water necessary to meet demands were not included in the mass-balance model. However, it is unlikely that existing drinking water criteria would be violated more frequently using additional MWD water for blending.

Because of the relatively large scatter in historical LADWP data, a field sampling effort was made by SWRCB consultants during 1991 to independently measure the important water quality variables at the major tributary locations upstream of Lake Crowley reservoir. These data generally confirmed the increase in concentration with EC of each sample at each location, shown in graphs of the available data in Auxiliary Report 17.

Detailed Response

The effects of alternative LA Aqueduct operations on the City of Los Angeles drinking water quality was given major consideration in the draft EIR. Chapter 3B, "Water Quality"; Appendix K, "Water Quality Assessment Model"; and Auxiliary Report 17, "Water Quality Data Report", each address this important topic.

The comparison of LA Aqueduct and MWD water quality is discussed beginning on pages 3B-20 of the draft EIR, and the 1985-1990 average concentrations for MWD sources are given in Table 3B-5. However, the mass-balance model described in Appendix K did not include the secondary effects of blending MWD water with LA Aqueduct water.

The draft EIR used existing drinking water criteria for evaluating the significance of the simulated increases in monthly average concentrations at the LA Aqueduct filtration plant. The possibility of changes in the standards (i.e., for arsenic) or new regulated parameters (i.e., for dissolved organic carbon) was not included in the draft EIR criteria for determining impact significance. However, the simulated pattern of monthly concentrations for each alternative was described in Appendix K so that independent judgment of the significance of calculated increases in the selected parameters can be made using the information presented in the draft EIR.

The confirmation of the mass-balance water quality assessment model uses the available historical LADWP mineral data presented in Auxiliary Report 17. Because of the relatively large scatter that was present in these historical records, a field sampling effort was made by SWRCB consultants during 1991 to independently measure the important water quality variables at the major tributary locations upstream of Lake Crowley reservoir. Although regression equations using the available historical data may not explain much of the scatter (i.e., low R-square values), the general increase in concentration with EC of each sample was evident in graphs of the available data, shown in Auxiliary Report 17.

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Because each of the selected water quality parameters for impact assessment are generally considered conservative, the use of a simple mass-balance model approach for estimating the effects of alternative aqueduct operations on LA Aqueduct concentrations was utilized. The results of the monthly LA Aqueduct model were used to determine the changes in concentrations at the LA Aqueduct filtration plant. The secondary changes caused by blending additional replacement water necessary to meet demands were not included in the mass-balance model. However, it is unlikely that existing drinking water criteria would be violated more frequently using additional MWD water for blending.

VEGETATION (C)

C1. Failure to Consider the Loss of Wetlands at Lake Crowley Reservoir

Summary of Comments

Several commenters indicated that 2,400 acres of high-quality wetlands were eliminated by the inundation of Lake Crowley reservoir, a component of the LADWP water conveyance system downstream of Mono Lake. The commenters believed that this loss should have been tabulated and considered in the draft EIR when changes that occurred from prediversion times to the 1989 point-of-reference were calculated.

Response

SWRCB determined that the prediversion conditions were to be described as they existed after the construction of the LADWP water conveyance system, but before the initiation of water exports. Impacts resulting from construction of the water conveyance system were purposefully excluded from the analysis unless construction impacts, together with diversion impacts, resulted in a cumulative impact. In this case, the loss of wetlands at Lake Crowley reservoir had no direct relationship with the loss of riparian vegetation along the Upper Owens River during the diversion period.

C2. Failure to Consider the Significant Prediversion Marsh and Meadow Wetlands on the Rush Creek Delta

Summary of Comments

Several commenters indicated that a 133-acre marsh and meadow wetland that existed on the Rush Creek delta under prediversion conditions should have been recognized in the setting section of the draft

EIR. Commenters believed that the existence of this wetland influenced the predicted future extent of marsh and wet meadow wetlands on the Rush Creek delta under the EIR alternatives.

Response

The 133-acre marsh and wet meadow wetland complex that existed on the Rush Creek delta under prediversion conditions was omitted from consideration because the background report prepared by Dr. Scott Stine (Auxiliary Report No. 21), which formed the substantive basis of the draft EIR's prediversion setting section, inadvertently excluded this wetland complex.

Reconsideration of the presence of this wetland complex increases the total extent of prediversion lake-fringing wetlands from 615 acres to 748 acres, or 21%. The prediversion extent of marsh, wet meadow, alkali meadow, and wetland scrub habitat increases from 356 acres to 489 acres, or 37%. Predictions of wetland extent under the different EIR alternatives and the assessment of cumulative impacts (i.e., the comparison of the prediversion condition to those predicted conditions under each alternative, after the dynamic equilibrium is reached) would also change slightly.

The extent of wetlands under the EIR alternatives was predicted, in part, based on prediversion conditions. Predictions of the future extent of wetlands were based on the assumption that wetlands would re-form at their historical locations if the geohydrologic factors dictating their presence had not substantially changed from the prediversion period to the point of reference.

The effect of presumed re-formation of wetlands on the Rush Creek delta would be to slightly increase the net extent of marsh and wet meadow wetlands fringing Mono Lake under the 6,372-Ft Alternative and higher lake level alternatives. Increases for the 6,372-Ft and 6,377-Ft Alternatives would be negligible. The increases for the 6,383.5-Ft Alternative and higher lake level alternatives would range from about 20 to 130 acres, respectively. These increases would not change the conclusions of significant adverse impacts resulting from the loss of wetlands under the 6,383.5-Ft Alternative and higher lake level alternatives. A 10% reduction was identified as the threshold for significant impacts when over 1,000 acres of lake-fringing marsh, wet meadow, alkali meadow, and riparian scrub wetlands were present (page 3C-51 of the draft EIR). The addition of marsh and meadow wetlands on the Rush Creek delta would not prevent a greater than 10% decline in the overall extent of marsh, wet meadow, alkali meadow, and riparian scrub wetlands.

Re-formation of the marsh and wet meadow wetlands on the Rush Creek delta could occur only if the lake were to rise to 6,400 feet or higher and the deeply incised creek channel refilled with sediment. In its present incised state, the channel depresses the base level of groundwater moving through the delta toward the lake, effectively preventing wetland formation on the gently sloped delta surface. This process of filling the channel with natural creek flows would take hundreds or thousands of years because Grant Lake reservoir drastically curtails the importation of sediment to the delta.

The predicted extent of wetlands under the No-Restriction Alternative would not be changed as a result of this omission.

The addition of wetlands on the Rush Creek delta also changes the cumulative impact assessment. Cumulative increases in wetland extent were slightly overestimated for each alternative. This overestimation does not, however, influence the conclusions of significance (or lack thereof) stated for the cumulative impact assessment. Similarly, the assessment of change from the prediversion to point-of-reference slightly overestimated the net increase in wetland area.

C3. Loss of Special-Status Plant Populations Not Considered Significant

Summary of Comment

USFS stated that it was unclear why the loss of populations of two special-status plant species under the No-Diversion Alternative was not considered a significant impact. In the long term, known populations of the Utah monkeyflower and Mono buckwheat would be inundated under the No-Diversion Alternative.

Response

The draft EIR incorrectly concluded that the loss of Utah monkeyflower and Mono buckwheat populations under the No-Diversion Alternative was a less-than-significant impact. The significance criteria on page 3C-52 of the draft EIR states that special-status species that are on California Native Plant Society lists 1b and 2 would sustain significant impacts if a direct loss of substantial portions of local populations or permanent loss of existing habitat occurred. While the existing information is not adequate to determine if a substantial portion of the local populations would be eliminated, the No-Diversion Alternative would permanently eliminate existing habitat for both species.

To mitigate this impact, SWRCB could require that local populations of the same species be protected from ongoing adverse impacts and enhanced. Populations that are currently exposed to negative impacts from off-road vehicle use, livestock grazing, or other activities could be protected. Enhancement activities could be implemented to recover portions of the population that were eliminated by earlier disturbances. Mitigation of this impact may be considered inappropriate, however, because the impact would be an artifact of restoring Mono Lake to a natural condition.

C4. Prediversion Vegetation Conditions along the Tributary Streams Are Unknown or Are Improperly Characterized

Summary of Comments

LADWP argues the condition of historical vegetation cannot be characterized because understory vegetation and the effects of grazing on it and the streambanks cannot be discerned on aerial photographs. It contends that the effects of prediversion heavy grazing are meagerly and inconsistently treated in the draft EIR, and the effects of prediversion stream dewatering by early irrigators are not appropriately emphasized.

Response

The overall condition of riparian vegetation in the prediversion period, especially those conditions sensitive to streamflow diversions, is well known from aerial photographs. In fact, the analysis in the draft EIR of vegetation changes resulting from stream dewatering over the 50-year diversion period is based on a unique data source: before and after aerial photography. The major loss of riparian vegetation due to stream dewatering and consequent flood and fire is thoroughly documented.

The effects of prediversion grazing on the understory in woodland and forest vegetation communities is of course less well known from aerial photography. The effects of grazing on shrubs in openings, however, can be seen on the photographs. Clearly massive overgrazing was not occurring, but herding and bedding of livestock probably did, as it does today, eliminate riparian vegetation in some locations.

The point of these comments regarding prediversion grazing impacts is unclear. Certainly there were some impacts, as there are today. These impacts affect all alternatives equally, so the analyses of the draft EIR are in no way affected. The perception of "meager treatment" may arise because the EIR is about stream diversions, not grazing practices. The draft EIR does, in fact, discuss prediversion grazing, as well as prediversion stream diversions, including stream dewatering, and notes the vegetation effects as well as they are known. An additional reference to grazing impacts as recommended by the commenter has been added in Chapter 6, "Errata to the Draft EIR", for page 3C-7.

C5. Natural Recovery of the Tributary Streams Is Not Accurately Addressed, and the Groundwater Model Used Is Inadequate

Summary of Comments

Recovery. LADWP maintains that the tributary streams are highly likely to recover if they are not damaged during the restoration process; a tremendous resurgence of riparian vegetation has occurred since rewatering. LADWP claims that rate of natural vegetation recovery is not properly accounted for in the draft EIR: rewatering and streamflow management of the four streams is causing a general widening of riparian vegetation zones. Also natural riparian recruitment, overbank flows, sediment deposition on floodplains, rising water tables, and removal of grazing has invigorated natural recovery.

LADWP also claims that an irreversible loss of riparian habitats due to stream incision is wrong because, although some areas have been lost, others have been created. It notes that wetlands are forming on the new stream deltas on the relicted lands.

Another commenter notes that because grazing has such an important effect on riparian vegetation, effects of changes in grazing practices between the alternatives should have been addressed.

Modeling. LADWP contends that the three models used to predict the extent of riparian vegetation are inadequate. It criticizes the Water Table Depth model for extrapolating from far too few measurements of groundwater depths. It also argues that groundwater depths observed during preparation of the draft EIR were in transition from stream rewatering, and rewatering is therefore not accounted for. The model results are also faulted for imminent obsolescence as vegetation increases, traps more sediment, and raises floodplain water tables.

Response

Recovery. The draft EIR thoroughly describes the substantial vegetation recovery and new growth that has resulted from stream rewatering. In analyzing riparian recovery, the draft EIR does not attempt to estimate its rate. The more appropriate analysis, which was used in the draft EIR, is to compare the extent of suitable riparian *habitat* over the long term under each of the alternatives. The rate at which full occupancy of this habitat occurs will depend on weather sequences, disturbances, and plantings, which cannot be predicted. Disturbances such as excessive grazing could prevent full occupancy from ever being approached, but, presumably, disturbances will not vary between the alternatives.

The Water Table Depth model, which was designed for the specific geomorphology of Mono Basin, and the lake level simulations, reflecting each alternative, were used together to estimate the extent of riparian habitat for each alternative. As the model indicates, a net loss of area capable of supporting riparian vegetation occurred over the diversion period because of stream incision (e.g., see Figure 3C-3 in the draft EIR). The lost area will remain occupied by xeric vegetation no matter what rate of riparian recovery transpires.

The Water Table Depth model results yield an estimate that about one-half of the riparian vegetation destroyed during the diversion period will recover. Most of this vegetation is recovering. The model thereby yields a corresponding estimate that about 20% of the prediversion habitat is irreversibly lost because of stream incision. These results are only approximate because the groundwater data used in the model was, as alleged, very limited. The conclusions are stated in correspondingly general terms and are not relied on as if they were precise.

Modeling. Of the three models considered, two were rejected for yielding implausible or useless results. More data would allow precision in the estimates resulting from the Water Table Depth model. However, as the draft EIR urges, additional groundwater investigation ought to be directed at sites where topography and geological conditions indicate that suitable riparian habitat should exist but riparian vegetation is currently absent.

A program of planting favorable but unoccupied sites and rewatering overflow channels would substantially reduce the period of full recovery of riparian habitat. If this program were undertaken for a period of 10 years, the actual irreversible loss of riparian habitat could then be accurately estimated through direct observation.

The comments about impending obsolescence of the model are incorrect because large volumes of sediment are not present in these streams that could significantly alter existing geomorphic conditions. Moreover, the trapping of sediment, to the degree it does occur, does not raise floodplain water tables. The depth of the water table is controlled principally by topography and stream stage, as the investigations reported in Appendix P of the draft EIR indicate. That claim that groundwater depths were in transition during the investigations is not supported by any evidence. During the water table monitoring period, no gradual rise of the water table was observed.

C6. Streamflow Thresholds Considered Damaging to Riparian Vegetation in Mono Basin Are Not Realistic

Summary of Comments

LADWP observes that estimated streamflow thresholds for channel instability appear to be arbitrarily established. Moreover, it sees no basis for assuming that a threshold phenomenon is involved. Characterization of high runoff as potentially damaging is considered misleading because floods are natural occurrences necessary for shaping channel morphology and thereby sustaining riparian plant communities.

Several commenters believe the thresholds are too low. Flows in Lee Vining Creek at the recommended threshold (250 cfs) occurred in 1993 and caused no damage; LADWP believes these flows continued enhancement of the riparian community through dynamic development of channel morphology.

DFG notes that none of its evaluation reports considered streambank erosion to be a potential problem on each of the four diverted streams but goes on to say that the thresholds used for Parker and Walker Creek are lower than recommended by its consultants. However, DFG states that the Rush and Lee Vining Creek threshold estimates "seem reasonable" and urges care be taken in managing extremely high flows.

Some commenters take issue with the use of descriptors such as "low", "moderate", "high" in the draft EIR's characterization of relative differences in "streambed" erosion potential of the alternatives, contending that the net stream damages assumed to occur as a result of a moderate frequency of damaging flows is overstated. On the other hand, some commenters hold that the thresholds need not be exceeded as frequently as stated in the draft EIR because the streamflows are based on alternative simulations not using Grant Lake reservoir for flood storage.

Some commenters assert that the damage thresholds are valid only for a few years, and thereafter the potential for damage will decrease substantially. In the short term, they urge, exceedances can be avoided by spreading high flows into distributary and overflow channels. Because these streams are regulated, one commenter also claimed high flows could be attenuated by spreading them out over a longer period in spring than the duration used in the alternative simulations.

Response

In the draft EIR, analysis of the potential for stream erosion between the alternatives was described. The EIR refers to "streambed erosion" in error; the intent was to assess "streambank erosion" (see Chapter 6, "Errata to the Draft EIR", for the correction to page 3C-23). RTC estimates of "flows capable of causing streambank erosion" (see the response to Comment 32-4) were simply compared with flows from the hydrologic streamflow scenarios of the alternatives, and the relative frequency of exceedance thereby estimated. An alternative was considered to have a significant effect if the damaging streamflow frequency exceeded the frequency of the point-of-reference scenario.

No evidence has been put forth to show that the damaging streamflow thresholds used in the draft EIR are not reasonable estimates. It is a well-known fact that bank erosion *is* a threshold phenomena, related to current velocity. The nature of the threshold recommendations of the RTC were properly understood in this analysis. During the prediversion period, flows of 500 cfs could pass down Lee Vining Creek, yet none of the commenters suggest the current threshold is currently near that high. The experience on Lee Vining Creek in 1993 suggests that the Lee Vining Creek threshold ought to be higher than the threshold estimated in the draft EIR, perhaps as high as 300 cfs. This change would not significantly affect the conclusion of the draft EIR, which is simply that flows exceeding these magnitudes should be prevented in the next two decades.

A rapid, 3- to 5-year-long recovery period for riparian vegetation to secure streambanks and channel stability comparable to the prediversion period, as commenters suggest, is unrealistically optimistic. Within 3-5 years of stream rewatering, an extensive acreage of riparian vegetation has and will be recruited in the most favorable areas, especially where subject to seasonal overflow. The root system from these seedlings and saplings, however, is much less extensive than that of the mature riparian forest that previously existed there. And on sites not subject to overflow or not having very shallow groundwater, recruitment may take years or decades to occur even though the site may, in fact, be riparian habitat.

The draft EIR correctly concludes that streamflows under the 6,410-Ft Alternative and higher lake level alternatives would be damaging to streambanks and that streamflows exceeding the best estimate of damage thresholds should be avoided for the next 1-2 decades. Appropriate management of high flows is a major need in this period, and, although Grant Lake reservoir could be utilized exclusively for flood control at the expense of recreation, management does not eliminate the need to pass large volumes of water down these streams to achieve the highest lake level alternatives.

Frequent or sustained excessively high flows will not only erode unvegetated banks and widen incised reaches, they will shorten the seasonal period available for stream restoration. The connection of overflow channels to the stream system, as recommended in the draft EIR, will lessen but not eliminate this concern. The idealized concept of "natural shaping of channel morphology" during these erosive flows, given the catastrophic events that preceded them and the resulting condition of the landscape, is simply not applicable.

FISHERIES (D)

D1. Prediversion Habitat Conditions and Fish Populations Are Improperly Characterized

Summary of Comments - Mono Basin Tributaries

The prediversion habitat conditions and fish populations, particularly in Mono Basin, have been a major area of dispute between commenters on the draft EIR. This area of disagreement has been carried into the water rights hearings without any resolution or compromise between parties. Commenters have taken two extreme positions on the conditions of Rush and Lee Vining Creeks. LADWP has taken the position, and presented evidence, that these creeks maintained poor habitat conditions and fish populations prior to LADWP diversions. DFG, the MLC, the National Audubon Society, Caltrout, and others have taken the opposite position, and presented evidence, that these creeks maintained excellent habitat conditions and fish populations prior to LADWP diversions.

Commenters representing both viewpoints were critical of the draft EIR, stating that the draft EIR did not go far enough in describing and presenting their particular viewpoint. Consequently, the response to comments cannot be prepared in a manner that will satisfy all of the commenting parties. Much of the testimony and many of the exhibits submitted for the water rights hearing were never made available by the parties to the SWRCB as part of the EIR-development process and thus could not have been incorporated into the draft EIR. Drafts of the "Environmental Setting" portions of the fisheries and vegetation chapters were distributed to the major parties several months before the draft EIR was published, but none of the reviewing parties provided comments in time to be incorporated into the draft EIR. LADWP and several other reviewing parties had no response.

Summary Response - Mono Basin Tributaries

The draft EIR adequately describes prediversion conditions habitat conditions and fish populations, and no major changes are deemed necessary based on the evidence provided by all parties during the water rights hearing. The preponderance of credible evidence indicates that Rush and Lee Vining Creeks provided good to excellent habitat conditions that supported a viable trout fishery prior to LADWP diversions.

LADWP argues that grazing impacts and periodic dewatering were major factors creating a poor fishery in lower Rush Creek. The draft EIR acknowledges that grazing and dewatering occurred on Rush and Lee Vining Creeks but differs substantially in the overall effects of these activities on the habitat conditions and fish populations. Additional detailed evidence provided by the MLC and others in the water rights hearing specifically defines the extent of grazing and dewatering impacts. The impacts are far less dramatic than stated by LADWP and support the general conclusions of the EIR on the status of habitat conditions and fish populations prior to LADWP diversions in Mono Lake tributaries.

Detailed Response - Mono Basin Tributaries

The habitat complexity in lower Rush Creek was extremely important in maintaining excellent conditions despite grazing and flow modifications occurring before 1941. Springs provided increased flows in lower Rush Creek and buffered the effects of daily flow modifications, which LADWP has described at gage locations. The spring-fed channels, while shallow compared to the main channel, maintained good to excellent cover and served as important nursery and refuge habitat for trout fry and juveniles and good to excellent refuge and feeding habitat for adult trout. Rush Creek itself consisted of multiple narrow, deep channels in the bottomlands. The habitat complexity that was present before 1941, and eventually lost, was affected by far more significant factors than grazing and dewatering. The commenter does not acknowledge the major geomorphic effects that occurred and does not present any information regarding the complex channel characteristics present during prediversion conditions. Habitat complexity and channel morphology were the critical elements responsible for supporting the good to excellent habitat and fish population characteristics of Rush Creek before 1941. These characteristics are summarized in the draft EIR and were presented in detail by numerous parties at the water rights hearings.

Information developed by LADWP, including additional submittals not available to the SWRCB before the public release of the draft EIR, was carefully considered but does not support LADWP's conclusions. The information encompassed only the status of trout habitat and the fishery in Rush Creek, primarily from the Mono Gate 1 to the confluence of Parker Creek, and thus was limited.

LADWP relies heavily on personal communications with current or past LADWP employees and other anecdotal information, yet discounts similarly derived information in the draft EIR. In the draft EIR, the first-hand observations of Mr. Eldon Vestal, a retired DFG fisheries biologist, provided credible information on channel morphology, as well as on spawning gravel and vegetation, during the prediversion period. The draft EIR's accurate representation of prediversion conditions was developed based on Vestal's observations and on additional available physical evidence. Further information from numerous parties made available during the water rights hearings supports the conclusion that Rush and Lee Vining Creeks maintained good to excellent habitat conditions for fish populations during the prediversion period and substantiates conclusions as stated in the draft EIR.

About Rush Creek, LADWP asserts that a "large portion of the stream was dry in the summer in many years." Only a single short section of Rush Creek likely was dewatered entirely. The bottomlands area of Rush Creek, in particular, was spring-fed and provided the most diverse, unique, and valuable habitat in Rush Creek. This habitat would have been buffered by the daily and even hourly flow fluctuations that LADWP has accurately portrayed as occurring. The information presented in several water right hearing exhibits (e.g., Audubon Society and MLC Exhibits 122 and 137) provides a reasonable scientific analysis of likely flows on a reach-by-reach basis.

The draft EIR acknowledges that Rush and Lee Vining Creeks were planted with trout during prediversion conditions. Most fish likely were wild, however, because of differential catch rates between wild and hatchery produced trout. Nevertheless, growing conditions in lower Rush Creek had to be good to excellent to support the growth of wild and hatchery-produced trout of this size. The fishery and habitat conditions in lower Rush Creek were unequivocally unique. LADWP commented that planting was necessary to support abundant, self-sustaining populations of large trout. However, all available evidence on the habitat conditions in Rush Creek support the conclusion that the prevailing prediversion habitat conditions were fully able to support a good to excellent trout population. Given the high levels of fishing pressure, stocking hatchery trout was then, and is currently, an appropriate management strategy used to augment native fish populations and keep catch rates high. Even large, healthy fish populations in streams with outstanding habitat conditions cannot generally support high levels of production under intense angling pressure unless the stream is stocked or angling is restricted in some manner. However, such populations can maintain self-sustaining fisheries.

The SLC, primarily through Dr. Scott Stine, questioned numerous statements made in the draft EIR on prediversion habitat conditions or commented that the habitat descriptions were too general. The sources of information for the statements in question are generally cited in the draft EIR where the statements are made. Trihey & Associates compiled much of the information regarding the characteristics of Mono Lake tributaries, with Dr. Stine's input in many instances. Also, Dr. Stine's 1991 report (Mono Basin Auxiliary Report No. 1) was reviewed but not cited in the draft EIR. The draft EIR portrays a reasonable characterization of Mono Lake tributaries based on the available information. More recent information, while more detailed, does not need to be incorporated in the draft EIR because it does not change the overall characterization of Mono Lake tributaries as presented in the draft EIR. Comments on the draft EIR by the SLC and Dr. Stine and testimony during the water rights hearing will be fully considered as SWRCB prepares the order.

Caltrout commented that quantitative fish population data on prediversion conditions should have been used more vigorously to support reliable inferences regarding fish densities and biomasses. These data were used to the degree possible without resulting in undue speculation on the fish population characteristics. The draft EIR summarized information to provide a reasonable characterization of fisheries and habitat conditions. SWRCB has reviewed "*every* bit of useful and reliable information" on tributary fisheries and habitats, whether this information was explicitly cited in the draft EIR.

Summary of Comments - Owens River Basin

A few comments were received on the draft EIR's portrayal of prediversion fish and habitat descriptions and are responded to below. No detailed response is required.

Summary Response - Owens River Basin

As LADWP correctly points out, Hot Creek is not typical of Owens River tributary streams and is much more productive than other Owens River tributaries. "Productive" in this context means a stream that produces more and larger fish than is typically produced in the region from similar-sized streams. Most Owens River tributaries supported self-sustaining populations of brown and/or rainbow trout in their lower sections.

The draft EIR acknowledges that by the 1930s, exotic species in the Owens River basin were self-sustaining and that they coexisted and competed with native fish fauna. As noted by LADWP, exotic game species were likely introduced into the Owens Valley between 1872 and 1908.

Several commenters questioned whether pre-1941 habitat conditions were similar to prehistorical conditions in the Owens River basin. Aquatic habitat conditions in 1940 probably were similar to prehistorical conditions although with widespread impacts from diversion and grazing. Channel morphology likely remained similar to prehistorical conditions despite mostly seasonal diversions and grazing effects. No evidence exists of major habitat or population losses related to these effects. Although the Owens River habitat has been adversely affected by diversions and grazing, the aquatic habitats in 1940 were generally intact and *similar to*, but not the same as, prehistorical conditions.

D2. Point-of-Reference Habitat Conditions and Fish Populations Are Improperly Characterized

Summary of Comments - Mono Basin Tributaries

LADWP had a few specific comments on the draft EIR's portrayal of point-of-reference habitat conditions and fish populations for Mono Basin tributaries. The SLC had numerous specific comments, primarily regarding geomorphic conditions.

Summary Response - Mono Basin Tributaries

Comments by LADWP and the SLC were generally not germane to the decision-making process but had technical merit or clarified certain issues. These issues are discussed below in the specific response section. In general, LADWP and SLC comments were minor but accurate.

Specific Response - Mono Basin Tributaries

Various measurements of the length of Lee Vining Creek affected by LADWP diversions have been suggested. Many differences are minor. Although some sections of Lee Vining Creek primarily require only rewatering to reproduce prediversion habitat conditions, the lower approximately 1.5 miles have been drastically altered and rewatering is not sufficient to reproduce prediversion habitat conditions. This lower area was the most productive in terms of fisheries resources under prediversion conditions. LADWP is likely correct that, after 1947, seepage past the LADWP diversion dam on Lee Vining Creek and return flow from the "O-Ditch" kept a small flow in Lee Vining Creek for a short distance downstream (LADWP indicates for 1.5 miles).

As noted in LADWP's comment, Lee Vining Creek below the diversion dam does not maintain brook trout and probably no self-sustaining population of brook or rainbow trout exist below the LADWP diversion. These species are present above LADWP's diversion in a greater proportion of the trout populations than in downstream reaches where brown trout predominate. The species composition in Rush Creek of primarily brown trout and small populations of brook and rainbow trout is correct as stated in the draft EIR. LADWP is correct in pointing out that this species composition is not unusual in other eastern Sierra Nevada streams and that cutthroat trout likely were extirpated in Rush Creek before 1941.

If rewatered, Parker and Walker Creeks may provide important spawning and rearing habitat for Rush Creek brown trout. The degree to which production in these tributaries would contribute to fish populations in Rush Creek is unknown; however, some Rush Creek brown trout likely would migrate into these tributaries to spawn. Fry produced from successful spawning activities by Rush Creek adults and fry produced from resident spawning brown trout in Parker and Walker Creeks could contribute to mainstem Rush Creek fish populations. This phenomenon is common in many Western United States trout streams and frequently reported in the scientific literature. The draft EIR correctly points out that this phenomenon *may* occur.

The 1967 flooding, in association with the lowering lake level, had extreme adverse consequences on the bottomlands area of Rush Creek. The desiccation of the springs contributed to the significant adverse effects on the bottomlands. The slowly degrading conditions were exacerbated greatly during the flooding and major dewatering in the late 1960s and early 1970s.

The SLC, primarily through Dr. Scott Stine, questioned numerous statements made in the draft EIR on prediversion habitat conditions or commented that the habitat descriptions were too general. The sources of information for the statements in question are generally cited in the draft EIR where the statements are made. Trihey & Associates compiled much of the information regarding the characteristics of Mono Lake tributaries, with Dr. Stine's input in many instances. Also, Dr. Stine's 1991 report (Mono Basin Auxiliary Report No. 1) was reviewed but not cited in the draft EIR. The draft EIR portrays a reasonable characterization of Mono Lake tributaries based on the available information. More recent information, while more detailed, does not need to be incorporated in the draft EIR because it does not change the overall characterization of Mono Lake tributaries as presented in the draft EIR. Comments on the draft EIR by the SLC and Dr. Stine and testimony during the water rights hearing will be fully considered as SWRCB prepares the order.

Summary of Comments - Owens River Basin

Caltrout, in particular, commented at length on the conclusion in the draft EIR that excellent fisheries resources existed in the Upper Owens River at the 1989 point-of-reference. Caltrout contends that fish populations are in excellent condition only on the Upper Owens River upstream, and not downstream, of East Portal.

Summary Response - Owens River Basin

SWRCB has reviewed available information and supports the draft EIR conclusion that the Upper Owens River, even in reaches affected by LADWP exports, maintains excellent fishery resources. Comparisons made by Caltrout between fishery resources upstream and downstream of East Portal are not valid.

Detailed Response - Owens River Basin

Caltrout argues that the Upper Owens River fishery is not "excellent" in the portions affected by LADWP flow augmentations and presents and interprets DFG data collected in 1985. Caltrout believes that DFG's 1986 report shows that fish populations are much higher above East Portal and that LADWP exports are responsible for the reduced fish populations between East Portal and Lake Crowley reservoir. SWRCB has reviewed DFG's 1986 report (Deinstadt et al. 1986) and 1985 report (Deinstadt et al. 1985), but has determined that the conclusions in the draft EIR remain unchanged. The Caltrout comparison is invalid for the reasons discussed below.

First, DFG's sampling design in the 1985 and 1986 reports does not lend itself to proper scientific comparisons of paired sites. The sites were not selected randomly but were chosen because of their accessibility by road and their possession of one or more of the following characteristics: 1) having a higher than average trout standing crop, 2) making up part of a proposed or existing hydroelectric project, or 3) representing a particular stream type. Comparing sites under such sample site selection procedures is not valid.

Second, Table 4 in Caltrout's comment letter is misleading in that DFG notes indicate that fall-run trout from Lake Crowley reservoir were present in the sample above East Portal. Consequently, this sample does *not* accurately reflect standing crop levels unaffected by migratory populations.

Third, Table 4 includes only one site above East Portal. Inclusion of the second site (section 15) would lower population estimates and biomasses presented in this table in the column labeled "Above East Portal".

Fourth, the limited sample sizes limit both spatially (number of sections) and temporally (number of years) the number of defensible conclusions that can be made about fish populations above and below East Portal.

Fifth, several factors that affect Upper Owens River fish populations above and below East Portal, particularly the river sections sampled by DFG, were not considered by Caltrout. Differences in grazing practices, angling regulations, fishing pressure, land ownership, local diversions, natural geomorphic and channel characteristics, and proximity to Hot Creek flows contribute significantly to fish populations and characteristics in each section of the Upper Owens River.

D3. Fisheries Models and Impact Analyses Are Inappropriate and Flawed

Summary of Comments

LADWP commented that the draft EIR's impact analyses were unsupported by biological literature or were inconsistent with current professional standards. These comments were broad in nature. Caltrout commented that a thorough discussion of limiting factors should accompany each alternative. DFG and other parties had specific comments on certain aspects of the draft EIR fisheries analyses, most of which were responded to individually in Chapter 5.

Summary Response

The fisheries impact assessment for the draft EIR was based on proven methods and included a quantitative analysis based on site-specific data, as well as references to pertinent scientific literature. Results from Instream Flow Incremental Methodology (IFIM) analyses, the best available fisheries reports and data, scientific literature, and professional judgment were used to develop the impact analyses. The fisheries impact analyses were done appropriately and provide the necessary information for SWRCB to make an informed decision on the effects of each alternative on the fisheries resources in Mono Basin and the Owens River basin.

Detailed Response

The body of scientific literature on the effects of flows on fish populations and habitat is by no means definitive, with the obvious exception that a completely dewatered section of stream can contain no live fish. From this point, scientific investigations of the effects of streamflows on fish populations and habitat diverge widely. Many factors are involved in this divergence: sampling biases; inadequate study designs; investigator biases; and differences in stream characteristics, fish populations, and limiting factors in the studied streams. Because fish populations can be dramatically affected by changes of flow over a wide range of time steps--minutes, hours, days, months, and years--conclusive and definitive statements about fish populations are difficult to make. The draft EIR preparers took a balanced approach in reviewing the literature.

The draft EIR relies on the results of other studies and was not a research project. During the initial development of the EIR scope and budget, all involved parties recognized that the EIR would be based largely on several ongoing studies, primarily DFG instream flow studies.

LADWP comments that habitat results in Mono Lake tributaries, the Owens River, and affected reservoirs should have been merged to provide a tradeoff analysis of the net losses and gains of fish habitat. SWRCB disagrees with this approach for several reasons.

First, merging IFIM output from streams with widely varying habitats constitutes improper use of IFIM from a purely scientific perspective when different methods, primarily different habitat suitability criteria, are used. The commenter incorrectly assumes that one unit of weighted usable area in the Middle Owens River equals one unit of weighted usable area in Rush Creek. This assumption is biologically and mathematically incorrect, given the existing methods that were used in each of these studies. Second, river and reservoir habitat values cannot be merged without making assumptions that are indefensible. Third, a balanced approach does not require that a single weighted usable area be generated for each alternative. Each stream must be evaluated independently to ensure that appropriate conditions required by law are maintained on each individual stream. Finally, a tradeoff analysis as recommended by the commenter would show that the highest habitat values would be obtained by decreasing flows in small streams to zero and increasing flows in the larger streams. This type of analysis does not result in appropriate management decisions that protect public trust values.

LADWP misquotes information on page 3D-35 of the draft EIR in its Comment 1-194. The draft EIR states, "[u]nfortunately, the databases available for each of the streams and reservoirs vary widely, despite attempts to develop relatively consistent databases since initial instream flow studies began on Rush Creek in 1987." Only one caveat is defined as "unfortunate". The rationale for the discussion on page 3D-35 was to indicate that there are areas of uncertainty involved in conducting impact analyses of this scope. These areas of uncertainty, which are beyond the control of the EIR preparers, are common in any fish population and habitat investigation or analysis and should be honestly and openly expressed. Nevertheless, the impact analyses were conducted using accepted methodologies and the best available and credible scientific data and are thus appropriate and fully in compliance with CEQA.

Monthly weighted usable areas were averaged throughout the impact analyses and therefore provide a consistent basis on which to compare impacts from each alternative. Use of median values or geometric means are other possible ways to conduct the impact analyses but were not employed. Habitat exceedance curves could be presented but would be less understandable to most readers and would provide little value in the overall decision-making process.

A 10% threshold for significant habitat changes that would potentially limit populations was used in the draft EIR on a consistent basis both for streams gaining or losing habitat. No specific threshold is required by CEQA, nor is there a threshold that is consistently used enough to be judged "standard practice". Selection of a specific threshold is based largely on professional judgment after consideration of the response variables and the impact mechanisms. Because use of IFIM assumes a direct relationship between fish habitat and fish populations, a 10% change in limiting habitat can reasonably be concluded to constitute an approximate 10% change in a fish population over the long term. If population levels fluctuate up to 10 times in abundance from year to year, that habitat, if it is limiting, may also reasonably be assumed to fluctuate accordingly. SWRCB disagrees with DFG that habitat conditions remain essentially the same year after year. Habitat values, particularly low and high habitat values that can have major effects on fish populations, can fluctuate dramatically in spatial terms, in temporal terms, in magnitude, and in duration.

Available information on fish population characteristics, water quality, and icing effects were evaluated. Professional judgment was necessary in certain instances to determine project impacts because available data and models did not permit a definitive quantitative analysis and result. LADWP and, to some degree, DFG state that there is insufficient information to consider these factors. However, Caltrout believes that this information should have been woven into a biological theory regarding each alternative. SWRCB disagrees with both of these extreme views and believes that in the absence of specific quantitative data, professional judgment should be used judiciously and cautiously to evaluate icing and other effects based on the best available information.

SWRCB agrees that numerous factors affect trout populations, one of which is habitat. The relationship between fish populations and fish habitat is not fully substantiated for these streams, but a major assumption of IFIM is that there is a direct relationship between fish populations and fish habitat. SWRCB does not believe that sole reliance upon IFIM habitat relationships (as recommended by DFG) is correct, particularly when other physical and biological data are available. SWRCB believes that qualitative use of these additional data is essential to assist in identifying significant impacts and associated mitigation.

The Tennant Method is a very general technique for identifying instream flow requirements. SWRCB recommends its use only if no other appropriate information is available and, even in this instance, advises that it be used cautiously. The Tennant Method was modified to serve as a consistent impact analysis tool on Parker and Walker Creeks, of which no site-specific data during rewatered conditions was available. SWRCB believes the modified Tennant Method provided consistent criteria and a methodology for determining relative impacts from flow changes. IFIM, a more accurate impact assessment tool, was used on Rush and Lee Vining Creeks because more data were available. Neither the modified Tennant Method or the standard Tennant Method also were used to establish minimum instream flow conditions.

SWRCB disagrees with LADWP and believes that an increase of 0.7 cfs in a stream as small as Walker Creek could very well change the quality of fish habitat from "good" to "excellent". SWRCB disagrees with USFS that changes of less than 1 unit in Tennant Method ranking represent significant cumulative effects. The criteria apply only to Parker and Walker Creeks and should not be used to evaluate significant cumulative impacts in the entire Mono Basin.

D4. Potential for Stream Recovery Is Improperly Characterized in Mono Basin Tributaries

Summary of Comments

LADWP, in its comments, takes exception to the draft EIR's characterization that riparian and freshwater habitats along the tributary streams have been irreversibly lost. LADWP believes that the draft EIR grossly underestimates the natural recovery rate of these streams and ignores the "tremendous resurgence" of riparian vegetation that has occurred on lower Rush and Lee Vining Creeks. DFG and Caltrout question the supporting data for stating that none of the alternatives can restore and maintain pre-1941 conditions within less than 50 or more years. Finally, the SLC believes that the draft EIR understates the damage sustained due to LADWP diversions.

Summary Response

LADWP correctly points out that riparian vegetation is coming back quickly and that streamflows have been restored to the creeks. The expanding riparian vegetation and streamflows are having a positive effect on the existing conditions of the streams. However, LADWP's comment does not address the extreme channel changes that resulted in lower Rush and Lee Vining Creeks following declines in Mono Lake elevation. Substantial evidence, including direct observations by SWRCB consultants, shows that the resulting geomorphic changes since LADWP began its diversions have been dramatic, and prediversion conditions cannot be restored in the lower portions of Rush and Lee Vining Creeks. This fact was acknowledged in the draft EIR by its authors; by the Restoration Technical Committee; and by LADWP's expert witness, Dr. Robert Beschta, during the water rights hearings. Consequently, the draft EIR's conclusion that much of the damage is irreparable and that 50 or more years are necessary to begin to approach prediversion conditions is accurate and has not been changed. See also the response to Comment C5.

Detailed Response

LADWP's comments did not acknowledge the major geomorphic effects that occurred on lower Rush and Lee Vining Creeks and did not present any information on the complex channel characteristics present during prediversion conditions. Habitat complexity and channel morphology were the critical elements responsible for supporting the excellent habitat and fish population characteristics. These characteristics are summarized in the draft EIR and presented in detail by numerous parties, particularly by Dr. Scott Stein, at the water rights hearings. Rewatering the channels and encouraging riparian vegetation restoration are important, but, without the complex channel structures that existed in lower Rush and Lee Vining Creeks prior to diversion efforts, the conditions that benefitted the fisheries cannot be fully restored.

SWRCB disagrees with LADWP that implementing constant flows, eliminating irregular flow fluctuations, and removing livestock will readily restore the complex habitat functions in lower Rush and Lee Vining Creeks. The increase in channel gradients in lower Rush and Lee Vining Creeks cannot be restored; consequently, the hydraulic conditions necessary to restore prediversion conditions cannot be reproduced. Work by Dr. Scott Stine and Mr. Woody Trihey, observations of fishery biologists from the SWRCB and its consultants, and scientific literature provide a credible and proper scientific foundation for the draft EIR's conclusions regarding the difficulty of restoring prediversion conditions in lower Rush and Lee Vining Creeks. Only in sections of Rush and Lee Vining Creek that have not undergone major channel changes can restoration of consistent flows and removal of livestock restore prediversion habitat conditions in a short time.

The draft EIR states that 50 or more years are needed to restore and maintain pre-1941 fishery conditions in lower Rush and Lee Vining Creeks. Experts during the water rights hearing corroborated that many years, on the order of 50 or more years, would be necessary for full restoration. The 50-year estimate provides readers with a general order-of-magnitude estimate of the amount of time necessary for full restoration; actual restoration will take many, many years, and likely will never be fully achieved because of the dramatic channel changes; see response to Major Issue C5. The major restoration efforts cited by Caltrout that have been ongoing since 1991 on Lee Vining Creek, and have not restored lower Lee Vining Creek to near its prediversion condition. SWRCB sees no reason to modify the draft EIR's conclusion that 50 or more years are needed to restore and maintain pre-1941 fishery conditions.

D5. Adverse Effects of High Flows on Fisheries Habitat and Fish Populations in Mono Basin Are Overestimated

Summary of Comments

Several commenters, including DFG, stated that high-flow effects on fish habitat and populations in Mono Basin were overstated in the draft EIR. Several experts modified or clarified their opinions on the adverse nature of high-flow effects near the end of the draft EIR process and during the water rights hearing. Initially, available information and the opinions of several key parties supported limiting flushing and channel maintenance flows to minimize impacts on gravels, restoration features, and fish in stream sections lacking refugia. Several of these parties have shifted their positions, partially because of observations during the 1993 high-water year, and now question the draft EIR's impact analysis of and mitigation for high-flow effects.

Summary Response

The hearing record has established that high flows are critical for flushing sediments and restoring and maintaining channels. SWRCB agrees with all parties that high flows should not be viewed as significant effects in nearly all cases. Conclusions in the draft EIR on the significant adverse effects of high flows on Mono Basin tributaries are revised to indicate less-than-significant impacts in the short term, and beneficial effects in the long term, with the following exception. High flows in excess of 350 cfs in Rush Creek (which could occur under the 6,410-Ft and No-Diversion Alternatives) and 250 cfs in Lee Vining Creek (which could occur under the 6,383.5-Ft Alternative and higher lake-level alternatives) would likely cause significant short-term impacts such as channel erosion, spawning gravel losses, damage to some restoration features, and direct mortality of fish from displacement. Such high-flow events could be mitigated, perhaps not fully, by distributing high flows through overflow channels or flood relief structures. See also response to Major Issue C6. Based on the comments on the draft EIR, the final EIR, and the water rights hearing record, the SWRCB will address this issue in its water rights decision for flushing and channel maintenance flows.

Detailed Response

Geomorphic and sediment transport studies on Rush, Lee Vining, Parker, and Walker Creeks were generally characterized in the water rights hearing as general applications of existing theoretical models, based on little collection and analysis of site-specific data. Consequently, the resulting DFG Stream Evaluation Reports served merely as reinforcement for court-ordered flushing flows, which were based on even less information. These recommended flushing and channel maintenance flows, at times not explicitly identified, were largely speculative and based primarily on professional judgment. Clearly, establishing flushing and channel maintenance flows for these streams has tended more toward art than science, inspiring little confidence in the recommended flow regimes.

DFG previously recommended 60 cfs as the maximum flow in Rush Creek. After recommending gravel augmentation in the stream, DFG increased its recommendation to 100 cfs. During the water rights hearing, Dr. Kondolf, representing DFG, recommended channel maintenance/flushing flows of 200 cfs for normal water-years and 300 cfs for wet normal and wet years based on applications of general "rule-of-thumb" relationships and assumptions regarding characteristics of appropriate flushing flows (see DFG Exhibit 170a). Lee Vining Creek recommendations have remained at 160 cfs, despite major observed impacts from high and fluctuating flows. Parker and Walker Creek recommendations have been in the range of 25-40 cfs and 15-30 cfs, respectively.

The hearing record has established that high flows are essential for flushing sediments and restoring and maintaining channels. The severe drought in California during the major years of investigative study of Mono Lake tributaries made observations of high-flow events difficult. Uncertainties of the effects of high flows, however, were largely dismissed in 1993, a wet year of high stream flows. While certain created habitats (i.e., main channel pools) filled with sediments and became less functional, other channel-building processes took place that, over the long-term, would be critically important to overall stream restoration.

SWRCB agrees with all parties that high flows should not be viewed as significant effects in nearly all cases. Conclusions in the draft EIR on the significant adverse effects of high flows on Mono Basin tributaries are revised to indicate less-than-significant impacts in the short term, and beneficial effects in the long term, with the following exception. High flows exceeding 350 cfs on Rush Creek and 250 cfs on Lee

Vining Creek for any duration would likely cause significant short-term impacts such as channel erosion, spawning gravel losses, damage to some restoration features, and direct mortality of fish from displacement. The frequency of these channel-damaging flows is discussed more fully in response to Major Issue C6. Such high-flow events could be mitigated, perhaps not fully, by distributing high flows through overflow channels or flood relief structures. Based on the comments on the draft EIR, the final EIR, and the water rights hearing record, the SWRCB will address this issue in its water rights decision for flushing and channel maintenance flows.

D6. Mitigation Measures for Significant Cumulative Impacts Are Not Appropriate

Summary of Comments - Mono Basin Tributaries

LADWP commented that the restoration efforts recommended in the draft EIR as mitigation are too "aggressive", have not been tested adequately, may be counterproductive, or should be deferred. LADWP also commented that no adequate basis exists to conclude that significant cumulative impacts are associated with all alternatives from effects on geomorphology, gravel recruitment, and migration.

Summary Response - Mono Basin Tributaries

LADWP comments that restoration efforts should not be "aggressive" because such measures can be ineffective and even counterproductive. SWRCB generally agrees with this position but believes that some level of restoration is required to help reestablish, to the extent possible, fisheries that existed prior to LADWP diversions. The evidence also establishes the need to proceed with development and implementation of plans for a number of habitat restoration measures, without waiting until the effects of existing measures can be assessed completely. SWRCB also disagrees with LADWP and believes that geomorphology, gravel recruitment, and migration are adversely affected on a cumulative basis. Based on the contents of the draft EIR, comments on the draft EIR, this final EIR, and the water rights hearing record, the SWRCB will set appropriate stream restoration requirements as part of its water rights decision.

Detailed Response - Mono Basin Tributaries

SWRCB agrees with LADWP that certain "aggressive" restoration treatments can be counterproductive. The riparian vegetation removal in Parker and Walker Creeks, for example, appeared to be much more aggressive than needed. Certain pools created in lower Lee Vining Creek were not developed at sites where natural hydraulic conditions could be used most effectively and, subsequently, these pools have partially filled after runoff from only one wet year. Heavy equipment used on lower Lee Vining Creek may have been utilized to meet interim court-ordered directives hastily; future use should be avoided to the greatest extent possible.

Regardless of the effectiveness of past restoration efforts, some treatments can be continued or developed to expedite the recovery process. The appropriate level of restoration activities will not be satisfactory to all parties, but SWRCB believes that it puts forth a balanced approach that is not overly aggressive and facilitates the natural recovery process. The root structure of riparian and streamside vegetation plays an important role in creating pools, undercut banks, and cover in a natural stream system. Some of the trees that were lost to stream dewatering, however, will likely take 30, 50, or more years to develop the complex root structure to fully modify hydraulic characteristics and restore prediversion bank conditions. Rewatering secondary channels can also be effective if sufficient flows are maintained in the main channel for pool formation. Removal of the quarry gravels that clog many of the channels of the Rush Creek bottomlands is another consideration.

LADWP points out that many of the restoration efforts completed to date have not been tested adequately or have not functioned long enough to conclude whether they are a benefit to the fishery. This is true of nearly all newly implemented restoration projects. SWRCB agrees with LADWP that greater time intervals for restoration treatments and monitoring must be initiated. Annual or more frequent monitoring of several stream parameters is not merited because some sections of the Mono Lake tributaries are undergoing tremendous readjustment after recent rewatering and restoration treatments. However, SWRCB does not believe that all mitigation measures should be put on hold until the effects of current mitigation activities are assessed.

LADWP comments that it is unaware of any road crossings downstream of the diversions that constitute significant barriers to trout migration. However, such barriers have been identified by Mr. Trihey both in written reports and in his testimony in the water rights hearings. Although some barriers have been removed or improved, other barriers remain to adversely affect trout movements.

All parties agreed that ramping rates are necessary to minimize effects on fish populations and habitats. Fish stranding, redd dewatering, and bank sloughing are the primary problems associated with inadequate or no ramping rates.

Based on the contents of the draft EIR, comments on the draft EIR, this final EIR, and the water rights hearing record, SWRCB will set appropriate stream restoration requirements as part of its water rights decision.

Summary of Comments - Owens River Basin

LADWP believes that project impacts on native fish species in the Middle Owens River cannot be separated from other, unrelated impacts. Ramping rates are recognized as necessary to preclude significant impacts on fish populations and habitats. (See response to Comment D7 for related response primarily to other parties.)

Summary Response - Owens River Basin

SWRCB agrees that sufficient information is available to conclude that significant cumulative impacts on native species in the Middle Owens River have resulted primarily from a combination of introduced exotic species, modified flow regimes, and grazing. However, while species introductions may be the largest single factor affecting native species, the synergistic and harmful effects of both introduced species and habitat modifications are well documented in the scientific literature. Modified flow in the Middle Owens River is related to project alternatives and is a significant factor affecting native species. SWRCB believes that there is sufficient information for the draft EIR's conclusions.

All parties agreed that ramping rates are necessary to minimize effects on fish populations and habitats. Fish stranding, redd dewatering, and bank sloughing are the primary problems associated with inadequate or no ramping rates on the Upper and Middle Owens River. SWRCB will consider the ramping rate recommendations made by LADWP and DFG in its decision. Based on the contents of the draft EIR, comments on the draft EIR, this final EIR, and the water rights hearing record, SWRCB will determine what mitigation measures are appropriate as part of its water rights decision.

D7. Upper Owens River Point-of-Reference Conditions Are Improperly Characterized and Fisheries Impacts at High Lake Levels Are Not Appropriately Ascribed to LADWP-Induced Channel Changes

Summary of Comments

Several comments were received on the reference points and fisheries impact results for the Upper Owens River. Several parties assert that fisheries habitat impacts on the Upper Owens River ascribed to high Mono Lake alternatives actually result from LADWP's flow exports that have straightened and widened certain reaches of the river, thereby necessitating higher flows to maintain habitat values. These parties suggested that habitat restoration plans and concepts be developed to mitigate these impacts rather than supporting maintenance of higher instream flow conditions.

Summary Response

SWRCB agrees that LADWP's Mono Basin exports into the Upper Owens River have had cumulative adverse impacts on channel morphology but also recognizes benefits to water temperature and water quality. Unlike lower Rush and Lee Vining Creeks, the Upper Owens River still maintains an excellent trout fishery and the habitat has clearly not been altered to the extent observed on Rush and Lee Vining Creeks. SWRCB finds significant fisheries impacts under the 6,372-Ft Alternative and all other higher Mono Lake alternatives, with impact severity increasing as Mono Lake elevation rises. SWRCB finds no reason to change the conclusions of the draft EIR on these project-induced impacts. Based on the contents of the draft EIR, comments on the draft EIR, this final EIR, and the water rights hearing record, the SWRCB will address this issue in its water rights decision.

Detailed Response

SWRCB agrees that LADWP's Mono Basin exports into the Upper Owens River, along with other contributing factors such as localized overgrazing, have had significant cumulative impacts on channel morphology. These exports, however, have also reduced water temperature and water quality impacts on the Upper Owens River below Hot Creek. The SLC's comment that these impacts related to Hot Creek are "natural" is immaterial given that significant impacts will occur relative to the point-of-reference condition for alternatives that have major reductions to LADWP exports. Impacts from local diversions have also been minimized. In addition, there is inadequate information to know to what extent these channel changes have adversely affected brown and rainbow trout habitats. A reduced number of meander mends, channel widening, and channel straightening likely reduces adult brown trout habitat but could actually increase adult rainbow trout habitat. Unlike lower Rush and Lee Vining Creeks, the Upper Owens River still maintains an excellent trout fishery and the habitat has clearly not been altered to the extent observed on Rush and Lee Vining Creeks. Consequently, negative attributes of LADWP's exports to the Upper Owens River fishery resources must be considered in the context of positive attributes.

SWRCB asserts that the August 1989 point-of-reference conditions should be applied equally to the Upper Owens River as they are for the Mono Lake tributaries. These point-of-reference conditions are *not* the absolute conditions on August 22, 1989, but the environmental conditions that existed *before* the preliminary injunction by the El Dorado County Superior Court was issued on August 22, 1989 (see draft EIR, page 2-25). For water conditions, a point-of-reference *scenario* was established to characterize conditions that best represent existing conditions rather than conditions that existed on a single day. Based on this point of reference, and after consideration of all available information including the water rights hearing testimony, SWRCB still finds significant fisheries impacts for the 6,372-Ft Alternative and all other higher lake levels. Impact severity increases as Mono Lake elevation rises. SWRCB finds no reason to change the conclusions of the draft EIR.

Some confusion apparently arose about project-specific and cumulative impacts on Upper Owens River fisheries resources. Table S-1 for "Aquatic Resources of the Upper Owens" and Table 3D-8 (see Chapter 7, "Errata to the Draft Environmental Impact Report") in the draft EIR have been corrected for the final EIR and are reproduced on the following two pages. The final EIR clarifies and supports the draft EIR text by restating that significant *project-related* impacts occur on the Upper Owens River under the 6,372-Ft Alternative, and all higher lake-level alternatives, because of reduced adult brown and rainbow trout habitat. This impact is not cumulative. The only significant cumulative impact is to Upper Owens River channel geomorphology.

SWRCB uses pre-1941 conditions as the point of reference for cumulative impacts. SWRCB again finds no reason to change the draft EIR conclusions, except to acknowledge significant impacts on the channel morphology of the Upper Owens River from LADWP exports. The rationale for this position is stated in the first paragraph of this response. The evidence necessary to support a conclusion of significant impacts on the fish habitat or fish populations is contradictory and not definitive. Consequently, no mitigation is required for significant cumulative impacts.

Lower river flows that are associated with the higher lake level alternatives would reduce the extent of trout habitat because the water will be distributed across an overwidened channel. As a result, some commenters suggested that fishery impacts resulting from flow reductions to the Upper Owens River (under the 6,372-Ft Alternative and higher lake level alternatives) should be mitigated by fitting the channel to the flows, as opposed to fitting the flows to the channel.

Habitat restoration can, depending on the restoration technique selected, require extensive channel modifications. Many miles of the Upper Owens River may require some degree of restoration to compensate for trout productivity declines associated with lower flows. Exposing this extensive area to habitat restoration would have near-term detrimental effects on the fishery. Furthermore, the ability to successfully restore habitats to conditions that equal or exceed those that presently exist, or that would exist under the EIR alternatives, is somewhat risky because of the large extent of habitat requiring restoration and the high likelihood that the techniques would involve major disturbances to the existing habitat.

Mitigation for high-flow impacts under the 6,372-Ft Alternative and all other higher lake level alternatives can likely best be achieved through proper instream flow requirements, limits on Mono Lake exports, and sound operations of Grant Lake reservoir to maximize flow stability. Such mitigation will, in the long term, also begin to restore the channel conditions of the Upper Owens River. Further mitigation in the form of active stream habitat restoration in the Upper Owens River is unnecessary to reduce cumulative impacts on the river channel to less-than-significant levels. Such activities, given the level of impact identified in the Upper Owens River, could even be counterproductive. The success of such an undertaking on the Upper Owens River is doubtful. Based on the contents of the draft EIR, comments on the draft EIR, this final EIR, and the water rights hearing record, SWRCB will address this issue in its water rights decision.

D8. IFIM Habitat Predictions Do Not Relate to Fish Populations, and IFIM Studies Used in the Draft EIR Were Flawed

Summary of Comments

LADWP commented that because no data or models exist to relate fisheries habitat or populations to flow on Parker and Walker Creeks, no data exist to support any flow recommendations on these streams. LADWP also submitted extensive testimony at the water rights hearings intended to show that fish populations in the eastern Sierra Nevada, including Rush and Lee Vining Creeks, are not limited by streamflows if a small amount of flow is provided. Finally, LADWP provided testimony intended to show that the Rush Creek, Lee Vining Creek, and Middle Owens River IFIM studies all had major flaws.

Summary Response

SWRCB believes that LADWP arguments on these IFIM-related issues are, for the most part, without merit. LADWP had numerous opportunities to raise some of its concerns early during the study process and failed to do so in many of these instances. Many IFIM issues are hotly debated around the country, and LADWP incorrectly attempts to represent one side of these issues as the *only* scientifically credible one. Given the arguments presented in its comments and expert testimony, LADWP's basic argument is that data and models are inadequate to support instream flow recommendations. SWRCB's position is that there is sufficient and appropriate information on each stream to establish instream flow requirements, based on a thorough review of the draft EIR and the written and oral testimony provided in the water rights hearing.

Detailed Response

LADWP comments that because no data or models exist to relate fisheries habitat or populations to flow on Parker and Walker Creeks, no data exist to support any flow recommendations on these streams. If LADWP's comment were valid, no dewatered section of stream could be rewatered. Granted, specific information on how habitats or fish populations will respond to flow are lacking for Parker and Walker Creeks. Professional judgment is customarily used to establish streamflows, based on hydrologic data, known species life history requirements, and other available and pertinent data. In this case, specific data on the habitat-discharge or population-discharge relationships are lacking.

SWRCB also disagrees that a "critical assumption" of the Tennant Method is that depths and velocities over the 10-60% range of mean annual flows average 1 foot and 0.75 foot per second, respectively. The Tennant Method provided these values as the *average* conditions over a wide range of streams varying from small mountain streams to large rivers. These values are not critical assumptions.

LADWP also submitted extensive testimony at the water rights hearings intended to show that fish populations in the eastern Sierra Nevada, including Rush and Lee Vining Creeks, are not limited by streamflows if a small amount of flow is provided. The evidence provided was inconclusive and ignored the specific role that water will play in reforming and restoring habitats in Mono Basin tributaries. The minor flow quantities necessary to maintain a self-reproducing fish population are not the same as the flow quantities necessary to restore natural channel-building processes or restore conditions that benefitted the fish populations before 1941. Given the complex interaction between fish populations and their habitats, and the simple correlative analysis of plotting trout biomass against mean annual flow, mean January flow, and mean June flow, it is not surprising that no relationship is apparent between fish populations and streamflows. For example, a 1-day event on Lee Vining Creek on May 8, 1990, had major effects on the fish populations probably for the next several years. Such events are not considered in LADWP's analysis, yet have profound influences on results.

Lastly, LADWP provided testimony intended to show that the Rush Creek, Lee Vining Creek, and Middle Owens River IFIM studies all had major flaws. SWRCB finds LADWP's assertions inaccurate and disagrees that "most workers now agree that it [habitat preference transformations] should seldom, if ever, be done". First, habitat preference criteria are acceptable despite their controversy in the scientific community. These criteria were the *desired* criteria when the Mono Basin and Owens River basin IFIM studies were designed. SWRCB consultants discussed the use of preference criteria in 1992 with Mr. Ken Bovee, an independent IFIM expert, and Mr. Bovee thought their use was still appropriate in many circumstances. The ends of the curves could be volatile, but acceptable adjustments could be made, and both preference and use criteria have such biases. Many of the fish observations for all of Mono Basin and Owens River basin IFIM studies were made at single flows out of necessity; in these cases, use criteria can be extremely biased and preference criteria are preferred. LADWP experts have used some of the same habitat suitability data sets on their other projects.

Second, LADWP's IFIM expert in the hearings (Dr. Hardy) was not involved first-hand in any of the study designs and was not familiar with the nuances of each IFIM study. Accurately analyzing IFIM data without the benefit of seeing the transects, knowing how data were collected, understanding why certain modeling decisions were made, or knowing what flows were involved in model calibration at high and low flows or what specific transects were removed from each study is inappropriate and casts doubt on the credibility of LADWP's allegations. Dr. Hardy's testimony on the Middle Owens River IFIM did not consider that 17 transects were removed from the study because of poor hydraulic simulations. Dr. Hardy also could not have known from the presented data which data sets (low or high flow) were used to calibrate each transect at varying flows; consequently, he could not have accurately presented the relationships between velocity adjustment factors and discharge without requesting additional and detailed calibration details from the Middle Owens River IFIM.

AQUATIC PRODUCTIVITY (E)

E1. Assumptions of the Alkali Fly Model Are Not Stated or Are Unsupported by Data

Summary of Comments

The assumptions of the alkali fly production model were not specified or were not adequately justified. The model did not incorporate all available empirical data on the alkali fly, particularly the data provided by David Herbst's microcosm experiments. Most importantly, the mortality rates used in the alkali fly model and their relationship to salinity were arbitrary.

The assumptions and procedures of the alkali fly model differed in many respects from those of standard population dynamics or ecological production models.

Given the paucity of information on the Mono Lake alkali fly, the simpler production model developed by Kimmerer and Herbst (Kimmerer 1992) should have been used for assessing impacts on alkali fly production of the alternative lake levels.

Response

Most of the assumptions of the alkali fly model are provided on pages 3E-18 through 3E-20 of the draft EIR in the "Impact Assessment Methodology" section and on pages L-8 through L-12 of Appendix L in the "Model Assumptions and Calculations" section. As detailed on pages L-4 through L-8 of the "Model Development" section, the model was based almost entirely on the results of Herbst (1986, 1990, 1992) and Herbst and Bradley (1990).

The mortality rates used in the model (see page L-10) were not derived from literature sources because no useful empirical estimates of mortality rates were available. Herbst (1992) reported survivorships of alkali fly exposed to different salinities in his microcosm experiments, but these results were not used because there were differences among the salinity treatments in the stage of fly development at which the experiment was terminated. This difference probably biased Herbst's survival estimates. Nevertheless, Herbst's results show that increasing salinity strongly increases alkali fly mortality, so the assumption that mortality increased with increasing salinity was not arbitrary. Ultimately, the issue of mortality rates had a minor influence on the impact assessment conclusions because differences in alkali fly production at different lake levels were caused primarily by differences in area of suitable hard substrate habitat.

The results of Herbst's microcosm experiments were not directly incorporated in the alkali fly model because the early termination of the experiments introduced uncertainty into the results, such as the uncertainty in survivorship estimates noted in the previous paragraph. However, the microcosm data were used to verify general predictions of the model. One or two reviewers seemed to suggest that the results of the microcosm experiments should have been used directly to assess impacts of the different lake levels. However, the microcosm experiments were not suitable, nor were they designed, for this purpose because area of suitable hard substrate habitat, the major factor driving alkali fly production, was not a variable in the experiments.

The alkali fly model was not intended to provide a full or accurate description of the ecology of alkali fly production (given the paucity of information on alkali fly, such a model would not have been possible in any case). Rather, the model was designed for a specific, narrow purpose: to predict, as accurately as possible, differences related to lake level in the production of alkali fly available as food to Mono Lake birds. Therefore, simple equations were used to derive estimates of alkali fly production, and many of the equations oversimplify the relationships they represent.

The equation for daily egg density (page L-9), which was criticized by two reviewers, illustrates the narrow purpose of the alkali fly model. Daily egg density is modeled as a function of temperature, even though factors other than temperature determine egg density, because temperature and egg density are well documented in Mono Lake and their empirical relationship is easy to model and provides a relatively accurate representation of the seasonal pattern of egg density. This treatment is justified because little is known about factors that directly determine egg density, such as adult abundance and fecundity, while temperature has a strong and well-documented indirect effect on egg density. The seasonal temperature and egg density patterns were held constant and therefore did not influence the modeled differences at alternative lake levels.

The Kimmerer-Herbst (KH) model does not adequately assess impacts on alkali fly production of the alternative lake levels because it assumes that the mortality rate would be constant at different lake levels. However, changes in salinity would accompany the changes in lake levels and, as noted earlier, Herbst's microcosm experiments indicated that mortality increases with increasing salinity. Despite several differences between the KH model and the draft EIR alkali fly model, the models predict similar effects of lake level on alkali fly production. This consistency supports the conclusion of the draft EIR that alkali fly production is maximized at lake levels between 6,383.5 feet and 6,390 feet.

E2. Brine Shrimp Model Is Inappropriately Applied to Prediversion Lake Levels

Summary of Comments

One reviewer stated that it was unscientific to conclude that brine shrimp production for prediversion lake elevations was higher than production at the point of reference because the brine shrimp model was not run for lake elevations above 6,390 ft. The University of Santa Barbara researchers did not run their model for lake elevations above 6,390 feet because conditions, particularly salinity conditions, for higher lake elevations were not adequately represented in the experiments and observations from which the data used to develop the model were obtained. Estimating conditions by extrapolating model results beyond the range of observations or measurements from which the model was developed is considered scientifically invalid.

Response

The draft EIR assumed that prediversion brine shrimp production at lake levels above 6,390 feet was the same as or greater than that at the 6,390-foot elevation. Although no data are available for estimating prediversion brine shrimp production, model simulations of brine shrimp production for lake elevations of 6,390 feet and below showed a very regular trend of increasing production with increasing lake elevation. Thus, the conclusion that production at lake levels of the 6,410-Ft Alternative, No-Diversion Alternative, and prediversion condition would not be lower than that of the 6,390-Ft Alternative is reasonable. This conclusion assumes, among other things, that factors such as predation and competition that are absent at low lake elevations do not significantly affect brine shrimp production at higher lake elevations. As noted on pages 3E-15 and 3E-23, however, such factors are unlikely to have significantly affected prediversion brine shrimp production in Mono Lake.

E3. Impact Assessment Criteria for Significance Are Arbitrary and Unrealistic

Summary of Comments

The criteria used to determine the significance of changes in predicted values of the impact assessment variables are arbitrary and, given the large natural variability in the assessment variables in Mono Lake, represent a change too small to be detectable or ecologically important.

Response

For the alkali fly assessments, a 10% or more change was considered significant, and for the brine shrimp assessments, a change of 25% or more of the simulated natural range of values was considered significant. The impact criteria are somewhat arbitrary, which is true of nearly any attempt to define a dichotomous condition using a continuous variable. For instance, even the commonly accepted practice of using a probability (of a Type I error) of .05 to define statistical significance is essentially arbitrary. The impact criteria for both the alkali fly and brine shrimp were selected after careful consideration of all available information on these populations.

The comment that a 10% change would rarely be detectable given the large natural variability is vague but presumably refers to statistical detectability. Statistical methods were not used for the impact assessments because there was not enough information to do so. Nevertheless, in a long-term study, a 10% change in mean alkali fly production probably would be statistically detectable.

The changes in value adopted for the impact criteria are, as indicated by the comment, smaller than the expected natural variability. However, it does not follow that such changes are ecologically unimportant. The alkali fly and brine shrimp models are designed to predict *average* levels of the impact assessment variables, not the extreme values. Therefore, a 10% change in alkali fly production indicates a 10% change in the permanent average value, not a 10% change in any one year. A permanent 10% change in production could be considered ecologically important regardless of whether it exceeded natural year-to-year fluctuations. The statistical detectability of a change is a separate issue from its importance.

Although natural variability should not be the only relevant issue in choosing significance criteria for assessments, it may affect the community's tolerance of change and thus should be considered. For instance, the large natural variability of the alkali fly and brine shrimp populations may keep birds from specializing too narrowly on these prey. Not overspecializing might help the birds accommodate small reductions in the production of their prey. Information on natural variability of the alkali fly population was not available and therefore could not be incorporated into the significance criteria for the impact assessment in the draft EIR.

Information on natural variability was incorporated into the significance criteria for the brine shrimp impact assessments. A change in the predicted value of the assessment variables for brine shrimp was considered significant if it was more than half of the largest difference between the mean and the individual yearly estimates for the 1983-1988 simulations (see page 3E-27). This procedure produced significance criteria for changes in brine shrimp impact assessment variables that ranged from 10% to 26% of the point of reference or prediversion estimate (see Table 3E-4).

E4. Impact Assessment Conclusions Rely Too Heavily on Results of Simulation Models

Summary of Comments

The impact assessments should not have relied so heavily on the simulation results of the alkali fly and brine shrimp production models because the models did not include certain potentially important factors. Conclusions about impacts of the lake levels should have included these factors as qualitative impact assessment variables. One important factor not used for impact assessment was submerged vegetation.

Response

The draft EIR identified several potentially important factors not included in the production models (see the "Factors Not Included in the Models" section on page 3E-23). These factors were not simulated by the production models because their effects were too little known. For instance, high salinity limits production of algae, but, because it is not known if alkali fly would be food limited in Mono Lake at any lake elevation, this factor was not used to assess impacts of the lake level alternatives.

Submerged vegetation might be an important factor at higher lake level for several reasons:

- Submerged vegetation is known to support high densities of alkali fly.
- The availability of suitable habitat strongly limits alkali fly production predicted for higher lake elevations by the alkali fly production model.
- Ecological evidence (see page 3E-23) and historical evidence indicates that submerged vegetation was much more prevalent under prediversion lake level conditions than under present conditions.

Historical evidence about the prevalence of submerged vegetation at high lake elevations was not discovered until after the draft EIR was written (excerpts from J. Grinnell's notes, July 20, 1937; Museum of Vertebrate Zoology, University of California, Berkeley). Including submerged vegetation as a substrate component would result in increased predicted alkali fly production for the higher lake elevations, although there is no basis for estimating how much higher the predictions would be.

E5. Relationship between LAAMP and DYRESM Models

Summary of Comments

The connections between LAAMP water budget model results and the DYRESM salinity model were not clearly discussed in Auxiliary Report 14. In particular, the basis for the assumed 48 inches of evaporation was unclear.

Response

Auxiliary Report 14 was prepared by staff of the University of California, Santa Barbara, as consultants for LADWP. The results from Auxiliary Report 14 were summarized in Appendix M and on page 3E-21 of the draft EIR under the "Physical Limnology Model" section. The final results from DYRESM were included in the 1991 annual report to LADWP (Dana, Jellison, Romero, and Melack 1992).

List of Acros

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The determination of the evaporation rate is described in Appendix A in the "Evaporation and Precipitation" section. The match of the measured surface temperatures with DYRESM simulations using various evaporation coefficient values provided the best estimate of 48 inches per year, as shown in Figure A-5.

The Mono Lake water budget used in LAAMP includes an unmeasured inflow of 34,000 acre-feet per year plus 5% of the measured runoff. Therefore, there was usually additional water needed in the DYRESM model to match the LAAMP end-of-month volumes. This additional water was assumed to be groundwater and was distributed with an assumed vertical pattern in DYRESM. In this way, the DYRESM model was made consistent with the LAAMP water budget results.

The DYRESM results indicated that the probability of meromixis increased with inflow and thus was greater during the transition period to higher lake levels. However, because the DYRESM results were not linked directly with the brine shrimp productivity model, they did not greatly influence the impact assessment of brine shrimp productivity.

WILDLIFE (F)

F1. Prediversion Population Estimates of Ducks and Other Migratory Water Birds Were Unreliable

Summary of Comments

Descriptions of prediversion populations of ducks and other migratory water birds at Mono Lake were unreliable because they were based on anecdotal sources and the recollections of untrained observers made 50 years ago.

Response

Ideally, SWRCB consultants would have relied on data published in refereed journals to describe prediversion water bird populations at Mono Lake. Unfortunately, however, few references published before 1941 included systematic observations of the lake's water birds.

Three articles reviewed by SWRCB consultants contained detailed information about water birds in the prediversion years, including a journal article by Fisher (1902) and books by Dawson (1923), and Grinnell and Storer (1924). In addition to these published sources, SWRCB consultants reviewed and cited the field notes of Joseph Dixon, Joseph Grinnell, and Walter Taylor taken during the period 1916-1922 (available at the Museum of Vertebrate Zoology, University of California, Berkeley).

Joseph Dixon visited Mono Basin for almost 2 months (from early May until early July 1916), but most fieldwork conducted there by Dawson, Grinnell, and Fisher lasted for only a few days or weeks in different years and their field notes and published works comprised an incomplete historical record for ducks and other wildlife at Mono Lake.

SWRCB consultants also reviewed and cited published articles summarizing historical population trends of California gulls (Jehl et al. 1984, 1988; Winkler and Shuford 1988), and Wilson's phalaropes and eared grebes at Mono Lake (Jehl 1988a). These publications relied extensively on unpublished field notes, newspaper articles, books on regional human history, egg collection records in major western museums, or interviews with historical residents because they were the best and only sources of information available.

Transcripts of interviews with long-term residents of Mono Basin provided detailed information that was unavailable from other sources. In addition to reviewing these transcripts, SWRCB consultants conducted independent telephone and in-person interviews with several prediversion observers (e.g., Don Banta, Kent DeChambeau, Wallis McPherson, and Eldon Vestal) to determine their experience with ducks and other water birds at Mono Lake. These observers were questioned about their wildlife observation techniques (i.e., did they have boats and optical equipment) and their overall experience with ducks and other water birds at the lake. These observers were also asked if they knew Walter Dombrowski, a seasonal aide for DFG, who conducted the only systematic waterfowl counts at Mono Lake in 1948 (Dombrowski 1948).

It is true that memories often fail, especially after half a century. However, Banta, DeChambeau, McPherson, and Vestal gave clear, and nearly identical, descriptions of huge concentrations of ducks they had seen and hunted during many fall migrations at Mono Lake in the 1930s, 1940s, or 1950s. All these observers mentioned the same species of ducks they had hunted and accurately recalled the major field marks that distinguish the common migratory species at the lake.

Banta and McPherson reported that large concentrations of ducks continued to visit Mono Lake until sometime in the early or mid-1960s. They recalled that duck populations declined abruptly when ponds, lagoons, springs, and other sources of fresh and brackish water around the lakeshore disappeared with declining lake elevations (i.e., between about 6,400 and 6,405 feet mean sea level [msl]).

Banta, DeChambeau, McPherson, and Vestal had all hunted with Walter Dombrowski and knew him well. They described him as a careful and experienced waterfowl observer who had an exceptional ability to identify waterfowl at long distances, even when they were in flight. Dombrowski's (1948) highest count of "well over a million ducks" on November 1, 1948, was consistent with their recollections of peak migratory waterfowl concentrations in the early diversion years. These observers agreed that major declines in the lake's migratory duck population had occurred and that point-of-reference populations represented a minute fraction of the numbers they had seen in the prediversion and early diversion years.

In 1942, DFG (then called the Division of Fish and Game) published a map of statewide game kills from 1940. This map was recently discovered by DFG personnel (Thomas pers. comm.) and was not available to SWRCB consultants for review during preparation of the draft EIR. Mono County reported 5,000 ducks on hunter return questionnaires; of these, 3,000 were taken on the north shore of Mono Lake near the DeChambeau duck ponds, and 2,000 were killed at Grant Lake, Rush Creek, and its tributaries (SWRCB Exhibit DFG-95). These data further corroborate the recollections of long-term residents that Mono Lake was a major duck hunting area in the prediversion years.

Published or unpublished data have not been provided in any of the comment letters on the draft EIR or in the SWRCB hearings to refute that a major loss of migratory ducks and their preferred wetland habitats has occurred at Mono Lake. Lacking any published data, interviews with long-term residents continue to provide the best and most complete sources of information available on prediversion and early diversion duck populations at the lake.

Further discussions of CEQA requirements regarding inclusion of unpublished materials in EIRs are provided in response to Comment X3.

F2. Prediversion Waterfowl Habitats at Mono Lake Were Insufficient to Support One Million Migratory Ducks

Summary of Comments

The amount of prediversion waterfowl habitats at Mono Lake (i.e., 260 acres of ponds and lagoons) as described in the draft EIR appear insufficient to support up to 1 million migratory ducks.

Response

The draft EIR reported that about 260 acres of fresh and brackish water ponds and lagoons existed around the lakeshore before 1940 (draft EIR, Table 3F-6). In addition to these wetland wildlife habitats, freshwater marsh covered 133 acres of the Rush Creek delta plain (SWRCB Hearing Testimony of Scott Stine). The existence of this large marsh area was unknown to SWRCB consultants at the time the draft EIR was prepared. Therefore, all references to 260 acres should be revised to reflect that about 390 acres of fresh and brackish water wetlands once existed around the lakeshore.

At Mono Lake, migratory ducks were abundant at most fresh water habitats, including ponds, creek deltas, and large spring discharge areas. Ponds, lagoons, and sheltered embayments provided important refuges from the lake's high waves during frequent periods of high winds (Banta, DeChambeau, McPherson, and Vestal pers. comms.).

As noted in the draft EIR (pages 3F-41 and 42), migratory ducks usually avoid hypersaline lakes unless sources of freshwater are available nearby. Studies in North Dakota concluded that most ducks frequent lakes with sheltered bays and chemical stratification providing a thin layer of fresh water floating on the saline water below (Swanson et al. 1984).

According to Walter Dombrowski's map, referenced in the draft EIR (page 38, paragraph 3), most of the ducks observed during his fall censuses were concentrated on the chemically stratified waters of Mono Lake, including the Rush Creek delta (45%), Lee Vining Creek delta (10%), DeChambeau Lagoon (also known as County Ponds) (15%), Warm Springs (5%), Simon's Spring (15%), and South Tufa (5%). Thus, migratory ducks frequented the lake's extensive nearshore waters and shoreline ponds and lagoons.

Since the draft EIR was prepared, SWRCB consultants have reviewed two new important sources of information, including a report prepared for SWRCB by Dr. Scott Stine (SWRCB Hearing Testimony of Scott Stine) concerning the lake's historical and modern waterfowl habitats, and summaries of field notes taken by Joseph Dixon and Joseph Grinnell during the 1930s and prepared by Emilie Strauss (pers. comm.).

Dr. Stine's report identified important prediversion creek and spring discharge areas that created freshwater lenses floating on the surface of Mono Lake. These freshwater lenses encircled the mouths of Rush, Lee Vining, DeChambeau, Wilson, and Mill Creeks, as well as former spring discharge areas near South Tufa, Horse Creek embayment, DeChambeau Ranch embayment, Monte Vista Springs, Simon's Spring, and Warm Springs (SWRCB Hearing Testimony of Scott Stine). According to this report (page 2, paragraph 2):

> Each of these areas was characterized by an abundance of freshwater that was derived from streams and/or springs. These influxes of freshwater did not simply dilute the hypersaline waters of Mono Lake. Rather, the fresh water inflow, being far lighter than salt water, floated as a lens on the surface of the lake--a phenomenon known as "hypopycnal stratification".

Joseph Grinnell's field notes from June 20, 1937, clearly described his observations of freshwater habitats along the lake's shoreline:

> Coves at the bases of the "hills," where much water seeps out of old water laid formations are luxuriant with vegetation: cottonwoods, willows, sheperdia, sedges, reeds, water cress, mimulus, orchids, etc., very rankly growing. In long stretches this freshwater goes down to within one yard of the edge of the lake water, oozing through the beach gravel or pebbles into the heavily alkaline water. There is thus no haline vegetation--all freshwater plants right down to the farthest lakeshore, the water level of which has been perhaps 7 feet higher than now (as attested by ancient stubs of willows in place), but also lower, as shown by such stubs quite a way out beneath the surface of water.

Thus, from a duck's perspective, Mono Lake's shoreline and nearshore waters were fresh water and offered thousands of acres of shallow, open water habitat. These areas were used extensively by migratory ducks, in addition to the 390 acres of ponds, lagoons, and freshwater marshes around the lakeshore.

F3. Superabundant Food Source for Water Birds Was Not Recognized

Summary of Comments

Alkali flies and brine shrimp provided a superabundant food source for nesting and migratory water birds at all historical elevations of Mono Lake, as evidenced by healthy populations of eared grebes, Wilson's phalaropes, and red-neck phalaropes that gain weight while at the lake.

Response

It may appear to human observers that alkali flies and brine shrimp constitute superabundant food resources for water birds at Mono Lake. However, the foraging requirements of individual water birds vary and species respond differently to changes in prey density.

If unlimited food is available, a predator might be expected to exhibit a functional response to increasing prey densities and reach a satiation level where higher prey availability would not induce a higher number of foraging attempts (Krebs 1978, Krebs and Davies 1978, Pianka 1983). Empirical data from laboratory and field studies are required to determine if water birds exhibit functional responses at all recorded densities of invertebrate prey at Mono Lake.

The term "superabundance" was never defined clearly in the comment letters. However, it implies that alkali fly and brine shrimp populations are available in such massive numbers that even relatively low densities of these prey species represent an unlimited food source for water birds at Mono Lake.

In preparing the draft EIR, SWRCB consultants reviewed an extensive literature on water bird populations at Mono Lake but only a few studies provided quantitative data on foraging behavior, diets, or responses to changes in prey density. Jehl (1988a) described the diets of eared grebes and red-necked phalaropes and Jehl and Chase (1987), Cooper et al. (1984), and Winkler (1983a) documented the diets of California gulls. However, only Rubega's (1993) laboratory and field studies examined the response of red-necked phalaropes to changes in prey density.

The primary data presented to support the hypothesis that invertebrate food is superabundant at Mono Lake are summarized in Dr. Joseph R. Jehl's written testimony to the SWRCB (SWRCB Testimony of Dr. Joseph R. Jehl, Jr.). Figure 7 of Jehl's testimony illustrates peak counts of migratory eared grebes, red-necked phalaropes, and California gull nests compared to the relative abundance of brine shrimp at various lake elevations from 1979 until 1992. Figure 7 does not illustrate trends in alkali fly production, although the flies are the primary food source for many migratory water birds, including red-necked phalaropes.

During the years illustrated in Figure 7 of Jehl's testimony, the lake's elevation varied between its historical lowstand of 6,372 feet in 1982 and its most recent highstands of about 6,381 feet in 1984 and 1986. According to Figure 7, the average yearly abundance of brine shrimp had a nearly inverse relationship with lake elevation and reached its highest recorded levels of about 22,000 shrimp per square meter at the lowstands of 1982 and 1989, while falling to 11,000 or fewer shrimp per square meter during the lake's 1984 and 1986 highstands.

More than 500,000 eared grebes were reported in every year and more than 950,000 grebes were observed in 1992 when brine shrimp abundance was relatively low (Figure 7 of Jehl's testimony). These data suggest that eared grebes were abundant and had enough food during the lowest recorded brine shrimp production years. Although, eared grebes consume large numbers of alkali fly larvae during summer and early fall, they rely almost entirely on brine shrimp in late fall when the grebes' numbers are highest (draft EIR, page 3F-23, paragraph 6; SWRCB Testimony of Dr. Joseph R. Jehl, Jr.).

Figure 1 of Jehl's testimony illustrates weight gains of adult eared grebes in relation to declining brine shrimp densities at Mono Lake in 1991. No information is offered on how the points on this graph were derived, but they appear to represent mean values of grebes collected on different dates rather than sequential measurements of the same birds through time. Since confidence intervals were not presented in Figure 1, the range of weight variations of birds collected on each date could not be examined. Similarly, the lack of data on population turnover rates could mean that grebes gained weight at Mono Lake, or alternatively, that they gained weight at another location (e.g., Abert Lake) prior to their arrival at the lake.

Despite the lack of data on weight gain or turnover rate for grebes, no evidence is available to suggest that their populations are limited by the availability of invertebrate prey at Mono Lake. Thus, the draft EIR (page 3F-24, paragraph 3) concluded that "alkali fly and brine shrimp populations were sufficient to meet eared grebe requirements at the lake's historical lowstand in 1982, the point-of-reference, and through 1992".

Data are lacking to support the hypothesis that invertebrate prey have always been superabundant for California gulls. As noted in Appendix C of the draft EIR (page C-14, paragraph 3), many California gull chicks died late in the 1981 breeding season and Winkler (1987) suggested that heat stress and possibly food shortages may have limited gull reproductive success in that year.

Specifically, Winkler (1987) reported that total brine shrimp production was not depressed compared to earlier years but the timing of shrimp emergence was shifted approximately 1 month later. A similar delay in brine shrimp availability was also noted in 1982, when gulls were observed to forage extensively on cicadas as an alternate food source until brine shrimp populations recovered in July of that year. The 1982 season, however, was the only year in the 13 years since intensive studies began that gulls have consumed large numbers of cicadas (Winkler, Shuford pers. comms.).

In the absence of data on unpredictable and uncommon food sources such as cicadas, how delayed food supplies, as in 1982, might have affected the gulls cannot be determined. In years of delayed brine shrimp emergence, food cannot be assumed to be superabundant for nesting gulls.

Figure 7 of Jehl's testimony illustrates peak counts of red-necked phalaropes at Mono Lake which have ranged from a low of 8,000 birds in 1983 to a high of 45,000 in 1993. Population trends in Wilson's phalaropes, whose migratory populations at Mono Lake have shown a dramatic decline since at least 1989 (Rubega pers. comm.), are not illustrated in Figure 7.

Figure 5 of Jehl's testimony displays weights of male and female red-necked phalaropes as a function of Julian dates and implies that both male and female phalaropes gained weight during their migratory stops at different lakes. As with the weight gain data presented for eared grebes in Figure 1 of Jehl's testimony, however, the red-necked phalarope data were apparently derived from collection of birds on different dates and not from sequential measurements of the same individuals through time.

Figure 5 of Jehl's testimony groups data from different years and lakes, most of which are represented by samples too small for statistical analysis. For example, the graph for males shows four 1992 samples from Mono Lake collected on two dates, one 1992 sample from Abert Lake, and four 1992 samples from Great Salt Lake collected on two dates. The graph for females contains data derived from similar sample groups. Although the samples are statistically inadequate, casual inspection of Figure 5 suggests that Mono Lake and Great Salt Lake may have different slopes; however, the graphs and text lack regression equations, regression coefficients, or any tests of significance that would permit independent analysis of these reported weight gain trends.

As stated above, eared grebes and red-necked phalaropes may gain weight during their stay at Mono Lake but data from the same birds at different points in time are not available to test this hypothesis. Rubega (1993) provides the only quantitative data on red-necked phalarope foraging behavior at Mono Lake. Her detailed laboratory studies concluded that prey density had a significant, and positive, effect on the prey capture attempt rate and feeding efficiency of both male and female phalaropes.

Individual phalaropes used in Rubega's (1993) experiments varied in their foraging attempt rates, success rates, and efficiency, but all (both sexes) continued to increase their feeding rates at alkali fly densities that were several, or many, times higher than those available at Mono Lake. Even those individuals that exhibited functional responses, or upper limits, to their feeding attempt rates in the laboratory (and some did not) did so at prey densities that were several thousand times higher than average field densities at the lake (Rubega 1993).

Rubega's study demonstrates that red-necked phalaropes at Mono Lake forage at rates that are far lower than their maximum rates observed in the laboratory and thus have the mechanical ability to capture and consume more alkali flies than they currently do in the wild. Therefore, current prey densities at the lake cannot be assumed to be nonlimiting for this species.

No evidence supports the assertion that current and point-of-reference invertebrate prey populations constitute a superabundant food resource for all water birds at Mono Lake. Availability of brine shrimp appears to be nonlimiting for eared grebes because the grebe's population was large and healthy at all historical lake elevations. However, California gulls could be adversely affected by late brine shrimp hatches in some years, especially if unpredictable food sources such as cicadas were not available. Similarly, laboratory studies and recent observational data (see following response to Comment F4) suggest that alkali flies may be limiting, rather than superabundant, for red-necked phalaropes.

F4. Food Supply Was Incorrectly Identified as Restricting Phalarope Distribution

Summary of Comments

The current restricted distribution of Wilson's and red-necked phalaropes in the northeastern sector of Mono Lake is not related to reduced food supplies and could be caused by other factors such as increased tourism.

Response

The draft EIR described the past and current distributions of red-necked phalaropes at Mono Lake (pages 3F-26, paragraphs 3 and 5, and page 3F-27, paragraphs 4 and 5). Until recently, this species was widespread at the lake, including during the lake's historical lowstand in 1981 and 1982 (Jehl 1986b). However, since at least 1989, phalaropes have been almost entirely restricted to the lake's northeastern sector and a small area near the Negit Island embayment (Jehl, Rubega pers. comms.).

Jehl (SWRCB Hearing Testimony of Dr. Joseph R. Jehl, Jr., page 41, paragraph 1) concluded that there was no general correlation between the surface elevation of Mono Lake and the distributional pattern of phalaropes. His testimony (page 39, paragraph 4) stated that the eastern side of Mono Lake was not used to a great extent during 1981 and 1982. Earlier Jehl (1986b) data, however, indicate that on seven of fourteen dates at least 2,000 red-necked phalaropes were observed in the lake's eastern embayment (e.g., east of Paoha Island).

Figure 4 of Jehl's testimony uses arrows to indicate the major distribution of phalaropes in 1980-1985 and in 1988-1992; the text implies that distributional maps are available for all years of his study, except for 1986 and 1987 when incomplete records were taken (page 39, paragraph 4). Despite several written requests, these additional data have not been made available to SWRCB consultants for review.

Although Figure 4 provides no data on numbers or specific locations of phalaropes in any year, it implies that this species was primarily in the eastern and northeastern sectors of Mono Lake since about 1988. Rubega's field notes confirm that both Wilson's and red-necked phalaropes have been restricted to these remote areas since at least 1989. Unlike the widespread use of the lake observed in most previous years, including 1981 and 1982, this restricted distributional pattern was predictable and consistent during the past 4 years.

The exact reasons for the recent distributional pattern of phalaropes at Mono Lake will not be known until long-term studies on their foraging behavior are conducted at higher lake elevations (e.g., above 6,376 feet msl). However, based on the best available scientific information, the draft EIR (page 3F-67, paragraph 2) concluded that the reasons for restricted phalarope distributions are probably related to the availability of free-floating alkali fly pupae and larvae, which tend to concentrate in the lake's northeastern sector where longshore currents converge (Stine pers. comm.). Further, the draft EIR concluded that phalaropes are attracted to this area because it provides the only consistently suitable foraging habitat remaining at lake elevations below about 6,376 feet msl.

Jehl proposed that the current phalarope distribution might be explained by greatly increased numbers of human visitors to Mono Lake (SWRCB Testimony of Dr. Joseph R. Jehl, Jr., page 46, paragraph 1). For example, he postulated that the large numbers of phalaropes he observed at South Tufa in the early 1980s may have abandoned this area due to harassment by tourists and their pets. Unleashed dogs often chase birds and can affect their feeding and roosting behavior in localized areas.

SWRCB consultants concur with Jehl that phalaropes might abandon a few specific areas if they were consistently disturbed there. However, phalaropes often permit humans to approach closely, and, when flushed, they usually fly short distances away and resume their previous activities. If phalaropes are frequently disturbed in specific areas, they probably would forage in nearshore waters rather than at the shoreline and would not abandon the area entirely.

Jehl's (1986b) 14 maps from 1981 and 1982 clearly indicated that he observed at least 1,000 or more red-necked phalaropes at many areas around the lakeshore, including County Park, Danburg Beach, DeChambeau embayment, Sulphur Springs, Warm Springs, Simon's Spring, South Tufa, Rush Creek delta, Lee Vining Creek delta, and the western shoreline. Increased tourism could not reasonably be assumed to cause phalaropes to avoid all of these historical foraging areas in favor of one restricted area in the lake's northeastern sector. Many historical foraging areas, such as DeChambeau embayment, Warm Springs, and Simon's Spring, continue to receive extremely low rates of human visitation and phalaropes have abandoned them, along with popular tourist spots such as South Tufa and the County Park.

As concluded in the draft EIR, phalaropes are probably restricted to the lake's northeastern sector because they cannot find suitable densities of alkali flies elsewhere. Other, unidentified, factors may also affect the distribution of phalaropes at Mono Lake; however, speculative comments regarding the effects of tourism are unconvincing and are unsupported by data.

F5. California Gull-Nesting Capacity Estimates Were Incorrect and Misleading

Summary of Comments

California gull-nesting capacity estimates in the draft EIR were based on incorrect assumptions and resulted in misleading conclusions about the future size of this colony at different lake elevations.

Response

Detailed descriptions of the methods and assumptions used to calculate the potential California gull-nesting capacity were provided in the draft EIR (pages 3F-50 to 3F-53). Gull researchers on Negit Island (Winkler pers. comm.), the Negit Islets (Shuford pers. comm.), and the Paoha Islets (Jehl pers. comm.) were requested to provide maps of each island and to rank specific areas as high, moderate, or low according to their potential to support nesting gulls. As discussed below, however, different assumptions were used to calculate the maximum potential nesting capacities on Negit Island and the Negit Islets compared to those for the Paoha Islets.

Potential gull-nesting areas on Negit Island and the Negit Islets were identified based on detailed contour and habitat maps of each island and analyses of their nesting densities at specific locations observed in previous years. Shuford and Winkler (pers. comms.) recognized a gradient in gull-nesting habitat suitability and applied potential density estimates to each category rank to compensate for the gradient.

The Negit Island map (draft EIR, Figure 3F-2) was based on observations in 1976 (Winkler et al. 1977) and indicated historically occupied, low-gradient scrublands as high-suitability nesting habitats, while similar but historically unoccupied scrublands were considered moderate suitability; historically occupied white rocks areas (i.e., tufa-encrusted lava flows) were also mapped as moderate suitability. As noted in Appendix C (Table C-3), incomplete records were kept on the gull colony during 1977 and 1978 and coyotes first invaded the island in 1979. Subsequent land bridging and coyote predation events have made Negit Island unsuitable or low-suitability gull-nesting habitat in all following years (Appendix C, Table C-3).

Potential nesting capacity estimates for Negit Island presented in the draft EIR (Table 3F-5) assumed that the areas mapped as having high and moderate suitability would have a sufficient water barrier to remain predator free long enough to allow nesting gulls to successfully reestablish their former populations. If these conditions were met, Table 3F-5 indicates that Negit Island could potentially accommodate more than 120,000 gull nests if all suitable nesting habitats were occupied.

Based on the observations from all previous years, of course, Negit Island is unlikely to ever support this many nests. The draft EIR never stated or implied that these maximum nesting capacities would be achieved at Mono Lake. However, the calculated values provide evidence that long-term isolation of Negit Island would offer almost unlimited gull-nesting habitat in both scrub and white rock habitats.

As with Negit Island, maps of the Negit Islets reflected the relative potential for specific islets to support nesting gulls based on their topography and observed densities during the past decade. Nest counts for each islet varied in most years. However, high-suitability areas were usually characterized by gentle, tufa-encrusted slopes; moderate-suitability areas were sandy beaches lacking surface debris and steeper slopes; and low-suitability areas included steep, rocky slopes and water-proximate, wave-cut platforms (draft EIR page 3F-51, paragraph 5).

Based on detailed topographic maps and maximum 1992 nest counts from specific mapped habitats on the Negit Islets (Shuford pers. comm.), SWRCB consultants defined potential nesting capacities as: high = 1,300 nests per acre, moderate = 600 nests per acre, and low = 200 nests per acre (draft EIR, page 3F-52, paragraph 3). These categories reflect that variable habitat quality exists across the Negit Islets and not all areas are equally attractive to nesting gulls.

As noted in the draft EIR, the habitat suitability categories used in this analysis accurately predicted the maximum nesting densities of the Negit Islets observed in all previous years (page 3F-65, paragraph 4). Thus, the suitability categories used in the draft EIR continue to provide the best approximation for the maximum potential nesting capacity of the Negit Islets.

Jehl (pers. comm.) indicated that the potential nesting categories used for Negit Island and the Negit Islets could not be applied to the Paoha Islets (draft EIR, page 3F-52, paragraph 4). Based on his observations made at the Paoha Islets, and elsewhere throughout the breeding range of this species, he noted that similar maximum nesting densities have been observed on rugose and nonrugose substrates and all suitable habitats could potentially accommodate 1,000 nests per acre. As discussed in the draft EIR, however, such nesting densities are rarely achieved over large areas (e.g., 1 acre or more) because such concentrations often deplete local food supplies, attract predators, or promote the spread of disease (page 3F-65, paragraph 6).

A comparison of Dr. Jehl's map of rugose and nonrugose substrates at the Paoha Islets (draft EIR, Figure 3F-4) shows a strong correspondence with maps of gull-nesting areas reported there in the past decade (e.g., Jehl 1983, 1989, 1991 and 1992). On Coyote Islet, for example, rugose areas along the northern and eastern shoreline supported high densities of gull nests while large, sandy areas in the center and southern portions of the islet supported few, if any, nests. Similarly, areas mapped as rugose substrates on Browne, McPherson, Gull, and Anderson Islets were also used by nesting gulls, while open, sandy areas were generally avoided.

Due to variable density assumptions used by individual researchers, potential nesting capacities of the Paoha Islets were calculated using several different maximum values that yielded a wide range of results (draft EIR, page 3F-53, paragraph 1). A realistic system for categorizing Paoha Islet habitats would incorporate substrate type (i.e., rugose or nonrugose), degree of wave or wind exposure (i.e., protected or unprotected), and past history of use by nesting gulls.

A realistic classification system would not include historically unoccupied areas as prime nesting habitat and would result in a lower estimate of maximum nesting capacity for the Paoha Islets. For example, based on nest counts made in similar habitats on the Negit Islets, one could assume that rugose substrates support up to 1,300 nests per acre and nonrugose substrates support up to 200 nests per acre; this converts to a maximum nesting capacity of about 11,500 nests for the Paoha Islets compared to their highest count of 9,300 nests in 1992 (draft EIR, page 3F-65, paragraph 5). The sum of the highest ever counts for individual islets is about 12,000 nests, as derived from various reports by Jehl: Anderson (768), McPherson (3710), Whitney (43), Channel/Obsidian (81), Winkler (82), Dawson (227), Gull (1,416), Smith (149), Conway (43), Browne (1,531), Coyote (3,954), and Cluster (7).

Any habitat classification system is an oversimplification of nature and will never predict future events perfectly. However, even calculations using the most optimistic nest density assumption for the Paoha Islets (i.e., 19,000 nests at 1,000 nests per acre) revealed that they could not accommodate all of the gulls that would be displaced by land bridging of Negit Island and Twain, Java, and Pancake Islets under the 6,372-Ft Alternative, and periodically under the 6,377-Ft Alternative (draft EIR, page 3F-66). Thus, regardless of what maximum density is used, potential gull-nesting habitat at Mono Lake is predicted to be at a shortage without these historical nesting areas. Conversely, nesting habitat should be nonlimiting to future growth of the colony if Negit Island and the Negit Islets remain intact and predator free.

F6. Paoha Island Was Not Identified as Potential California Gull-Nesting Habitat

Summary of Comments

The potential importance of Paoha Island as a California gull-nesting habitat was not considered in the draft EIR. This island was used by nesting gulls historically and could provide important habitat for future expansion of the Mono Lake colony.

Response

Paoha Island has not supported nesting California gulls for almost 70 years and thus was not considered potential habitat for this species in the draft EIR. The exact reasons for the gull's long-term avoidance of this island are unknown but may be related to the current existence of coyotes and severe dust storms there (Winkler pers. comm.).

Appendix C described the history of California gull nesting on Paoha Island during the early 1900s (page C-1). As summarized in Table C-1, Dixon (1916) observed about 2,000 nesting adults there and Dawson (1923) recorded about 1,700 gulls there in 1919. Gulls continued to nest on Paoha Island until sometime in the late 1920s when they abandoned it, possibly because humans, dogs, and goats were present on the island (McPherson pers. comm.).

About 200 gulls nested on Duck Islet (a peninsula of Paoha Island at lake elevations below 6,379.5 feet) in 1986 but not in subsequent years after it again became a peninsula (Table C-3); apparently a few pairs have attempted nesting on the island during the past decade, but none were successful because coyotes were present (Jehl pers. comm.).

When, or how, coyotes first arrived at Paoha Island is unknown, but a resident population has existed there since before 1980 (Winkler pers. comm.). Murphy (pers. comm.) observed a coyote swimming the narrow channel (i.e., about 1/2 mile wide) between Negit and Paoha Islands in 1990 (Appendix C, page C-12, paragraph 4), and other individuals may have followed this same route. The success of this island-hopping technique depends on the relative ease of access to Negit Island; if the land bridge is exposed, the entire trip would entail a short walk to Negit Peninsula and a short swim to Paoha Island. If coyotes were required to swim a long distance (i.e., a mile or more) to get to Negit Island, however, access to Paoha Island would become far more difficult.

The presence of small mammals and fresh water on the island provide favorable habitat conditions for coyotes and at least several individuals currently reside there (Jehl pers. comm.). Attempts to trap coyotes from Paoha Island during the mid-1980s were unsuccessful (Murphy pers. comm.), and future gull nesting there appears to be unlikely unless the coyotes are removed.

Since gulls last nested successfully on Paoha Island, Mono Lake's surface elevation has fallen by more than 50 vertical feet and its area has enlarged from 1,236 acres in the prediversion period to about 2,030 acres at the point-of-reference (draft EIR, page 3F-16, paragraph 5). Most of this exposed acreage is composed of unvegetated, or sparsely vegetated, lakebed sediments. The western shore of Paoha Island is one of the major sources of dust storms in Mono Basin (draft EIR, page 3H-21, paragraph 1). Gulls may prefer to nest on rocky substrates (i.e., like those on Negit Island and the Negit Islets and rugose areas on the Paoha Islets) to avoid exposing themselves and their chicks to frequent episodes of wind-blown dust.

Gulls might return to Paoha Island if resident coyotes, dust storms, and possibly other factors did not combine to make it an unfavorable nesting habitat. Intensive trapping efforts could probably remove the coyotes, but the dust storms would not cease until the lake's elevation increased to cover the recently exposed sediments. Unless these measures were taken, however, Paoha Island is unlikely to provide suitable nesting habitat for this species in the future.

F7. The California Gull Impact Analysis Ignored the Point of Reference

Summary of Comments

The draft shifted the 1989 point of reference to 1992. Higher numbers of gulls were observed in 1992, which allowed for the prediction of major adverse effects on the colony.

Response

As shown in Appendix C (Table C-3), the Mono Lake colony consisted of about 44,000 nesting gulls at the 1989 point-of-reference. In subsequent years, however, the colony increased its numbers dramatically to about 61,500 adults in 1990, 65,000 adults in 1992, and 61,000 in 1993; the only exception to this increasing trend was in 1991 when only 43,500 adults were recorded.

The impact assessment for gulls was based on the predicted maximum potential for individual islets and islands to support nests at different lake elevations. This analysis could have been based exclusively on the point-of-reference population, without consideration of an observed population increase of more than 20,000 breeding adults. Had this been done, the nesting capacities of the Negit and Paoha Islets would have been based on the maximum populations observed up to 1989 and the extremely high populations recorded on these islets during three of the last four years would not have been considered.

Restricting the gull habitat analyses to 1989 conditions would have introduced a source of error regarding the elevations when Java and Twain Islets would be land bridged. Important research data from

1992 and 1993 indicate that coyotes can gain access to Java Islet at 6,375 feet, rather than at 6,373 feet, as predicted by the draft EIR (page 3F-19, paragraph 6). These new data clearly indicate that lake conditions under the 6,372-Ft Alternative would lead to effective land bridging and disruption of gull-nesting efforts more frequently than the 20% of the time as predicted by the draft EIR (page 3F-65, paragraph 2). Similarly, gulls likely would be slow to recolonize Twain and Java Islets if frequent coyote visitations occurred there (Shuford and Winkler pers. comm.).

Lakewide nesting capacities based on the highest gull densities up to 1989 point of reference would have resulted in the following assumptions and calculations for the 6,372-Ft Alternative: 1) Negit Island would be land bridged and unavailable for gull nesting; 2) land bridging of Twain Islet, Java Islet, and Pancake Islet would result in the displacement of up to 13,000 nests (i.e., the sum of the highest densities in all years before 1989); 3) the estimated capacity of all other Negit Islets would be about 12,500 nests (draft EIR page 3F-65, paragraph 4); 4) before 1989, the highest observed totals for the Negit Islets, other than Twain, Java, and Pancake, was about 7,500 nests, which would represent an unused capacity of about 5,000 nests and about 8,000 displaced nests; 5) the predicted capacity of the Paoha Islets would be about 8,000 nests, based on the highest total of 8,001 nests in 1983; 6) in 1986, the highest count through 1989, about 3,600 nests were counted on the Paoha Islets and the unused capacity of these islets would be about 4,400 nests; and, finally, 7) about 3,600 of the 8,000 nests displaced from Twain and Java Islets would not be accommodated on the Paoha Islets.

Thus, calculations based on point-of-reference and 1990 to 1992 populations both result in a prediction of significant impacts on nesting gulls under the 6,372-Ft Alternative. However, data collected in the early 1990s offer a more realistic view of maximum populations and potential impacts than do calculations based on a point in time that ignores important changes in the Mono Lake colony.

F8. California Gull Nesting Preferences Were Not Correctly Identified

Summary of Comments

California gulls at Mono Lake and elsewhere in their breeding range prefer to nest in entirely open habitats and avoid nesting on islands with shrubs. The prediction that gulls could have increased reproductive success in hot years in shaded greasewood habitat on Negit Island is unsubstantiated speculation.

Response

Photographs presented to SWRCB by Dr. Joseph R. Jehl, Jr. clearly show California gulls nesting in unvegetated, or sparsely vegetated, habitats on the Paoha Islets, Mudbar Island and Farmington Bay at the Great Salt Lake, Utah; Honey Lake, California; and Bamforth Lake, Wyoming (LADWP Exhibits 81H, 81R, 81U, 81W, 81Y, and 81Z). Similarly, long-term studies of gulls nesting on the Paoha Islets suggest that they have high reproductive success on barren substrates (Jehl 1992).

Jehl's photographs also show gulls nesting near shrubs at Gunnison Island and Morton Salt Company at the Great Salt Lake, Brushy Island at Honey Lake, and Neponset Reservoir, Utah (LADWP Exhibits 81A, 81K, 81N, 81V). Similarly, photographs by Dawson (1923) and Fraser (NAS/MLC Hearing Testimony Exhibits) depicted California gulls nesting in greasewood habitats on Negit Island during 1919 and the mid-1930s, respectively. The overall impression gained by viewing these photographs is that California gulls are highly adaptable in their choice of nesting substrates.

Observations by early ornithological visitors to Mono Basin suggested that gulls preferred shade when it was available on secure nesting islands. In his May 27 and 28, 1916 field notes, Dixon (1916) recorded the following observations during a visit to the Paoha Island gull colony:

> Our next stop was at the *California Gull* rookery on the north side of Paoha Island. Two long ridges of black broken glass like obsidian rock extend out about two hundred yards towards Negit Island. . . . Gulls nest on both points (ridges), but mostly on the eastern one which is triangular and has a dense or rather vigorous growth of a thorny "arrowweed" like bush. The gulls nested on the shingle near the beach, under bushes, in holes and on the tops of the rocks. . . . The gulls seemed to realize the need of protecting their eggs from the boiling sun and often stood over the eggs shading them while they panted with open mouths.

On July 3, 1916, Dixon (1916) observed that:

> practically all of the gulls eggs had hatched and probably 30 percent of the young gulls were running about well feathered and nearly half grown. . . . I watched one with down still wet scramble about until she reached the shade of a sheltering rock. A few very young ones were found dead apparently from the heat as the sunlight is intense on the bare black rock upon which the eggs are often laid. . . . In one part of the rookery "hop" sage bushes were common. They stand about three feet high and are three or four feet across growing close to the [ground?]. . . . Holes under or in rocks were favorite hiding places for the young as they were well shaded and shade was much sought after by the young.

The Mono Lake gull colony expanded from about 2,000 adults in 1916 to about 51,000 adults in 1976 (Appendix C, Tables C-1, C-2 and C-3). The exact timing and rate of this dramatic population increase are unknown, but the increase occurred while the gulls nested primarily in greasewood scrub habitat on Negit Island.

When the island was first land bridged in 1979, however, approximately 25% of the Mono Lake colony shifted to the unvegetated Paoha Islets where they have continued to experience high reproductive success. Similarly, the unvegetated Negit Islets have supported nesting gulls since at least 1963 and they currently provide habitat for about 70 to 85% of the Mono Lake colony (Shuford pers. comm.).

Since 1979, Negit Island has not maintained a sufficient water barrier in most years to deter frequent coyote visitations and few gulls have nested there successfully (Appendix C, Table C-3). Thus, it has not been possible to observe whether gulls prefer to nest in open or shrub-dominated areas at Mono Lake when they were offered a choice of these habitats over a period of years. Long-term studies would be required to test this hypothesis and should focus on microhabitat selection and relative reproductive success on different islands and in open and shaded habitats.

Long-term reproductive data are lacking from shrub-dominated habitats on Negit Island; however, Winkler (1983b) suggested that a combination of heat stress and food shortages may have caused the extremely high rate of chick mortality observed on unshaded substrates of the Negit Islets in 1981. Heat stress may have been a factor in the low reproductive success observed on the Negit Islets in 1984 (Shuford et al. 1985), and Winkler (1983a) also found statistically significant correlations between chick mortalities and dates with high temperatures in previous years. These observations suggest that shaded habitats could increase chick survival rates, especially in extremely hot years like 1981 and 1984.

SWRCB consultants did not consider reported gull preferences for shaded or unshaded habitats crucial to the draft EIR's analyses of lake elevation alternatives. Under the 6,383.5-Ft Alternative, for example, Negit Island probably would be protected from coyote visitations and would offer an abundance of shaded and unshaded nesting habitat, including about 42 acres of greasewood scrub and 100 acres of scrub and open, white rock habitat (draft EIR, Table 3F-5). Similarly, the Negit Islets would provide about 27 acres of alternative, open habitat at this lake elevation.

About 14 acres of nesting habitat on the Paoha Islets would be lost to erosion, but the 6,383.5-Ft Alternative would result in a lakewide increase of almost 400% in total shaded and unshaded habitat, compared to point-of-reference conditions when Negit Island was land bridged (draft EIR, Table 3F-5). Therefore, the loss of unshaded habitats on the low-lying Paoha Islets was not predicted to have any significant adverse effects on the potential nesting capacity of gulls at Mono Lake. Furthermore, it should be noted that under LADWP's preferred alternative (SWRCB Hearing Testimony of William Hasencamp), the lake would rise to 6,385.5 feet msl and destroy the Paoha Islets.

F9. Effects of Increased Lake Elevations on Caspian Terns Were Not Considered

Summary of Comments

The adverse effects of increasing lake elevations on Caspian terns nesting on the Paoha Islets were not considered in the draft EIR's impact analyses. Failure to consider this species was a major flaw of the draft EIR.

Response

Criteria for considering individual species in the impact analyses were summarized in the draft EIR (pages 3F-55 to 3F-57). Based on these criteria, species that required consideration were special-status species, including state- and federal-listed threatened and endangered animals, Category 1 or 2 candidates for federal listing under the federal Endangered Species Act, animals proposed for listing by the State of California, animals of special concern to DFG, and species listed as sensitive by local USFS and U.S. Bureau of Land Management regions (Appendix E, page E-1, paragraph 2). The impact analyses also included discussions of unprotected species that frequent Mono Lake in large numbers or that depend on it for the continued success of their regional, statewide, or global populations.

Caspian terns meet none of these criteria. They are not legally protected, or candidates for protection, by any state or federal law or agency. They are common at many coastal and interior locations across North America and in northern Europe, southern Asia, eastern China, the Persian Gulf, Australia, New Zealand, and along both coasts of Africa (draft EIR, page 3F-20, paragraph 4). Their population in western North America has increased in this century, especially at human-created habitats along the Pacific Coast (Gill and Mewaldt 1983).

The population size and nesting success of Caspian terns at Mono Lake were summarized by Jehl (SWRCB Testimony of Dr. Joseph R. Jehl, Jr., Table A). They nested on a high bench on Twain Islet (i.e., about 6,415 feet msl) from at least 1976 until 1979 when they abandoned this islet due to coyote predation (Winkler pers. comm.). Since 1982, up to 15 pairs have continued to nest at Mono Lake, principally on the Paoha Islets; reproductive success there has been low, ranging from 0 to 5 chicks fledged per year for the entire colony (draft EIR, page 3F-21, paragraph 3). Due to this poor reproductive success, Mono Lake's population of Caspian terns is probably sustained by immigration rather than by local reproduction (Jehl pers. comm.) and represents a minute fraction of this species' breeding population in western North America.

Caspian terns nest in dense colonies, and individual pairs defend about 15 square feet around their nests (Zeiner et al. 1990a). Therefore, only about 225 square feet would be required to accommodate the entire point-of-reference colony of 15 pairs.

In summary, Caspian terns were not considered in the draft EIR impact analyses because they lack legal protection or candidate status and because they are uncommon and unsuccessful at Mono Lake but abundant and successful at many other places in western North America and throughout their global range. Further, if their recent nesting habitat on the Paoha Islets were lost by increasing lake elevations, they could simply shift back to their previous nesting area on Twain Islet.

F10. Eared Grebes Were Not Considered in the Impact Analysis

Summary of Comments

Eared grebe populations were large and healthy at all lake elevations between 6,372 feet and 6,385 feet. Even during the lowest recorded lake elevations during 1980 and 1982, food was more than adequate to support the grebe population; this should have been considered in the impact analysis.

Response

The draft EIR concluded that alkali fly and brine shrimp populations were sufficient to meet eared grebe foraging requirements at Mono Lake's historical low stand in 1982, at the 1989 point of reference, and through 1992 (page 3F-24, paragraph 3).

Because no adverse impacts on eared grebes have been observed at any historical lake elevation, SWRCB consultants assumed that food and habitat conditions would be suitable for this species under the 6,372-Foot Alternative and all higher lake levels.

Adverse impacts on eared grebes, and most other water birds, were considered under No-Restriction Alternative (draft EIR, page 3F-60, paragraph 1). Long-term management of the lake under this alternative, would result in a surface elevation of about 6,355 feet and salinity of abut 150 g/l (draft EIR, page 3F-59, paragraph 6). This value is near the upper limit for successful reproduction by alkali flies and brine shrimp and would result in dramatic reductions, or total elimination, of invertebrate prey and water bird predators from Mono Lake (draft EIR, page 3F-60, paragraph 1).

F11. Effects of Lost Alkali Shoreline Habitat on Nesting Snowy Plovers Were Not Identified

Summary of Comments

Large areas of alkali shoreline habitat along Mono Lake would be lost at higher lake elevations. This loss would have significant adverse effects on nesting snowy plovers.

Response

Approximately 2,500 acres of alkali flat or barren habitats were required to support the 1988 population of 170 nesting pairs of snowy plovers (draft EIR, page 3F-34, paragraph 6). At the 1989 point-of-reference, about 10,000 acres of potentially suitable breeding habitat existed around the lakeshore, suggesting that more than 70% of the available habitat was not occupied by nesting snowy plovers.

All surface elevations above the 6,377-Foot Alternative would cause inundation of potential snowy plover breeding habitat, compared to point-of-reference conditions. However, more than 2,500 acres of barren habitats would exist around the lakeshore at all lake elevations except those of the No-Diversion Alternative (i.e., 6,425-6,430 feet msl) (draft EIR, page 3F-84, paragraph 3).

Although thousands of acres of alkali flats and other barren habitats would be inundated as the lake's elevation increased from 6,377 feet to 6,410 feet, the shoreline would become longer and former springs and seeps would likely reappear. These changes would benefit snowy plovers by increasing the size and productivity of their preferred wetland foraging areas (Page pers. comm.).

Based on the breeding and foraging requirements of snowy plovers, their populations are expected to remain at point-of-reference levels or to increase under all alternatives but the No-Diversion Alternative.

F12. Benefits of Higher Lake Elevations to Water Birds Were Not Identified

Summary of Comments

Extensive areas of saline, lake-fringing wetlands that would be lost at higher lake elevations (i.e., 6,390 feet and above) would be replaced by freshwater wetlands with higher value to ducks, shorebirds, and other migratory water birds.

Response

Despite their large extent, alkali lakeshore, marsh, meadow, and scrub habitats that currently exist around Mono Lake support relatively few wildlife species (Appendix D, Table D-4). Wildlife use is probably low in these habitats because they lack any sources of freshwater. Under the 6,383.5-Foot alternative and higher lake levels, more than 55% of the lakeshore habitat would be inundated. Although it has low value, the loss of thousands of acres of habitat could result in significant impacts on wildlife that currently live there. (Not all of these habitats constitute jurisdictional wetlands under the Clean Water Act.)

As the lake's elevation increases, new freshwater wetlands would form at the creek deltas and at springs around the lakeshore (SWRCB Hearing Testimony of Dr. Scott Stine). However, these wetlands did not exist at the time of the 1991 field surveys conducted by SWRCB consultants (Appendix D), and they were not included in any of the analyses of wildlife habitat values (Appendix D, Table D-4).

Due to the lack of quantitative data from the prediversion years, changes in Mono Lake's avifauna due to elimination of freshwater sources around the lakeshore were discussed qualitatively for ducks, shorebirds, and other freshwater-dependent species in the draft EIR.

F13. Impacts of Major Losses of Habitat on Bald Eagles, Willow Flycatchers, and Other Special-Status Species Were Not Identified

Summary of Comments

LADWP water diversions caused major losses of lakeshore wetlands and tributary riparian habitats and resulted in significant, adverse impacts on bald eagles, willow flycatchers, and other special-status species populations. These impacts were not disclosed in the impact analyses.

Response

As discussed in the draft EIR, diversion of Mono Lake's primary tributary streams, Lee Vining, Rush, Parker, and Walker Creeks, resulted in a loss of more than 200 acres of cottonwood-willow riparian habitat (draft EIR, page 3F-87, paragraph 4).

Since the draft EIR was prepared, SWRCB consultants have reviewed additional field notes taken by Joseph Dixon and Joseph Grinnell (available at the Museum of Vertebrate Zoology, University of California, Berkeley). Dixon (1916) observed and collected willow (Traill's) flycatchers in willow clumps around the lakeshore in May 1916. Similarly, Grinnell (1937) found this species to be fairly common in willows and swampy places around the lakeshore in June 1937.

Because breeding willow flycatchers are currently absent from Mono Basin, one might conclude that their decline was directly attributable to habitat losses caused by LADWP diversions. Reduced or discontinued streamflows and spring flows and channel incision caused by the diversions have reduced the quantity and quality of willow and meadow habitats associated with affected streams. However, approximately 500 acres of potentially suitable willow flycatcher breeding habitat continues to exist in Mono Basin (Appendix E, page E-17, paragraph 5), and the decline of this species is probably tied more directly to nest parasitism by brown-headed cowbirds (Sanders pers. comm.).

As noted in the draft EIR, fish comprise most of the bald eagles' diet (Appendix E, page E-5, paragraph 5). They also forage for injured or dead waterfowl, especially where large concentrations are present (Zeiner et al. 1990a). Thus, bald eagles likely were attracted by both the productive fisheries supported by Mono Lake's tributary streams and the large concentrations of waterfowl around the lakeshore. Reviews of prediversion references (e.g., Dixon 1916; Grinnell 1915, 1937; Dawson 1923; Grinnell and Storer 1924; Grinnell and Miller 1944), however, did not reveal any references to the occurrence of bald eagles in Mono Basin.

Gaines (1988) indicated that bald eagles concentrate at Lake Crowley reservoir and have been observed on lower Rush Creek. This is apparently the only published account of bald eagle occurrence in Mono Basin; without further supporting details their prediversion population status in Mono Basin cannot be assessed. For this reason, cumulative impacts on bald eagles were not described in the draft EIR.

F14. The Wildlife Benefits of Increased Flows in the Upper Owens River Were Not Discussed

Summary of Comments

Increased flows in the Upper Owens River resulted in the creation of wetland wildlife habitats that receive extensive use by waterfowl and shorebirds. These benefits to wildlife were not described in the draft EIR.

Response

The draft EIR (page 3F-48, paragraph 5) concluded that increased flows in the Upper Owens River had not resulted in the creation of new wetland wildlife habitat. Rather, about 12.4 acres of willow scrub were lost during the diversion period, representing a 77% decline in the extent of this habitat since 1941. This decline in willow-scrub acreage has been attributed to increased soil saturation and bank collapse resulting from augmented flows downstream from East Portal (Stromberg and Patten 1991).

Cattle also reduced the extent of willow-scrub habitats by browsing foliage and by trampling moist areas near the river. Similarly, cattle-induced bank erosion is gradually reducing irrigated meadow habitats along the Upper Owens River (draft EIR, Chapter 3C).

Results of surveys conducted in spring and summer 1991 did not indicate that water bird use of the Upper Owens River was extensive. Forty-two bird and mammal species were observed during general and intensive surveys of willow-scrub and irrigated meadow habitats along this reach of the river (Appendix D, Table D-5). However, nesting waterfowl and shorebirds occurred in low numbers and Canada geese, mallards, cinnamon teal, American wigeon, gadwalls, American avocets, spotted sandpipers, and common snipe were the only species observed in the stream channel or adjacent irrigated meadows. Frequent disturbance by anglers and cattle, observed during the field surveys, probably reduce the value of these areas as waterfowl and shorebird nesting habitat (draft EIR, page 3F-48, paragraph 6).

In summary, the draft EIR did not emphasize the wildlife benefits of flow augmentations on the Upper Owens River because no benefits were identified. The acreage of willow-scrub and irrigated meadow habitats probably have been reduced or degraded during the diversion period and current use of this area by nesting ducks and shorebirds is low.

F15. Benefits of New Wetland Wildlife Habitats Created by Lake Crowley Reservoir Were Not Discussed

Summary of Comments

Wetlands along the western shoreline of Lake Crowley reservoir provide an extremely important habitat for shorebirds, ducks, and other water birds in the eastern Sierra. The benefits of new wetland wildlife habitats created by Lake Crowley reservoir were not discussed in the draft EIR.

Response

These wetlands were not discussed in the draft EIR for the reason explained in response to Major Issue C1. Nonetheless, the following is an assessment of this issue.

LADWP staff reported that construction of Lake Crowley reservoir resulted in the creation of 916 new wetland acres with high wildlife value (SWRCB Hearing Testimony of Brian Tillemans). The existence and current wildlife values of these wetlands are not disputed; however, their relationships to prediversion wetlands in Long Valley are unclear.

SWRCB consultants were unable to find any detailed accounts of the prediversion wildlife habitat values of the Long Valley wetlands. Joseph Grinnell (1922) made passing reference to plants and animals he had seen while passing through this area on his way to Owens Lake in July 1922. In his account of the yellow rail, Dawson (1923) offered the following brief description of the Long Valley wetlands:

> A broad stretch of shallow water, say quarter of a mile wide and a mile long, is here fed by mountain springs, and bears a complete investiture of rank grasses or dwarf sedges, save where, centrally, it supports low beds of tules, or irrupts in pools so charged with mineral content that vegetation will not grow. Cattle tramp the edges in droves, but apparently avoid the central portion of the swamp because of its treacherous nature.

U.S. Geological Survey maps from 1899 to 1914 depicted between 2,000 and 2,400 acres of marshland in Long Valley; many of these areas were the same wetlands that currently exist along the western shoreline of Lake Crowley reservoir (SWRCB Hearing Testimony of Dr. Scott Stine). Without further descriptions of these seasonal and permanent wetlands before 1940, the beneficial and adverse impacts of constructing Lake Crowley reservoir cannot be evaluated. However, any comparison of current wildlife values around its lakeshore must also consider the adverse impacts of inundation of at least 2,000 acres of seasonal and permanent freshwater wetlands in Long Valley.

LAND USE (G)

No major issues were identified.

AIR QUALITY (H)

H1. A Designated Regulatory Model Should Have Been Used

Summary of Comments

Two commenters (neither of which is a regulatory agency) stated that the draft EIR should have used an EPA designated regulatory model or that SWRCB should ignore the modeling results prepared for the draft EIR and rely on the modeling results produced by a study recently completed for the GBAPCD.

Response

In the interest of procedural consistency, EPA-designated regulatory models must be used for State Implementation Plan (SIP) documents and for most air quality permit applications. However, the EIR on the SWRCB's water rights action is not an air quality permit or a SIP document.

The Fugitive Dust Model (FDM) was used for the EIR analysis with the full knowledge and concurrence of all relevant air quality agencies. An EIR modeling protocol specifying the use of FDM was circulated to GBAPCD, the California Air Resources Board (CARB), and EPA for comment. After initially recommending the use of FDM, GBAPCD suggested that CARB and EPA be contacted directly to ensure that these agencies had no objections to FDM. CARB and EPA had no objections to the use of FDM; EPA Region 9 specifically stated that the draft EIR is not a SIP document or an air quality permit document and thus "the formal regulatory status of FDM is not an issue" (Bohnencamp pers. comm.).

EPA also noted its plan to replace the area source subroutines in its industrial source complex short-term (ISCST) model with a calculation procedure based on FDM. This planned future revision to ISCST was EPA's primary reason for not designating FDM as a formal regulatory model.

The EIR modeling protocol also was provided to the LADWP and Dr. Cahill of the University of California, Davis, for review and comment. Comments from LADWP's consultant and from Dr. Cahill were considered in designing the EIR modeling analyses. LADWP's consultant stated that FDM was an appropriate model to use. Dr. Cahill expressed reservations about the ability of any Gaussian dispersion model (such as the FDM and the ISCST model) to provide an adequate analysis.

SWRCB consultants selected FDM over ISCST for both technical and practical reasons (e.g., basic structure of the model, use of CARB settling and deposition algorithms, incorporation of wind-speed-dependent emission rate subroutines, and use of rectangular [as opposed to square] source area approximations). The FDM program code is primarily a merging of two EPA-designated regulatory models (CALINE3 and ISCST). Four model comparison studies conducted by TRC (including one study conducted specifically for Mono Basin under contract to GBAPCD) have each concluded that FDM performs somewhat better than ISCST as an area source model.

The air quality analysis presented in the draft EIR provide a fully adequate technical and legal foundation for SWRCB's actions.

H2. Modeling Analyses Did Not Properly Characterize Emission Sources

Summary of Comments

One commenter questioned several technical aspects of the air quality modeling studies performed for the draft EIR, focusing on issues related to proper emission source characterization. In particular, modeling results presented in the draft EIR were questioned with respect to:

- delineation of source areas and the assumption of uniform emission rates within delineated areas,
- the lack of sensitivity testing for particle characteristics derived from literature data,
- the mathematical form of the emission rate equations,

- an alleged failure to account for lake fluctuations at dynamic equilibrium, and

- additional uncertainty posed by newly released portable wind tunnel study data.

Response

The air quality modeling analyses presented in the draft EIR recognized that source area delineation and emission rate equations must be linked because available information does not allow a simulation of the spatial and temporal variation in emission rates within areas mapped as a common source category. This issue was addressed by careful delineation of the source area to distinguish source characteristics wherever possible and by selection of emission rate equations that generate emission rates well below peak emission rates.

The draft EIR modeling analysis separated emission source areas into seven source types having different emission characteristics: three subcategories of terrestrial high emission rate areas, three subcategories of terrestrial low emission rate areas, and the lake surface. The various source area categories were differentiated by combinations of basic emission rate equation format, threshold wind speed value, particle density, and mass distribution among PM10 size classes.

The draft EIR modeling analyses were prepared for impact assessment purposes, not for academic model sensitivity evaluation purposes. Parameter values were established only after careful analysis of available data. The literature data used represent real data from real measurements.

Particle densities reported by a wide range of sources are remarkably uniform and well established. The particle densities used in the draft EIR modeling analyses are based on careful consideration of the substrate mixtures expected in the different emission source categories. The threshold wind velocities used in the draft EIR analysis are entirely consistent with direct measurements reported by GBAPCD. Most emission rate equations were likewise derived from available data. The low emission rate terrestrial source area equations are the only emission rate equations not derived from directly measured data, and these equations were tested to ensure that these areas would not inordinately influence modeling results.

There is no need to arbitrarily modify the parameter values used in the draft EIR analysis just to see how different the results would be if unrealistic parameter values were used.

The modeling analyses presented in the draft EIR were designed to estimate potential 24-hour average PM10 concentrations under conditions conducive to wind erosion. The assumption of active source areas is logical in the context of the draft EIR modeling analyses. These analyses were designed using reasonable combinations of source area delineation and emission rate characteristics. The active source area assumption would be less reasonable if the analyses were designed to calculate annual average concentrations, but the draft EIR analyses focused on 24-hour average concentrations.

The draft EIR balanced emission rate equations with procedures used to delineate source areas so as to avoid seriously over estimation of PM10 concentrations. Detailed modeling results presented in Auxiliary Report 26 demonstrate that the draft EIR does not over estimate peak PM10 events at the Simis Ranch monitoring site.

Modeling results were directly used only to estimate potential PM10 concentrations under conditions that would be prone to wind erosion. Independent analyses were performed to assess the realistic frequency with which air quality standards might be exceeded at different lake levels.

The proper way to compare the emission rate equations used for the draft EIR and the 1993 GBAPCD modeling study is to examine their ability to fit the actual monitoring data from which both equations were derived. The draft EIR sigmoidal equation provides a superior fit to the underlying data.

The draft EIR assessment explicitly recognizes the lake level fluctuations inherent in each alternative. Individual model runs necessarily assessed discrete lake elevations, but eight discrete lake levels were modeled to allow analysis of fluctuating lake levels. The results of discrete model runs are presented in Table 3H-7 of the draft EIR, but the narrative discussion of impacts associated with each alternative explicitly reflects the range of lake levels anticipated under dynamic equilibrium conditions. Conditions during the transition to dynamic equilibrium are easily reviewed by reference to model results for intermediate lake levels (refer to Table 3H-7 of the draft EIR). Impact characterizations presented in Table 3H-6 of the draft EIR reflect lake level fluctuations under dynamic equilibrium conditions.

The new wind tunnel data released by GBAPCD indicate that peak emission rates can be an order of magnitude higher than the rates measured during the 1990 tests used for the draft EIR analysis. The 1990 emission rate data used in the draft EIR were clearly much lower than maximum short-term emission rates, and this fact was recognized in designing the draft EIR analysis.

The new emission rate data will provide a basis for further refinement of any modeling analyses conducted in the future. The same considerations used to design the draft EIR analysis should be applied in any future modeling analyses using the new emission rate data. In particular, development of emission rate equations must be balanced by consideration of the manner in which emission source areas will be delineated. Maximum emission rate data should be used only if more refined procedures are applied to the issue of source area delineation.

H3. Modeling Analyses Did Not Address the Potential for New Salt Deposit Formation at Higher Lake Levels

Summary of Comments

One commenter suggested that rising lake levels may generate new efflorescent salt deposits in areas where there is little or no efflorescence today, resulting in no change in the frequency of dust episodes.

Response

The potential for changes in salt deposits in response to rising lake levels was investigated as an essential element of the draft EIR air quality modeling analyses. No direct or circumstantial evidence was found to support the speculation presented in this comment. More importantly, no mechanism has been identified that could produce meaningful expansion of salt deposits into new areas as the lake level rises.

There is no evidence that major efflorescent salt deposits existed at Mono Lake until after the lake level dropped significantly. The groundwater table slopes toward Mono Lake, not away from it. Mono Lake is a terminal lake for both surface water and groundwater. The horizontal and vertical extent of efflorescent salt deposits away from the Mono Lake shoreline indicates that direct percolation of lake water is a very unlikely source of most of the efflorescent salts. Available evidence (see Appendix U of the draft EIR) clearly points to groundwater as the direct source of efflorescent salt deposits, except those deposits in the immediate vicinity of the shoreline. Absence of efflorescent salt deposits in the prediversion period provide the primary basis for the draft EIR assumption that salt deposits would not expand as lake levels rise.

H4. The EIR Should Include a Comparative Summary of Results from the 1991 and 1993 Modeling Analyses Conducted for GBAPCD

Summary of Comments

One commenter believed that the draft EIR did not adequately summarize results from a 1991 model comparison study performed by TRC for GBAPCD. Some commenters suggested that the EIR should present a summary of results from a 1993 modeling analysis conducted for GBAPCD, either as a comparison to draft EIR modeling results or as a replacement for the draft EIR modeling analyses. One commenter believed that the EIR should discuss technical differences between the draft EIR and 1993 GBAPCD modeling analyses.

Response

The 1991 TRC study was reviewed during preparation of the draft EIR but provided no new data useful for the EIR air quality analysis. The 1991 study was designed for comparative evaluation of the FDM and ISCST models and recommended that future modeling studies use the FDM model. (The 1991 model comparison study was one of the factors used in selecting FDM as the model to use for the draft EIR air quality analysis. Refer to the response to Comment H1.)

The results of the 1993 GBAPCD modeling study, which used ISC2, an updated version of ISCST, were received too late for inclusion in the draft EIR. However, a preliminary comparison of modeling results from the FDM and ISC2 studies suggests that the draft EIR FDM analysis more accurately replicated monitored PM10 values at Simis Ranch and Cedar Hill, while the ISC2 analysis more accurately replicated monitored PM10 values at Warm Springs. A detailed summary of the 1993 GBAPCD study is not necessary because GBAPCD concludes that both the draft EIR and the APCD modeling analyses support similar conclusions (Comment Letter No. 13). As noted in response to Comment H1, the draft EIR air quality modeling analyzed provide a fully adequate technical and legal foundation for SWRCB's actions.

The draft EIR analysis used FDM, a technically more refined model, and more refined input data and assumptions than those used for the ISC2 modeling study. Use of the FDM had the following advantages:

- the FDM particle settling and deposition algorithms are generally acknowledged to be superior to the ISC2 settling and deposition rate algorithms,
- the draft EIR emission rate algorithm provided a better fit to available wind tunnel data than did the algorithm used in the ISC2 study,
- the draft EIR delineation of source areas was more refined than the source area delineation used for the ISC2 study, and
- the draft EIR source characterizations (i.e., particle size classes, mass distributions, and particle densities) were more refined than those used for the ISC2 study.

H5. The Draft EIR Does Not Address Health Risks Associated with the Arsenic Content of PM10 in Mono Basin

Summary of Comments

One commenter noted that the draft EIR did not discuss the implications of the arsenic content of efflorescent salt deposits. This comment has been interpreted as referring to health risks.

Response

Arsenic exposure associated with Mono Basin PM10 concentrations was mentioned but not discussed in detail in the draft EIR for three reasons:

- there is no evidence that the arsenic content of PM10 samples poses any significant direct toxicity risk,
- evidence presented in previous court testimony indicates that the cancer risk from airborne arsenic exposure in Mono Basin is low, and
- available data do not allow an accurate comparative assessment of alternative lake levels in terms of arsenic exposure and associated cancer risk.

Available data allow a generalized assessment of the cancer risk associated with historical total suspended particulates (TSP) and PM10 concentrations along the north and east shores of Mono Lake, but do not provide a reliable basis for extrapolating this information for the south and west shores of the lake or for the future at altered lake levels. (Available data come from analysis of 40 particulate matter samples collected at various locations over a 10-year period.) Although arsenic has been detected in historical TSP and PM10 samples from the north and west shores of Mono Lake, the substrate components that are the source of this arsenic have not been identified.

Historical TSP samples (14 samples between 1979 and 1982 from Binderup, Hansen Ranch, and Simis Ranch) had a mean arsenic content of 37.64 parts per million by weight (ppmw). More recent PM10 samples (26 samples between 1987 and 1990 from Simis Ranch, Warm Springs, and Cedar Hill) had a mean arsenic content of 31.64 ppmw. The arsenic content of individual TSP and PM10 samples spans a range of less than 7 ppmw to more than 87 ppmw, indicating that the arsenic content of contributing substrates is not uniform. Both the lowest and highest arsenic fractions were found in PM10 samples from Simis Ranch. The analyzed TSP and PM10 samples are significantly biased toward higher TSP and PM10 concentrations and may not be representative of annual average exposure values.

Neither the TSP nor the PM10 samples exhibit any correlation between particulate matter concentration and arsenic content. The only geographic pattern suggested by the available data is that TSP sources affecting Hansen Ranch have a lower arsenic content (18 ppmw) than the TSP and PM10 sources affecting Binderup, Simis Ranch, Warm Springs, and Cedar Hill. However, this apparent geographic pattern could be attributable to limited data because only two TSP samples from Hansen Ranch were analyzed.

Available data do not demonstrate that terrestrial substrates are the dominant source of the arsenic found in TSP and PM10 samples. Any analysis of cancer risk from airborne arsenic must examine the importance of spray aerosols from Mono Lake. Available data indicate that dissolved solids in the water of Mono Lake have an arsenic content of 170 ppmw (see Table 3B-2 in the draft EIR). The high arsenic content of Mono Lake water indicates that lake spray may be the dominant source of measured PM10 arsenic whenever spray aerosols contribute 10% or more to the total PM10 mass. Lake spray aerosols accounted for 10% or more of the total PM10 mass in the Simis Ranch area on 28 of the 50 days modeled for the draft EIR air quality analysis.

Because altered lake levels will be associated with altered source area contributions to ambient PM10, historical data are not a reliable basis for assessing the cancer risk associated with PM10 exposure for the different lake level alternatives.

Supplemental analyses have been prepared to verify the low risk associated with recent airborne arsenic exposures on the north and east side of Mono Lake. These supplemental analyses assume an average arsenic content of 34 ppmw for PM10 in the vicinity of Simis Ranch. The analyses used the current lifetime exposure unit risk factor for inhaled arsenic (a cancer risk of 0.33% [3,300 chances per million] for a 70-year exposure to an average inhalable arsenic concentration of 1 microgram per cubic meter).

The documented arsenic content of historical PM10 and TSP samples represents only a trivial cancer risk for visitors to the scenic area: 38 chances in 1 billion for visitors spending a lifetime cumulative total of 2,400 hours (100 days) along the north and east shores of Mono Lake at PM10 exposures averaging 86.5 micrograms per cubic meter over the 100 days. There is a low risk from airborne arsenic exposure for residents in the Simis Ranch vicinity: 1.68 chances in 1 million for a 70-year exposure to PM10 concentrations averaging 14.96 micrograms per cubic meter (the arithmetic average of all reported Simis Ranch PM10 samples collected from October 1986 through June 1992).

H6. The Draft EIR Does Not Adequately Discuss the Full Range of Health and Ecosystem Effects Associated with High PM10 Concentrations

Summary of Comments

One commenter believed that the draft EIR did not adequately discuss the air quality aspects of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This commenter made reference to long-term public health risks and the uniqueness of the Mono Lake ecosystem. Another commenter noted that the draft EIR failed to address air quality, particle saltation, and dune activation impacts on upland vegetation. A third commenter noted that the draft EIR did not discuss the traffic safety hazards associated with dust storms.

Response

As noted in the draft EIR, available physical and chemical characterizations of Mono Basin PM10 are not detailed enough to allow an analysis of specific health effects. Consequently, the draft EIR used the health-based state and federal air quality standards as indicators of potential short-term and long-term health effects. Short-term health effects are addressed according to the 24-hour average PM10 standards, and long-term health effects are addressed according to the annual average PM10 standards.

The state and federal standards that address acute health effects are the 24-hour PM10 standards. Both the state and federal 24-hour average PM10 standards are periodically violated in various portions of Mono Basin. Individuals exposed during these violations are likely to experience acute respiratory irritation; significant eye irritation is also possible, especially when efflorescent salt particles are a significant component of PM10. Significant respiratory symptoms have been reported from persons living in communities exposed to dust storms originating from Owens Lake (Saint-Amand et al. 1986).

The state and federal standards address chronic health effects through the annual average PM10 standards. As noted in the draft EIR, annual average PM10 values in Mono Basin are among the lowest in California, which indicates a low risk of long-term health effects. Although repeated short-term exposure might aggravate an individual's preexisting chronic respiratory problems, there is no reason to expect it would be a primary cause of those problems.

Long-term cancer risks associated with the arsenic content of PM10 in Mono Basin are addressed in response to comment H5. As indicated in that response, available data do not indicate a high arsenic-related cancer risk from Mono Basin PM10.

Dust storms in Mono Basin are expected to produce short-term respiratory and eye irritation problems, but available data do not support any indication of significant long-term health effects. The draft

EIR recognizes that short-term respiratory and eye irritation problems represent a significant air quality impact.

There is no evidence that episodic dust storms have measurably constrained either short-term uses of the resources in Mono Basin or long-term productivity of Mono Basin ecosystems. It is reasonable to assume that dust storms have short-term impacts on exposed wildlife and vegetation (e.g., gull chicks on Paoha Islet), but the magnitude and extent of these impacts are unknown. Available data provide no basis for assuming that dust storms are producing significant long-term impacts on Mono Basin ecosystems.

Deposition of alkaline dust on vegetation probably has short-term effects on the palatability of the affected vegetation for wildlife and livestock, but the SWRCB consultants are not aware of any studies providing either a quantitative or a qualitative assessment of this effect. Individual dust storms undoubtedly have short-term respiratory effects on wildlife and livestock, but there are no data on the magnitude of these effects. Deposition of alkaline dust may be affecting vegetation growth rates in some locations, but no studies or data confirm such an effect or assess its significance. Likewise, there are no data on long-term physiological effects on wildlife or livestock.

The draft EIR notes that efflorescent salt deposits preclude vegetation establishment on the affected lakebed sediments. The alkalinity and salinity effects of salt deposits are compounded by the salinity, alkalinity, and mineral content of shallow groundwater. Available data are not sufficient to assess the extent to which downwind alkaline dust deposition produces an ecologically significant alteration in the chemistry of affected Mono Basin soils or shallow groundwater.

As noted in the draft EIR, barren substrates exposed by the lowering of Mono Lake are subject to wind erosion. Particle movement during wind erosion occurs by surface creep, saltation, and suspension transport of particles, with eventual deposition of the particles in downwind areas. Surface creep and saltation typically account for most of the soil or sediment mass moved during the wind erosion process. Particles moved by surface creep and saltation tend to be deposited relatively close to the original source area. Deposition is most pronounced around vegetation, rocks, surface irregularities, and structural features such as fences and buildings.

The draft EIR did not discuss vegetation impacts resulting from abrasion by windblown sand or plant burial by deposited sand and silt. No specific investigation of these processes was performed during the preparation of the draft EIR, and field studies conducted for other purposes did not identify sand abrasion damage or plant burial as issues of significant concern.

Plants growing downwind of the barren substrates that have been exposed by the lowered lake level are undoubtedly being damaged by abrasion and buried under sand and silt. The magnitude and geographic extent of these impacts were not evaluated during preparation of the draft EIR. Information on these issues will become available in the future as ongoing research is completed. The extent and magnitude of these impacts will be reduced by alternatives that result in higher lake levels.

The commenter raising the issue of traffic safety hazards from dust storms claims to have been escorted by California Highway Patrol along U.S. 395 during a major dust storm. The commenter may have confused Owens Lake with Mono Lake. The dust storms at Mono Lake only affect county roads or unimproved roads in remote areas north, northeast, and east of Mono Lake.

H7. Air Quality Mitigation Measures Are Not Adequately Addressed

Summary of Comments

One commenter believed that the EIR should discuss the feasibility of air quality mitigation measures that are being considered in Owens Valley.

Response

Most mitigation measures that have been suggested for the Owens Lake area have already proven to be ineffective or infeasible there and would be even less feasible at Mono Lake because of scenic area restrictions. Measures that have been considered and rejected at Owens Lake include compaction of the surface of emission source areas; application of stabilizing chemicals; and installation of single sand fences, sprinkler irrigation, and tree plantings. Studies at Mono Lake have determined that revegetation with grasses or shrubs is infeasible. Other mitigation measures still under consideration for the Owens Lake area (e.g., multiple sand fences and gravel spreading) are in conflict with current scenic area restrictions at Mono Lake. In addition to the conflict with scenic area restrictions, the gravel spreading measure is of dubious economic feasibility and entails significant environmental impacts related to mining and material transport.

Flood irrigation has been suggested as a mitigation measure for Owens Lake; raising the level of the lake is the practical equivalent of flood irrigation at Mono Lake.

Both GBAPCD and the USFS have submitted comments concurring with the draft EIR evaluation that no feasible air quality mitigation measures have been identified.

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H8. The Regulatory Requirements Associated with the State PM10 Standards Should Be More Completely Described

Summary of Comments

One commenter noted that achieving the state 24-hour PM10 standards will require a significantly higher lake level than that necessary to achieve the federal 24-hour PM10 standards. This commenter requested that the EIR provide additional discussion of whether the state PM10 standards represent a regulatory requirement that must be met or a goal that can be balanced against other considerations.

Response

CARB was contacted to determine whether the state PM10 standard is a regulatory requirement or a goal that can be balanced. When contacted about this issue, CARB cited Section 40001 of the California Health and Safety Code. That code states that the air districts shall adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards. This response indicates that CARB believes the state PM10 standard is a regulatory requirement rather than a goal.

The California Clean Air Act effectively sorted the state ambient air quality standards into two groups distinguished in part by the extent of new regulatory requirements. The California Clean Air Act includes an ultimate goal that all ambient air quality standards be attained at the earliest practical date, but specific planning and regulatory program requirements were set only for the ozone, carbon monoxide, nitrogen dioxide, and sulfur dioxide standards.

The California Clean Air Act explicitly required that CARB provide a report to the legislature addressing the practical prospects for and implications of programs that would be required to attain the state ambient air quality standards for PM10, visibility-reducing particles, sulfates, lead, and hydrogen sulfide. The CARB report to the legislature suggested an approach to PM10 problems that did not include uniform control requirements, annual emission reduction targets, or classification of nonattainment areas by the severity of the problem. Instead, the report endorsed an approach of tailoring control program requirements to each nonattainment area. The report recommended that PM10 control programs be targeted toward those components of ambient PM10 that pose the greatest health risk, rather than focusing exclusively on aggregate PM10 concentrations in the context of the numerical standards.

The CARB report recognizes the difficulties inherent in trying to attain the state PM10 standards and notes that there may be limited areas where the state PM10 standards cannot be consistently attained due to emissions associated with wind erosion. The report also notes that efforts are needed to reduce the impact of human activities that disturb ground surfaces and that more research is needed to investigate methods to reduce wind erosion from undisturbed ground surfaces.

VISUAL RESOURCES (I)

I1. Criteria Used to Judge the Significance of Visual Impacts Are Inappropriate and Conclusions Are Unsupportable

Summary of Comments

The criteria for judging the significance of visual resource impacts are flawed or too limiting, and the underlying assumptions pertaining to the significance thresholds are not presented. Impact conclusions are unsubstantiated and appear to support the superiority of certain alternatives.

Response

After further review of data collected during preparation of the draft EIR, new data available since publication of the draft EIR, and written comments on the draft EIR, the criteria for judging the significance of visual resource impacts have been revised. Under the new criteria, a project alternative is considered to have a significant adverse impact on scenic quality if one of the following conditions would occur:

- a permanent loss from view, through toppling and flooding, of more than 35% of all the tufa towers found at visually important locations or
- a reduction of more than 35% in the total number of visually conspicuous birds at Mono Lake, including gulls and other visually important species.

Other criteria remain as stated on page 3I-37 of the draft EIR.

The 35% criteria for judging the significance of adverse impacts on the scenic quality of tufa and visually conspicuous birds is based on suggestions by USFS managers of the scenic area in USFS's written comments (comment 3-64). Although a 10% reduction (the previous threshold) in tufa towers or in numbers of visually conspicuous birds may or may not be readily perceptible to visitors of Mono Lake, a 35% reduction would be noticeable and would have a recognizable influence on landscape character.

The procedure for applying these criteria also was modified. In the draft EIR, criteria were applied to assess a potential significant impact wherever it occurred, even if the impact were localized and did not adversely affect resources in other locations. This procedure has been modified to focus on localized effects on visual elements that are important to the scenic quality of an important viewing location, as well the entire basin. This modification permits consideration of scenic quality impacts related to changes in resource elements, such as tufa groves, that have both location-specific and basinwide importance to scenic quality.

Under the 6,390-Ft Alternative, basinwide reductions in tufa would be below the criterion of 35% loss, which includes toppling and inundation. Therefore, implementation of the 6,390-Ft Alternative will not result in basinwide significant adverse impacts on scenic resources. As noted in the draft EIR, several beneficial, basinwide visual effects would occur under the 6,390-Ft Alternative, and the overall effect of implementation on the scenic quality of the basin will be positive. However, at South Tufa Grove, if the highstand under the 6,390-Ft Alternative is reached, approximately 60% of all the tufa visible at 6,372 feet would be lost from view due to toppling and inundation. As reported in the draft EIR, 50% of *all* towers (not 50% of the small towers) will be toppled. Such a substantial and permanent loss of tufa at South Tufa Grove would be a significant adverse impact on the visual quality at this location, which is heavily visited. Table 3I-6, which shows the effects of the project alternatives on tufa towers, has been modified to be consistent with these revisions. (Refer to Chapter 7, "Errata to the Draft Environmental Impact Report".)

Sand tufa, although an important visual feature, is visible only in the areas in which it occurs. Sand tufa is not visible from distances beyond a few hundred feet and thus is not a characteristic feature of the Mono Lake landscape. The towers are found at locations visited by relatively few people; these locations are not considered key observation points by USFS, and sand tufa is not considered to be a recreational attraction in USFS's Comprehensive Management Plan for the basin (see Comment 3-63). Although the destruction of sand tufa through inundation by rising lake waters is considered an adverse impact, this impact would not affect basinwide scenic quality or scenic quality of an important location; consequently, the impact is not considered significant. According to Dr. Stine, additional sand tufa likely would become visible in the newly eroded faces of wave-cut cliffs if the lake surface were to rise above 6,390 feet.

Significance criteria were selected based on the professional judgment of the draft EIR preparers after consideration of all available information. Although the perceptions of Mono Lake visitors were important considerations in developing these criteria, reliance on visitor's perceptions as the sole basis for judging significance would be impractical. A broader range of considerations that includes visitor's perceptions is needed.

The purpose of the visual impact assessment is to identify and report the effects associated with each project alternative. When possible, positive effects are described, in addition to adverse impacts. The study is not intended to "support" certain alternatives.

I2. The Methodology for Assessing Visual Impacts Is Flawed

Summary of Comments

The visual impact assessment is flawed because the analysis attempts to measure the wrong effects, does not consider changes in some resources, and does not adequately consider the sensitivity of viewers and key observation points.

Response

The goals of the visual impact assessment are discussed in the draft EIR on pages 3I-31 through 3I-37. The study was designed to assess changes on individual visual features at specific locations and to assess the overall, collective influence of the specific visual effects on scenic quality and landscape character.

As reported in the draft EIR, the assessment of visual impacts followed a multistep process and utilized information from a wide variety of sources, including visual simulations of the lake at different surface elevations and survey data collected from visitors to Mono Lake. All of this information was used to identify effects of the project alternatives. Although visual simulations and survey data were not developed specifically for the 6,377-Ft and 6,383.5-Ft Alternatives, impacts of these alternatives were determined through a process similar to that used for the other alternatives.

As part of the impact assessment, key features of the Mono Basin landscape that could be affected by project alternatives were identified. Tufa and birds were found to be the most critical. In distinguishing between various potentially affected features, a formal or structured process by which different features were assigned relative weights was not considered necessary. The most important features and the relative differences in their importance were identified based on the survey of public perceptions about the landscape, the location of popular visitor areas, and potential effects of the project alternatives on the landscape. The average preference scores obtained through the survey supported the conclusions that visitors considered tufa and birds to be the basin's most important visual features.

The contribution by birds to viewer appreciation of Mono Basin's landscape is well substantiated. The seasonality or timing of effects on the numbers of visually conspicuous birds was not considered in the analysis because these factors were not assumed to vary substantially between the alternatives. The visual impact assessment did not to attempt to identify differences between various bird species other than variations in their relative abundance, which was considered the most important factor affecting the quality of public viewing.

The visual analysis accounted for the sensitivity of different types of viewers, including those who simply travel through the area, destination travelers who visit Mono Basin for a specific experience, and local residents, by determining their preferences for different visual elements in the visitor survey. Respondents to the visual preference survey were not asked about specific activities or if they belonged to special interest groups; however, the surveys were conducted during week days and weekends at different popular recreation sites over several weeks to obtain a representative sample of visitor types. The term "casual observers", which is taken from USFS technical manuals that describe USFS's officially adopted Visual Management System, refers to members of the general public who visit lands administered by USFS.

Describing the impacts on visual quality from each key observation point would have been an informative way of presenting the results of the study but would have required considerably more reporting of information and would not have changed the study conclusions. The findings were presented in a condensed format that highlighted distinctions between the project alternatives.

I3. The Analysis of the Effects on Tufa Is Flawed

Summary of Comments

The analysis of effects on tufa is flawed because it did not consider positive and negative effects of land-based tufa becoming water-based tufa, did not distinguish between submerged and toppled tufa or effects on small tufa towers compared to tufa domes and bulwarks, and did not accurately assess effects on sand tufa.

Response

The draft EIR analysis of the effects of the project alternatives on tufa and sand tufa was based on information developed by Dr. Scott Stine. Most of this information appears in Auxiliary Report 9, "Past and Future Toppling of Tufa Towers and Sand Tufa at Mono Lake, California". The information in Table 3I-6 of the draft EIR, "Effects on Tufa Towers Compared to the Point of Reference", was confirmed through personal communication with Dr. Stine. This table summarizes the effects of each project alternative at each of the main tufa groves, showing the number of tufa submerged at their bases (i.e., converted from visible land-based tufa to visible water-based tufa) and the number of tufa completely submerged (i.e., no longer visible above the lake's surface). For South Tufa Grove, the number of tufa towers expected to topple as a result of undercutting wave action as the lake elevation changes also is presented. The table indicates the percentage of small-diameter tufa towers expected to topple under each alternative. Dr. Stine could not determine if the larger diameter tufa towers, or domes, would also topple, but indicated that they may. He believes that only the tufa bulwarks appear unlikely to topple.

Toppling or complete submergence of tufa towers has little or no positive benefit to visual resources, as assessed in the draft EIR. Although completely submerged tufa could be viewed by divers or snorkelers, relatively few people engage in these activities, and the number of potential viewers is an important consideration in identifying impacts. Tufa that becomes completely submerged at higher lake surface elevations is lost from view to the vast majority of visitors.

Since the draft EIR was published, Dr. Stine has reexamined the effects of project alternatives on sand tufa and has concluded that within the range of surface elevations that would occur under the 6,383.5-Ft Alternative, particularly its high stand, free-standing sand tufa currently exposed and visible at Mono Lake would be destroyed. Therefore, this adverse impact is associated with all project alternatives at or above 6,383.5 feet. However, as previously indicated, Dr. Stine considers it likely that additional sand tufa would become visible in the newly eroded faces of wave-cut cliffs if the lake surface were to rise above 6,390 feet. The USFS suggests that samples of sand tufa could be collected prior to a rise in lake level and displayed for interpretive purposes in the future (Comment 3-84).

I4. The Accuracy of the Photosimulations Is Suspect

Summary of Comments

The accuracy of the photosimulations is questionable because the procedures used for 3-D modeling and land surveying were not described, there are inconsistencies in the visual chapter and the household survey, and certain effects were not depicted in the simulations.

Response

The visual simulations were prepared using a proprietary multistep process, which has been applied successfully on numerous projects in recent years. Using the most recent and accurate topographic data available, a three-dimensional computer model of the lake and nearby areas was first developed. The model included land-based tufa features that also appeared in baseline color photographs serving as multiple registration points. The baseline color photographs were taken at well-known locations along the lakeshore, enlarged to 11 inches by 14 inches, and scanned using 486-based PC image-editing facilities. True-perspective views of the three-dimensional model were generated from the locations depicted in the baseline photographs.

The simulations were prepared to represent viewing conditions at the different camera stations. A 35-mm camera fitted with a standard 50-mm lens was used to photograph all the views. The baseline photographs were not taken using lenses of different focal length, such as a wide-angle lens, to avoid introducing inconsistent depths of field and other distortions. For the simulations of visual conditions at Mono Lake County Park, U.S. Highway 395 adjacent to the Old Marina, and South Tufa Grove, single-frame images were used. For the wider view taken from the east side of the Mono Basin National Forest

Scenic Area Visitor's Center, two frames were joined side to side. To fully represent the panorama from the Mono Lake Vista Point on U.S. 395 below Conway Summit, three frames were joined.

The original baseline images were then computer-edited to represent the appearance of the lake at the various surface elevations. Guidance on how to best represent resource conditions, such as changes in wetlands, nearshore vegetation, and riparian conditions along tributary streams, was provided by SWRCB consultants. Draft visual simulations were distributed to interested parties, including a technical advisory group, for review and comment.

As part of the review, Dr. Scott Stine surveyed land to provide instructions for revising the draft images to increase their accuracy. Comments from other reviewers on depictions of landscape conditions also were considered. Additional land surveys were conducted before final changes were made.

The visual simulations were intended to represent the average conditions associated with the lake elevation under each alternative. Conditions, such as dust storms, that do not occur under average conditions were not simulated.

The simulated images used in the household survey were the same used in the visual study, except that the image depicting the 6,380-foot lake elevation was not included. The image cited as the 6,375-foot lake elevation in household survey was the same image cited as the 6,374.5-foot lake elevation in the visual study. The surface elevation depicted in this simulation is actually 6,374.5 feet, which was the elevation of the lake surface on the day that the baseline photographs were taken.

I5. The Design and Administration of the Public Perception Survey and Interpretation of the Results Are Questionable

Summary of Comments

The methodology for presenting information to respondents in the public perception survey is questionable because conclusions are internally inconsistent, no frame of reference was provided to respondents, no instructions were given on how to view the images, labels may have influenced respondents, and the sequencing of images presented to respondents may have influenced them. The interpretation of results is questionable because demographic characteristics of the sample population are not presented, the responses to scenic beauty were misinterpreted, tests for response equivalence were not made, and the relative differences of ranking were not discussed.

Response

The procedure for creating photosimulations, described in the response to Comment I4, produced final images that vary in size, but that accurately represent the actual view from each observation point. Public responses were elicited in a consistent framework, and the issue of "correct viewing angle" does not apply. The only images used in the survey were photographs and photosimulations, and observers were not required to compare simulated scenes to computer models or actual landscapes. Testing for response equivalence between the simulated images and actual landscape conditions was irrelevant. As noted above, all photographs were taken with a 35-mm camera fitted with a 50-mm lens, the most common photographic format with which the public is readily familiar; therefore, no instructions on how to view the images were required.

The public perception/preference survey of Mono Lake visitors, which was conducted as a part of a larger, overall program to assess visual resource impacts, consisted of two main parts. In the first part, individual images depicting the appearance of Mono Lake from one of several popular locations under one of five different lake surface elevations where shown to observers. Because these images were presented one at a time, there was no opportunity for observers to compare one scene to any other. Observers were asked to rate the scenic beauty of each individual image on a 10-point scale. Although the results of the analysis of survey data indicated meaningful differences in observer ratings of scenic beauty, these differences did not appear to be well explained by lake surface elevation.

In the second part of the survey, observers were shown presentation boards that showed all five lake-level variations of a location on one board, which allowed observers to directly compare changes in lake appearance under different elevations. Observers were asked if they had a preference for one or more of the variations, based on scenic beauty, and, if so, to rank their preferences for the scenes from 1 (most preferred) to 5 (least preferred).

Analysis of the responses to part 2 indicated a clear pattern in preferences. Observers generally ranked the scene depicting the highest lake surface elevation as most preferred and the second-highest lake level as next most preferred; the scene showing the lowest lake level was ranked as least preferred. This pattern was consistent except for scenes of the Mono Lake County Park and South Tufa Grove, in which the simulations at the highest lake level showed tufa towers and foreground vegetation submerged and lost from view. For these locations, the highest lake level was ranked as least preferred whereas the second-highest level was ranked most preferred.

The survey results were used to provide an indication of how different lake levels influence the public's judgment of scenic beauty and to determine visual features that were most important to scenic quality. Survey results were not used as direct indicators of impact. Labels were not used on any images employed in the survey.

Photographic surrogates of landscape conditions have been used for many years to measure landscape aesthetics by presenting a variety of scenes to observers to obtain their responses to scenic beauty. The survey was designed, implemented, and interpreted according to procedures described by Daniel and Boster (1976) in "Measuring Landscape Esthetics: The Scenic Beauty Estimation Method", USDA Forest Service Research Paper RM-167, Rocky Mountain Forest and Range Experiment Station, which offers a commonly applied and widely accepted approach to measuring scenic beauty of various landscape conditions. Responses to color photographs or color slides of landscape conditions correlate strongly with actual landscapes.

Many thousands of people visit Mono Lake each year, but only a small portion return many times. One-time visitors do not have the opportunity to compare the appearance of the lake and the basin to previous experiences. Depending on the length of time between visits for those who do return to Mono Lake, the ability to recollect how the lake and basin appeared under a different lake surface elevation may vary. Local residents generally can recall how the landscape appeared at different times and under different surface elevations and, as a group, are most sensitive to these changes. The presentation of scenes depicting various lake surface elevations one at a time and in random order is similar to the experience of the less frequent or one-time visitor. The presentation at one time of all five lake levels portrayed from one scene more closely relates to the experience of long-term local residents. As described above, both presentations were included in the survey.

Although demographic data and other information that could be used to assess the variability of the sample population were not collected, sampling procedures were designed to obtain a representative sample of visitors to Mono Lake. Surveys were conducted at the most popular visitor locations, including South Tufa Grove, Mono Basin National Forest Scenic Area Visitor's Center, and Mono Lake County Park. Because survey respondents were engaged in viewing Mono Lake and the basin, their frame of reference for judging photographs of Mono Lake was established. Consequently, it was unnecessary to show preview scenes or examples of Mono Lake scenery to prepare observers for responding to the survey.

RECREATION (J)

J1. Point of Reference for Recreation Impacts at Grant Lake Reservoir Is Inappropriate

Summary of Comments

The 1991 recreation season was inappropriate to use as the point of reference for Grant Lake reservoir because reservoir levels were unusually low in 1991.

Response

As explained on page 3J-26 of the draft EIR, the point of reference for assessing recreation impacts at Grant Lake reservoir was not based on actual reservoir levels in 1991 or any other historical year. Rather, point-of-reference conditions were defined by reservoir levels projected to result from historical runoff conditions and diversion practices and minimum release flows for lower Rush Creek. Specifically, point-of-reference conditions at Grant Lake reservoir are defined by an average level of 7,112 feet over the recreation season (Table 3J-13 of the draft EIR). This average exceeds the average 1991 level by approximately 17 feet.

J2. Use of Historical Visitor Data for Mono Lake Tufa State Reserve Results in Underestimation of Use and Economic Impacts at Mono Lake

Summary of Comments

Use of historical visitor data for Mono Lake Tufa State Reserve results in underestimation of recreation use at Mono Lake and of related economic impacts. Such underestimation could be corrected by using visitor data for the Mono Basin National Forest Scenic Area instead of data for the Tufa State Reserve, or by increasing historical use data for the Tufa State Reserve by multiplying those data by a correction factor to account for the systematic underestimation of the number visitors to Mono Lake before 1993.

Response

Baseline recreation use levels at Mono Lake reported in Table 3J-2 of the draft EIR were developed from visitor data for the Tufa State Reserve, rather than for the Mono Basin National Forest Scenic Area. Most of the Scenic Area consists of uplands up to several miles from the lakeshore that would be relatively unaffected by changes in the lake level, whereas the entire Tufa State Reserve is located within approximately 1 mile of the lakeshore.

California Department of Parks and Recreation initiated a new system for estimating visitor use of the Tufa State Reserve in 1993. This system is based on direct counting of cars and hikers instead of voluntary self-registration, and is considered to be more reliable than the old estimation system. Data collected under the new system were not available when the draft EIR was prepared.

Under the new system, total use of the Tufa State Reserve was projected to be approximately 254,000 in 1993, an increase of 57% over estimated use in 1992 under the former system. If the new system is relatively reliable, the large increase most likely indicates an underestimation bias in the former system rather than the actual change in use. The 1983-1992 baseline use levels reported for Mono Lake in Table 3J-2 of the draft EIR could be substantially lower than actual use levels. However, these baseline use levels were not used to assess the recreation impacts of the water export alternatives. Projected changes in use, which were assessed based on the per-capita use rates of visitors, were used to evaluate the significance of changes in Mono Lake recreation opportunities. Baseline per-capita use rates were estimated from user surveys conducted for the EIR rather than from visitor data compiled by public agencies. The conclusions of the recreation impact assessment in the Chapter 3J of the draft EIR would not be affected if the use levels reported in Table 3J-2 were revised substantially upward.

The regional economic impacts of changes in recreation use at Mono Lake assessed in Chapter 3N of the draft EIR were, however, based on the baseline use levels reported in Table 3J-2. In particular, changes in the number of annual visitor days at Mono Lake and other affected recreation areas were used to project changes in regional recreation spending (Table 3N-17) and related income and employment (Table 3N-18). Changes in the number of visitor days resulting from implementation of each alternative (relative to the point of reference) were projected by multiplying the percentage changes in per-capita use from the recreation impact analysis times the baseline use levels reported in Table 3J-2. Thus, if historical use levels were systematically underestimated for Mono Lake, the regional economic impacts of changes from baseline use levels discussed in Chapter 3N would also be underestimated.

The importance of this potential historical underestimation of use at Mono Lake for the economy of the Mono-Inyo region can be analyzed by comparing spending associated with use of Mono Lake with total recreation-related spending in the region. As shown in Table 3N-9 of the draft EIR, recreation-related expenditures in Mono and Inyo Counties has exceeded $300 million per year since 1987. Annual spending resulting from use of Mono Lake under the point of reference was projected to be $3.1 million in the draft EIR, or approximately 1% of the regional total.

Daily per-capita spending levels were underestimated in the draft EIR, however (see the response to Comment J35). Daily per-capita spending levels for Mono Lake survey respondents averaged $28.38, or 2.4 times the level reported in the draft EIR. If, as indicated by revised California Department of Parks and Recreation information, baseline use at Mono Lake were 57% higher than reported in the draft EIR, actual spending attributable to use of Mono Lake would be 3.8 times greater than the $3.1 million reported in the draft EIR, or $11.7 million per year.

Higher per-capita spending and annual use at Mono Lake imply that Mono Lake has greater importance to the recreation sector of the regional economy than indicated in the draft EIR. Although the effects of alternative lake levels as measured in terms of regional spending, income, and employment would be greater than shown in Tables 3N-17 and 3N-18, the relative effects of implementing the various water-export alternatives would be qualitatively the same as shown in the draft EIR:

- recreation spending, income, and employment would increase relative to the point of reference under all alternatives except the No-Restriction and No-Diversion Alternatives and

- recreation spending, income, and employment would be maximized under the 6,390-Ft Alternative.

J3. The Beneficial Recreation Impacts of Partial-Submergence of Tufa at the 6,390-Ft Lake Level Should Be Analyzed

Summary of Comments

Many tufa that are land based at lake levels less than 6,390 feet would become partially submerged at levels exceeding 6,390 ft. Most visitors to Mono Lake consider partially submerged tufa to be visually preferable to land-based tufa because of the attractiveness of reflections of the tufa on the lake surface and other visual aspects of the tufa-water interplay. The beneficial impact of partial tufa submergence on the quality of lake-viewing experiences was not considered in the draft EIR.

Response

Increasing the level of Mono Lake to 6,390 feet would result in the complete toppling and inundation of one-half of the small and perhaps large tufa towers at South Tufa and in the partial submergence of many additional tufa that are land-based at lower lake elevations. These two phenomena (tufa toppling and partial submergence) tend to offset each other from the standpoint of sightseeing and lake-viewing opportunities. As discussed in Appendix V of the draft EIR, most people perceive destruction of tufa through toppling as diminishing, and partial submergence of tufa as enhancing, the lake's visual quality.

Partial submergence was not identified as a key environmental feature, and no threshold lake elevation for recreation opportunities was identified in Table 3J-6 of the draft EIR. Had a threshold been specified for partial submergence, lake elevations less than 6,390 feet and greater than 6,407-feet would have been associated with exceedance of the threshold and an adverse effect on recreation opportunities. Relative to the point of reference, these thresholds would have been exceeded substantially less often under the 6,390-Ft Alternative and recreation would have been beneficially affected.

Inclusion of recreation opportunity thresholds for partial tufa submergence would not have affected any draft EIR conclusions on recreation effects, however. Under the 6,390-Ft Alternative, sight-seeing and lake-viewing opportunities were considered beneficial relative to the point of reference, despite the absence of analysis of partial submergence. Under the 6,410-Ft and No-Diversion Alternatives, recreation opportunities at Mono Lake would be adversely affected (as concluded in the draft EIR) because nearly all tufa would be inundated and destroyed, while relatively few tufa would remain partially submerged.

J4. Extrapolating from Historical Angling Use Levels on the Lower Tributaries Results in Underestimation of the Long-Term Effects of Alternative Streamflows on Angling Use and Related Economic Effects

Summary of Comments

Angling use of the lower tributaries has been extremely low in recent years because of the historically degraded condition of their fisheries and lack of knowledge among California anglers about the recently improving fishing opportunities at the lower tributaries. As these fisheries are restored and anglers become aware of the restoration, angling use will increase to levels comparable to other eastern Sierra streams. In the draft EIR, use estimates for the lower tributaries were based on historical use levels. This approach resulted in underestimation of the long-term effects of alternative streamflows on angling use and their related regional economic effects.

Response

Angling use of the lower tributaries is likely to increase substantially from its current level of less than 600 visitor days per year to several thousand visitor days per year when the tributaries and their fisheries have been fully restored and the fishing public becomes aware that they have been restored.

Changes in average annual per-capita use and the average number of anglers using the tributaries each year could be affected by which water export alternative is implemented. For example, if the 6,383.5-Ft Alternative were implemented and lower Rush Creek streamflow averaged 95 cfs over the recreation season, more anglers would probably use lower Rush Creek and spend, on average, more days fishing each year than if the 6,372-Ft Alternative were implemented and the flow on lower Rush Creek averaged 36 cfs.

Projection of use effects on the lower tributaries in the draft EIR focused exclusively on the change in per-capita use and did not consider changes in numbers of anglers using these streams. As a result, the percentage changes in use of lower tributaries shown is Table 3J-12 of the draft EIR understate the relative differences in total use that would result under the various alternatives over the near term (i.e., the next 20 years).

Tables 3N-17 and 3N-18 project the effects of per-capita use changes on the lower tributaries from Table 3J-12 on total use and recreation expenditures and on regional economic output, personal income, and employment, respectively. The use levels and spending levels shown in Table 3N-17 reflect current use and spending and substantially underestimate future use and spending levels when the streams are fully restored. Similarly, the output, income, and employment levels shown in Table 3N-18 reflect current levels and underestimate future levels during the postrestoration period.

Use levels for the lower tributaries will be small relative to use levels at Mono Lake and Lake Crowley reservoir, however, even when the streams are fully restored. Even if changes in use of the lower tributaries were, for example, 10 times greater than shown in Table 3N-17, total visitor days and spending at all affected areas would change by less than 0.5%. Similarly, effects on the regional economy shown in Table 3N-18 would not change appreciably if changes in numbers of visitors to the lower tributaries were taken into account.

CULTURAL RESOURCES (K)

No major issues have been identified.

LOS ANGELES WATER SUPPLY (L)

L1. Assumptions about Reclamation Projects Included in the Water Supply Analysis Are Questionable

Summary of Comments

Several commenters questioned the draft EIR's assumptions about the reclamation projects included in the water supply analysis. Comments focused on the following issues:

- the reason for the differences between the draft EIR's projections of 119,000 af and LADWP's goal of 255,000 af,
- the schedule for implementing the reclamation projects,
- the reason for identifying reclamation projects that are not part of LADWP's plan, and
- the need to apply the MWD rebate to all reclamation projects.

Response

LADWP's goal of 255,000 af/yr includes effluent used for purposes other than replacing potable water supplies. The draft EIR estimate of 119,000 af/yr includes reclamation projects that would be used to replace potable water supplies with water from sources identified in Table 3L-3 in the draft EIR.

LADWP indicated that delays expected in its implementation schedule for reclamation projects would increase its reliance on MWD supplies. LADWP's most recent schedule for reclamation projects (included in its comments on the draft EIR) shows a slower rate of implementation than was assumed in the water supply analysis. Delayed implementation of most of the reclamation projects identified in the draft EIR would raise LADWP's water supply costs because LADWP would have to obtain more expensive water supplies as replacement. Although these delays would increase costs under each alternative, the incremental costs of each alternative compared to point-of-reference conditions likely would increase only slightly. Costs would increase more substantially if delays resulted in additional years of water supply shortages.

The reclamation projects discussed on page 3L-14 of the draft EIR are planned for water districts outside of LADWP's service area and were included to show that many water districts in southern California are taking steps to recycle and reclaim wastewater. These projects were not included in the estimate of water supply costs to LADWP.

The projects assumed to receive the MWD rebate were only those designated to receive the rebate in MWD's Urban Water Master Plan (UWMP), such as the LA Greenbelt and the West Basin projects. A recent agreement between LADWP and MLC commits AB 444 funds (ranging from $36 million to $50 million) to develop reclamation projects. One project, the East Valley Water Reclamation Project, has been identified to receive funding. Cost savings associated with the East Valley project were not included in the water supply analysis because the agreement was reached after the draft EIR was completed.

L2. The Water Supply Analysis Should Have Been Based on Stochastic Simulation of Water Supply Years

Summary of Comments

One commenter indicated that the water supply sampling method used to calculate the future average annual LA Aqueduct deliveries was overly simplistic. (The method used in the draft EIR was based on a single 20-year projection of 12 normal, 4 wet, and 4 dry years selected from the 50-year hydrologic record.) The commenter believed that a probability analysis should have been performed to support the likelihood that the 20-year projection period adequately represents the expected average future deliveries.

Response

More ambitious sampling procedures could have been used in the water supply cost analysis but likely would not have substantially changed the results. The conclusions of the differential analysis in the draft EIR depend on a comparison of alternative scenarios, using a given sampling method. Deviations arising from imperfections in the sampling method roughly cancel out in the comparisons. This situation would be different if deviations were to differ systematically between two lake levels, but the EIR preparers are not aware of any systematic differences (and none were suggested in the comments). Consequently, there is no reason to expect that the results of the analysis are biased.

The methods used to develop the 20-year projection period were designed to minimize the effects of sampling bias and other potential sources of bias. As stated in the draft EIR and above, 20 years were chosen randomly from the 50-year historical hydrological record. The number of dry, normal, and wet years was selected proportionate to how often each type of year occurred in the 50-year period (20%, 60%, and 20%, respectively). The representativeness of the sample was assessed by comparing the average water deliveries over the 20-year projection period to the average deliveries over the 50-year period under the 6,372-Ft, 6,377-Ft, 6,383-Ft, and 6,390-Ft Alternatives. The deviations varied by alternative, ranging from 0.5% under the 6,372-Ft Alternative to 2.2% under the 6,383-Ft Alternative. This level of deviation is considered acceptable for the type of differential analysis performed.

L3. The Source and Effects of Increased LADWP Demand for MWD Supply Were Not Considered

Summary of Comments

One commenter indicated that the draft EIR assumes that MWD supplies are available to replace Mono Basin water but does not consider the source or the impacts on other MWD member agencies. The commenter stated that MWD's future water supply is limited by the uncertainty of the various federal agencies to protect species in the Delta.

Response

The water supply analysis in the EIR assumed that MWD would meet increased demand from LADWP either from additional water supplies obtained from the Colorado River aqueduct, by water transfers from the Central Valley Project (CVP), or potentially by reductions in the amount of water available to other MWD member agencies.

According to the written testimony of Dr. Tim Quinn, Director of MWD's State Water Project and Conservation Division, MWD believes that it can obtain additional supplies to replace water required to protect or restore Mono Lake without significant adverse impacts on its member agencies. MWD affirms that it intends to take whatever actions are necessary to maintain Colorado River deliveries at 1.2 million af in the future, more than double MWD's firm rights to Colorado River water. In the short-term, reduced Mono Lake diversions would be supplied from an increase in water supply from the Colorado River aqueduct.

If additional supplies of imported Colorado River water are not available to replace Mono Lake supplies over the longer term, it is assumed that MWD would obtain additional supplies from water transfers from the CVP or reduce, if necessary, the amount of water supplied to other MWD member agencies because of LADWP's preferential rights to MWD supplies. If reductions to other MWD member agencies are necessary, it was assumed that these member agencies would need to develop additional local supplies, such as reclamation, conservation, and groundwater. The analysis did not assume that increased LADWP demand for MWD water associated with reduced diversions from Mono Basin would be made up by additional exports from the Delta. Refer to the response to Comment X8 on the evaluation of environmental impacts of developing alternative water supplies.

L4. Procedures for Taking Potential Reductions in Colorado River Water into Account in the Draft EIR Analysis Are Unclear

Summary of Comments

One commenter requested additional information on how potential reductions in Colorado River water to MWD were incorporated in the draft EIR analysis. The basis for stating in the draft EIR that LADWP prefers water supplies from sources other than MWD was questioned. Another commenter stated that the draft EIR does not provide any basis for its statement that LADWP prefers other supplies due to MWD's water supply uncertainty.

Response

MWD's UWMP was used in conjunction with LADWP's UWMP to estimate LADWP's potential demand for MWD water. Page 4-19 of LADWP's UWMP shows that, under drought conditions, LADWP would demand from 280,000 to 300,000 af/yr of water from MWD between 1995 and 2010. These drought condition assumptions were used as the basis for the water supply analysis in the draft EIR.

These assumptions were considered reasonable. According to LADWP's UWMP, LADWP's preferential right to MWD water will range between 24% and 26% of MWD's total water supplies during the 1995-2010 period. Page 4-23 of LADWP's UWMP shows that under drought conditions, MWD's total water supply would range from 3.32 million af in 1995 to 3.27 million af in 2010. The Colorado River aqueduct would supply 620,000 af of MWD's total water supply, as specified in MWD's UWMP. (Refer to the response to Comment L3 for additional information about MWD current assumptions about the availability of Colorado River water.)

These numbers are consistent with Table III-6 (page 60) of MWD's UWMP. Given these estimates, it is reasonable to assume that LADWP would demand up to 300,000 af/yr of MWD's total water supply of 3.27 million af/yr, which amounts to less than 10% of MWD's total supply, and is much less than LADWP's preferential right to MWD water. In addition, this allocation is less than the 385,000 af of water that MWD provided to LADWP in 1990 during the middle of the most recent drought.

LADWP's UWMP clearly indicates that LADWP is very concerned about the reliability of MWD water supplies. Statements throughout LADWP's UWMP describe MWD's supply as uncertain and imply that LADWP is aggressively pursuing the development of additional water supplies despite its large preferential right to MWD water.

L5. Mitigation Measures Are Speculative

Summary of Comments

Several commenters indicated that some of the water sources identified in draft EIR as mitigation for potentially significant water supply impacts were speculative. Questions were raised about water transfers and programs funded by AB 444.

Response

The sources identified in the draft EIR as mitigation for potentially significant water supply impacts include those that state and federal water resource agencies are currently considering to augment supplies to urban water users. Considerable uncertainty about the amount of water that can be contributed by these sources exists. However, the EIR preparers believe that sufficient water likely is available from these sources to mitigate for potentially significant water supply impacts associated with the loss of water supplies from Mono Basin. The water supply impacts that were considered significant range from an estimated 42,000 af/yr under the 6,383-Ft Alternative to 66,900 af/yr under the No-Diversion Alternative. This conclusion was based on estimates of water potentially available from these sources. The California Department of Water Resources (DWR) estimates in its State Water Plan (SWP) that 600,000 af of water are assumed available from the drought water bank to meet water needs. According to MWD, more than 800,000 af of supplies were available from the Governor's Drought Emergency Water Bank under drought-stressed conditions in 1991. MWD also states that additional supplies to replace water from Mono Basin can be obtained as long as state and federal regulatory agencies allow reasonable flexibility in SWP and CVP operations and access to an effective voluntary water market (written testimony of Dr. Timothy Quinn). Supplies from the Colorado River also are expected to help offset potential increases in demand for MWD supplies in the short term. (Refer to the response to Comment L3 for additional information about MWD's intent to obtain additional Colorado River water supplies.)

The draft EIR stated that a provision in Public Law 102-575 indicated that water to be reclaimed through programs supported by this legislation was designated for replacing Mono Basin supplies. This statement was incorrect. As pointed out by MWD, the legislation refers to reclaimed water being used to "reduce the demand for imported water" but does not specifically mention Mono Basin.

The Mono Lake Committee and LADWP have filed an application with DWR for funding of reclamation projects pursuant to AB 444. DWR further notes that the future of the AB 444 program is uncertain because of funding constraints. Although opportunities to obtain funding for projects that could help offset Mono Basin water supply reductions diminish as time passes, this program is currently considered one of several mitigation measures that could potentially reduce water supply impacts.

Based on these considerations, it is reasonable to assume that the measures identified in the draft EIR could reduce the water supply impacts to a less-than-significant level.

L6. Demand Projections, Conservation, and Use of Best Management Practices Need to Be Addressed More Fully

Summary of Comments

Demand projections in the water supply analysis rely on information from LADWP's UWMP that is outdated and does not include consideration of the Best Management Practices agreement, the new water rate structure, federal and state laws requiring water-conserving plumbing fixtures, and appliance efficiency standards promulgated by the 1993 federal energy bill.

Response

The water supply analysis was conducted in fall 1992 before the drought had ended, before LADWP had adopted new water rates, and before the passage of the 1993 Federal Energy Act. Moreover, although the California Water Conservation Council issued a memorandum on assumptions and methodology for determining estimates of reliable water savings from the installation of ultra-low-flush toilets in July 1992, this information was not widely disseminated at the time and the draft EIR preparers did not obtain it until a year later. Consideration of this information in the analysis would not materially change the results because the alternatives would be affected similarly.

Some of the demand reduction measures, however, were considered in the analysis. Auxiliary Report 27 discusses the potential additional savings associated with Best Management Practices and other conservation activities, including the use of ultra-low-flush toilets. The analysis roughly estimated the effect of these measures on demand, as compared to the projections in LADWP's 1990 UWMP. The analysis also indicated that hotter weather in dry years would raise demand beyond these projections. The analysis carefully evaluated the LADWP forecasting methodology compared to the MWD-MAIN model used by MWD and concluded that the LADWP projections were more reliable based on the information available at the time.

The water supply analysis focused on estimating the incremental water supply costs of the different lake-level alternatives relative to point-of-reference conditions. Consequently, reducing demand by explicitly incorporating demand reduction measures into the demand projections would tend to lower the water supply costs for all alternatives. The differential effect would be small unless shortage costs were reduced.

L7. Significance Criteria Used to Assess Indirect Impacts on MWD Have No Justification

Summary of Comments

Some commenters stated that the historical average share of MWD supplies has no relevance for determining the significance of indirect water supply impacts on MWD.

Response

The historical average during the 20-year projection period was used to assess the significance of potential water supply impacts on MWD because it provided a context for assessing the extent to which implementation of the project alternatives could affect established patterns of regional water allocations. Alternative thresholds could have been selected; however, none were suggested by commenters on the draft EIR and a threshold based on historical share is a reasonable indicator of impact significance.

The draft EIR incorrectly stated that the significance criterion was based on LADWP's 19-year weighted average share of MWD supplies for 1971-1990, instead of a *20-year* weighted average. The criterion was based on the sum of MWD's total supplies during the 20-year projection period divided by the sum of LADWP's water supply received from MWD during the same period.

L8. The Drought/Acute Shortage Analysis Was Insufficient

Summary of Comments

One commenter stated that the water supply analysis should have considered the effects of different types of water years and that it does not address drought conditions. Another commenter stated that the drought analysis does not represent a worst-case analysis and that the minimum firm yield with an exceedance probability should be calculated. Another commenter suggested that a drought scenario be developed that illustrates a minimum firm yield with an exceedance probability associated with it.

Response

The effects of different types of water years on water supply were analyzed in a drought scenario, which consisted of 8 dry water years, 2 wet years, and 10 average water years as compared to 4 dry, 4 wet, and 12 average water years in the base case analysis. To consider the effects of a prolonged drought, the drought scenario assumed that the 8 dry years would occur in succession at the start of the 20-year projection period.

The results of the drought scenario analysis indicate substantial differences in water supply impacts compared to results of the base-case analysis. In the base-case analysis, water deliveries from the aqueduct were estimated to decrease by approximately 9.5% under the 6383.5-Ft Alternative compared to point-of-reference conditions (Table 3l-5 of the draft EIR). Analysis of the drought scenario shows that average water deliveries under the 6,383-Ft Alternative would decrease by 18% compared to point-of-reference conditions. A similar comparison can be made based on information presented in Table 3L-5.

The drought scenario contained in the draft EIR and described above was developed to represent a reasonable worst-case drought scenario for evaluation. No attempt was made to correlate this drought scenario with minimum firm yield or an exceedance probability. The minimum firm yield approach is believed unnecessary because, during drought periods, virtually all the water delivered through the LA Aqueduct comes from the Owens River basin rather than Mono Basin. Additionally, the assumption of 8 successive dry years exceeds the number of dry years (7) found in the hydrological record for Mono Basin.

The draft EIR incorrectly stated that the drought analysis was based on 8 dry water years, 4 wet years, and 8 average water years, instead of 8 dry years, *2* wet years, and *10* average years.

L9. Water Supply Modeling Did Not Adequately Address Lake Level Transition Periods

Summary of Comments

One commenter stated that the water supply analysis in the draft EIR does not take into account the transition period for Mono Lake to reach its equilibrium elevation and that MWD would be expected to supply most of LADWP's immediate water needs.

Response

The water supply modeling analysis specifically considers lake-level transition periods. The 50-year LAAMP model runs and the 20-year socioeconomic runs from which they were derived include a transition period to bring lake levels up to the target level. The length of the transition period varies, depending on the alternative being analyzed. For the 6,390-Ft, 6,410-Ft, and No-Diversion Alternatives, the target lake level is not reached in the first 20 years (the limit of the modeling run); consequently, the analysis of water supply impacts for these alternatives is based entirely on the transition period. For lower lake-level alternatives, the analysis includes evaluation of a transition period and an equilibrium period.

L10. Further Clarification and Justification of LA Basin Groundwater Pumping Assumptions Are Needed

Summary of Comments

One commenter stated that increased extractions of local groundwater from managed basins depends largely on regional water management and water quality constraints beyond LADWP's control. Another commenter stated that LADWP cannot depend solely on the groundwater supply to make up for shortages in LA Aqueduct supply. This commenter indicated that LADWP's groundwater supply was overestimated by 20,000 af/yr because the increase in groundwater pumping is due to a projected increase in recharge from the East Valley project, not in recharge from returned water.

Response

The groundwater assumptions in the water supply analysis recognize that LADWP has historically influenced and is expected to continue to influence decisions on groundwater pumping, including LADWP's right to groundwater in the San Fernando, Sylmar, and Central Basins.

The water supply model assumes that the maximum amount of groundwater that can be pumped each year is equivalent to the city's groundwater rights for that year plus any surplus water stored in the ground from previous years. This assumption is based on information in LADWP's UWMP, including information on groundwater contamination and clean-up activities that LADWP is undertaking to maintain and increase its groundwater capacity.

The comment on overestimating groundwater supplies refers to footnote "**" of Exhibit 4.0-2 in LADWP's UWMP. Although this footnote confirms that the increase in groundwater production is due to groundwater recharge from reclaimed water, it does not state the source of that reclaimed water. For the water supply modeling analysis in the draft EIR, East Valley reclamation water was assumed to increase from 15,000 af/yr in 1995 to 35,000 af/yr by 2010. The East Valley project is ultimately expected to yield up to 50,000 af/yr of reclaimed water, of which, in the latest estimates, 35,000 af/yr will be used for groundwater recharge and 15,000 af/yr for landscape irrigation and industrial customers.

L11. Several Misleading or Outdated Assumptions from LADWP's Urban Water Management Plan Were Used to Develop the Water Supply Simulation Model

Summary of Comments

One commenter stated that the water supply simulation model relied on misleading information and unsupportable assumptions from LADWP's UWMP. Specific statements included:

- the draft EIR did not adequately demonstrate that MWD could supply up to 300,000 af/yr to LADWP,
- an analysis performed by MWD shows that there is a 25% likelihood that LA Aqueduct supplies could be as low as 125,000 af,
- the draft EIR confuses LADWP's preferential rights to MWD water with the amount of water available,
- the draft EIR assumes that MWD water will replace LA Aqueduct water in dry years and implies that MWD would not be limited by the same drought conditions as those that exist in the Mono Basin watershed, and
- LADWP's preferential rights were confused with the amount of water available.

Response

MWD's UWMP was used in conjunction with LADWP's UWMP to estimate LADWP's potential demand for MWD water. Page 4-19 of LADWP's UWMP shows that, under drought conditions, LADWP would demand between 280,000 and 300,000 af/yr of water from MWD between 1995 and 2010. These drought condition assumptions were used as the basis for the water supply analysis. Page 4-23 of LADWP's UWMP also shows that, under drought conditions, MWD's total water supply would range from 3.32 million af in 1995 to 3.27 million af in 2010 and the Colorado River aqueduct would supply 620,000 af of MWD's total supply. These numbers are consistent with Table III-6 (page 60) of MWD's UWMP.

LADWP's assumed demand of up to 300,000 af/yr of MWD's total supply of 3.27 million af/yr of water amounts to less than 10% of MWD's total supply. This assumed demand is much less than LADWP's preferential right to MWD water, which ranges between 24% and 26% of MWD's total supplies during the 1995-2010 period, based on information from LADWP's UWMP. MWD provided 385,000 af of water to LADWP in 1990 during the middle of the most recent drought. Consequently, the assumption that MWD could supply up to 300,000 af/yr of water appears reasonable.

Although the MWD study referred to by one commenter estimates a 25% probability that LA Aqueduct supplies could be as low as 125,000 af, the point-of-reference conditions in the water supply analysis show deliveries of 283,000 af of water in the worst-case year over the 50-year hydrological period and deliveries as low as 205,000 af of water under the No-Diversion Alternative. Based on this information, the historical record used in the water supply analysis does not substantiate a 25% likelihood of deliveries as low as 125,000 af.

MWD's water supplies from the northern Sierra Nevada are correlated with LADWP water supplies through the Mono Basin watershed. However, as described in the response to Comment L3, the draft EIR analysis assumed that LADWP could obtain additional water from MWD even during most drought years because of LADWP's preferential rights. If water is unavailable from MWD or other sources, rationing could be necessary.

The water supply analysis in the draft EIR recognized the essential distinction between LADWP's preferential rights and the amount of water actually available. Preferential rights are rights to the amount of MWD water available. The draft EIR's estimate of the maximum amount of MWD water available to LADWP was based on a consideration of LADWP's preferential rights, LADWP's expected future demand for MWD water under drought scenario, and MWD's supply estimates under the drought scenario.

The scenario presenting LA Aqueduct water deliveries under the point-of-reference scenario is based on 50 years of historical record, not on a particular drought scenario.

L12. The Water Supply Simulation Model Is Incapable of Addressing Temporal Variations in Supply and Should Reflect Marginal Costs

Summary of Comments

Several commenters suggested modifications to the water supply cost model, including adding more flexibility to take advantage of available groundwater and less expensive MWD water, and using marginal instead of average costs to estimate water supply costs.

Response

The model used to estimate the water supply impacts is an annual model that does not account for variances in water supply within an individual year. Although the model can carry over surplus groundwater from one year to the next, it is not capable of allowing for storage of inexpensive surplus water from MWD within a year for use in subsequent periods.

The suggested modifications to the model would provide improved capabilities to evaluate the water supply impacts and costs. Some of these modifications were considered in developing the model but were not incorporated because of time, budget, and data constraints. The water supply cost model used in the draft EIR estimates the incremental costs of water supply impacts relative to the point-of-reference conditions and provides a reasonably accurate estimate of these costs. Modifying the model as suggested would tend to lower the incremental costs associated with all the alternatives would not substantially affect relative costs between alternatives.

POWER GENERATION (M)

M1. Key Assumptions of the Effects on Rated Capacity and Energy from the LA Aqueduct Units and the Availability of Replacement Capacity and Energy Are Missing

Summary of Comments

LADWP stated that the assumptions used to estimate replacement capacity and energy should have been specified in the draft EIR. LADWP also stated that the analysis does not appear to consider the capacity lost from the LA Aqueduct units and typical operation of the LA Aqueduct units. LADWP estimates that up to 27 megawatts (MW) of capacity would be lost during an average year and this amount of capacity would have to be replaced.

Response

The draft EIR preparers made a considerable effort to coordinate with LADWP in estimating changes in the rated capacity of the LA Aqueduct units and energy from them as a result of changes in water availability.

During summer 1991, the draft EIR preparers requested data from LADWP that would have been used to quantify the impacts on capacity due to reduced water availability. The attachment to a LADWP letter dated July 26, 1991, states that "In our conference call on July 11, 1991 . . . LADWP also stated that the rated capacity of the Aqueduct plants does not change significantly due to seasonal variations in water deliveries. . . ."

In July 1992, the draft EIR preparers sent a draft report entitled "Effects of Los Angeles Aqueduct Diversions on Fuel Use, Production Costs, and Emissions" to LADWP for review and comment. Appendix B of that report contained a detailed discussion of the relationships between water availability and capacity availability and Appendix C contained a listing of the ELFIN input data for the LA Aqueduct facilities for the point-of-reference conditions. Appendix C also described the monthly variation in peaking and run-of-the-river capacity and energy for point-of-reference conditions. For example, Appendix C showed that the assumed capacity available from the LA Aqueduct units under point-of-reference conditions varied in 1992 from 197 MW to 203 MW on a monthly basis whereas it varied from 197 MW to 208 MW in 2008.

In October 1993, the draft EIR preparers provided additional information to LADWP on the ELFIN simulations for the point-of-reference conditions and for the No-Diversion and No-Restriction Alternatives. This information showed, for example, that assumed capacity available under the No-Restriction Alternative varied from 197 MW to 205 MW on a monthly basis.

The draft EIR reflects changes in capacity due to changes in water availability. LADWP never expressed concern with the methods used to estimate the change in the capacity of the LA Aqueduct plants. With respect to LADWP's preliminary estimate of 27 MW of lost capacity, the draft EIR preparers have not reviewed the assumptions for this estimate and therefore cannot respond to its validity.

LADWP apparently misinterpreted statements in the draft EIR regarding the availability of replacement capacity from outside sources. The draft EIR states that the total amount of capacity (both inside and outside California) available to LADWP from existing and planned resources is projected to be greater than LADWP's capacity requirements under all water diversion alternatives. Consequently, additional capacity resources are not expected to be required under any of the water diversion scenarios.

Table 3M-1 in the draft EIR shows that LADWP's capacity resources in 1990 were 7,141 MW (including 200 MW from the LA Aqueduct) and peak demand in 1990 was 5,312 MW, resulting in reserves of 1,829 MW (about 34% of peak demand). LADWP's total capacity resources (including 199 MW from the LA Aqueduct) are projected to be 8,865 MW in 2009 (Table 3M-11) and LADWP's peak demand is projected to be 7,421 MW in 2009 (Table 3M-10), resulting in reserves of 1,444 MW (about 19.5% of peak demand). A decrease in LA Aqueduct capacity of 27 MW (as estimated by LADWP) would decrease projected capacity resources by approximately 0.3% (to 8,838 MW) in 2009 and projected capacity reserves to 1,417 MW (about 19.1% of peak demand).

The annual average amount of generation available from the LA Aqueduct facilities under point-of-reference conditions is estimated at 1,038,000 megawatt hours (MWh) (Table 3M-14). The draft EIR identifies the change in the amount of energy assumed available on an average annual basis for each alternative. For example, the draft EIR indicates that approximately 34,000 MWh of additional energy would be generated under the No-Restriction Alternative.

M2. Potential Air Quality Effects Resulting from Changes in Energy Production from the LA Aqueduct Units Are Minimized in the Analysis

Summary of Comments

LADWP stated that the draft EIR only touches on air emissions and considers increases in emissions as less than significant, does not address societal costs associated with potential increases in air quality emissions, and does not adequately address future air quality regulations.

Response

The draft EIR estimated changes in air emissions based on the results of the ELFIN production model, which is a widely accepted model for estimating changes in emissions associated with changes in power production.

The cumulative NO_x emissions under the point of reference and No-Restriction, 6383.5-Ft, and No-Diversion Alternatives were estimated at 13,776 tons, 13,758 tons, 13,909 tons, and 14,010 tons, respectively. The cumulative "cost" of NO_x emissions (assuming an ER-90 per ton emission value of $14,700 in 1992 dollars) under these four scenarios is estimated to be $202.5 million, $202.2 million, $204.5 million, and $205.9 million, respectively. The largest increase in costs (with respect to point-of-reference conditions) is $3.4 million, which is approximately 1.7% higher than under point-of-reference conditions. Differences of this magnitude are considered minimally detectable, given the accuracy of the input data. If ER-92 or ER-94 values are used, the societal costs would be higher but the relative difference between the alternatives and the point-of-reference conditions would still be relatively small.

Future air quality regulations were identified in the draft EIR in reference to future events that could affect the analysis of cumulative impacts. Quantifying the effect of future regulations on energy production in the South Coast Air Basin to assess potential cumulative impacts of the project alternatives was considered beyond the scope of the draft EIR.

ECONOMICS (N)

N1. Water Shortage Costs Are Underestimated

Summary of Comments

LADWP states that the shortage costs estimated in the draft EIR are not actually shortage costs and that they underestimate the value people place on avoiding water shortages. Also, LADWP states that the draft EIR failed to measure the cost of reducing the reliability of its water supply.

Response

To measure shortage costs, the "outage" costs developed by Mayor Bradley's Blue Ribbon Committee on Water Rates were used instead of the higher estimates from the Carson and Mitchell study for two reasons. First, the Carson and Mitchell study is somewhat outdated and generic. It is based on the results of a contingent valuation survey conducted in April 1987 in which a random sample of 1,500 households in southern California and 500 households in northern California were asked to consider different cutbacks in their water supply as a result of a drought and then asked about their willingness to pay higher water costs to finance a water shortage prevention program that would safeguard against those cutbacks. At the time, the only experience that respondents had with droughts was 10 years earlier during the 1976-1977 drought. The draft EIR preparers preferred using data that incorporated people's actual experience with the recent drought and that pertained specifically to the LADWP service area rather than to urban California generally.

The second reason for using the results from the Blue Ribbon Committee relates to the use of price rationing as a response to drought, as occurred in Los Angeles in 1991 and is likely to occur in future shortages, in the opinion of the draft EIR preparers. It is presumed that price rationing induces more customers with a below-average outage cost to reduce their water use than those with an above-average outage cost. The result is what economists referred to as a selectivity bias: the users most affected by the outage costs associated with the actual reductions are not drawn evenly from the entire spectrum of water users but disproportionately more from those with lower outage costs. This effect, which was not considered in the Carson and Mitchell study, reduces the aggregate outage cost and increases the estimate. Selectivity bias was explicitly accounted for in the analysis in the draft EIR.

The Blue Ribbon Committee and its technical panel approved the use of the estimates of shortage costs associated with outages of varying degrees. The Blue Ribbon Committee accepted the recommendations that the upper block in a two-tier price structure be set equal to an estimate of the outage cost of the customer who reduced use and then commissioned an analysis by David M. Griffith and Associates. Because the analysis was based on limited data (i.e., Los Angeles experience with drought emergency surcharges during summer 1991), the estimates were to be revised when more complete information became available.

The economic value of a reliable water supply was considered in the draft EIR analysis by incorporating a resource-loading approach that added resources as needed to maintain the reliability of the system under point-of-reference conditions. Shortage costs were used to explicitly account for the costs associated with not maintaining system reliability.

N2. The Indirect Economic Costs Associated with MWD's Actions to Serve LADWP Are Not Appropriately Analyzed

Summary of Comments

The draft EIR provides no explanation for stating that indirect economic costs on the MWD are not considered sufficiently reliable and for leaving them out of Table 3N-14. LADWP rejects the approach of using reclamation to measure these costs.

Response

The draft EIR used the differential cost between MWD supplies and high-cost reclamation projects to approximate the indirect costs associated with LADWP obtaining additional MWD water to replace Mono Basin supplies. The underlying assumption for this approach was that higher demand by LADWP for MWD supplies would result in less MWD water available for other MWD member agencies and that these agencies would need to develop additional local supplies. Reclamation was the source considered most likely for water districts to develop, and an upper estimate of the cost per acre-foot of water was used for the calculation.

Although the estimate in the draft EIR is considered reasonable for approximating indirect costs, it is not considered very reliable because the specific member agencies that would be affected are not known and the accuracy of the cost estimate to represent affected agencies' costs for replacing MWD water supplies is uncertain. The cost to replace lost MWD water supplies could vary substantially between affected agencies and could be either higher or lower than the estimated cost, depending on specific supply and cost conditions. Because of this uncertainty, the estimate was considered only an approximation and was not included in Table N-14. As indicated in the footnote to Table 3N-14, including indirect costs would potentially change the conclusion regarding the net economic benefits of the 6,377-Ft Alternative; however, conclusions regarding other alternatives would not be affected.

N3. The Draft EIR Does Not Present Any Evidence of Economic Robustness for Its Conclusions

Summary of Comments

LADWP states that the draft EIR does not present any evidence to support the statement regarding the economic robustness of its conclusions and that the conclusions change if suggested assumptions regarding the timing of reclamation projects and deliveries from the LA Aqueduct are incorporated. LADWP also states that the effect of data uncertainty on the results should be considered.

Response

The draft EIR refers to robustness as it pertains to the conclusion that net economic benefits are maximized under the 6,390-Ft Alternative. This conclusion is based on marginal benefits exceeding marginal costs by several times. The draft EIR preparers believe that this result is consistent with the concept of robustness.

The draft EIR preparers do not consider the purported effect of delaying reclamation projects and adjusting LA Aqueduct deliveries on the results to be valid. As explained in the preceding response to Comment L1, delaying reclamation projects would have only a slight impact on the costs of a particular alternative because the cost for the point-of-reference conditions also would increase. As explained in the response to Comment L2, the suggested adjustment to deliveries from the LA Aqueduct do not appear warranted and would only slightly affect the results of the analysis.

The draft EIR explicitly recognizes the uncertainty associated with projected future costs and benefits. The robustness of the conclusion regarding net economic benefits of the 6,390-Ft Alternative is addressed for this reason. The draft EIR preparers do not believe that a more detailed sensitivity analysis would change the conclusions regarding which alternatives have positive net economic benefits and which alternative is optimal from the perspective of net economic benefits.

N4. Conditions Described in the Household Survey Are Not Consistent with the EIR Alternatives

Summary of Comments

LADWP states that the scenarios described in the household survey are not consistent with resource conditions described for the alternatives in the draft EIR. LADWP also states that the environmental impacts described in the draft EIR are generally less severe than conditions described in the survey. Impacts on tufa at South Tufa are cited as an example of this inconsistency. LADWP suggests that estimates for the three programs described in the survey be ascribed to the alternative having impacts most similar to effects described in the survey, not necessarily to the alternative having lake levels closest to those of the programs stated in the survey.

Response

Information on resource conditions described in the household survey was necessarily preliminary. Predicted resource impacts described in the draft EIR, however, differed only slightly from the descriptions in the household survey. After review in response to LADWP's comment, the draft EIR preparers still believe that estimates of preservation values were ascribed to the most appropriate EIR alternative.

Relative effects on tufa described in the three program levels and the No-Action Level for the various lake levels in the survey instruments are consistent with the impacts of the corresponding alternatives described in the draft EIR. Effects on tufa towers described for the No-Action Level, Program A, and Program C correspond exactly to conclusions of the draft EIR for the corresponding lake-level alternatives. Only the description used for Program B (6,390 feet) was found to be somewhat inaccurate in its details, but it did correctly characterize the tufa effects as intermediate between those of the next highest and next lowest lake-level programs and alternatives. Thus, it is unlikely that "errors" in the exact percentage of small towers covered with water or toppled at South Tufa Grove in the household survey would have a material effect on respondees' program preferences.

N5. The Sampling Design Used in the Household Survey Resulted in Sample Selection Bias

Summary of Comments

LADWP states that the sampling method used in the household survey resulted in a fairly low response rate and potential sample selection bias. The sources of sample selection bias include under representation of Hispanic and black households and of persons who spend time away from home.

Persons that place little or no value on preserving Mono Lake are also under represented because they would be less likely to agree to participate in the survey.

Response

The draft EIR preparers recognize that the sampling methods used could result in sample selection bias and thus developed procedures to adjust the results to correct for certain sources of potential bias. Zero values were assigned to all non-English speaking households (10.8% of the sample) that were contacted but refused to participate in the survey.

Correction factors were not developed for other sources of nonresponse bias because the EIR preparers were less certain about the effect of this bias on the results. The draft EIR preparers considered it prudent not to correct for potential sources of bias in which the effect was uncertain.

The sampling plan, which was developed by the EIR preparers with assistance from the technical review team, including LADWP representatives, was limited by budget constraints. The sampling methods called for by the plan were considered acceptable for providing the level of precision needed for the analysis.

N6. The Draft EIR Does Not Provide Any Statistical Confidence Intervals for the Estimates of Preservation Values from the Household Survey

Summary of Comments

LADWP states that the draft EIR provides no statistical confidence intervals for the estimates of preservation values or for the difference in preservation values between programs. LADWP also states that the data are consistent with an extremely small preservation value associated with moving from Program A (lake level of 6,375 feet) to Program B (lake level of 6,390 feet).

Response

Because of budget and time constraints, confidence intervals were not calculated for the estimates of preservation values or for the difference in preservation values between programs.

The confidence interval presented by LADWP for the difference in preservation values between programs does not indicate that the data are consistent with a small preservation value associated with moving from Program A to Program B. This interpretation was made, but the wide confidence interval could also have been interpreted to indicate a large preservation value. The only interpretation that can be made with certainty is that the preservation value estimate for Program B is statistically larger than the value for Program A.

N7. The Draft EIR Fails to Discount Household Willingness to Pay Estimates for Future Years

Summary of Comments

LADWP states that the estimates of preservation values for future years should be discounted because survey respondents do not pay attention to the number of years for which payment is being requested, and therefore the value reported in the draft EIR does not represent an annual willingness-to-pay amount for the entire period.

Response

The contingent valuation survey was framed in terms of willingness to pay an annual increase in state taxes over the next 20 years. The draft EIR pointed out some concerns associated with projecting annual payments over such an extended period; however, the estimates were not adjusted for several reasons.

First, there is no consensus in the literature about when and how an adjustment should be made. LADWP offers an opinion based on analysis of data collected in connection with the State of Alaska's damage assessment for the Exxon Valdez oil spill; preparers of the draft EIR collaborated on that research and do not share the opinion expressed by LADWP.

The second reason is that if an adjustment was made to the preservation values, adjusting other economic values, such as the water supply costs, should also be considered. For example, attitudes toward conservation could change over the 20-year planning horizon, thereby shifting the demand for municipal and industrial use. Adjusting all costs and benefits to reflect potential changes in future preference was not considered practical or necessary to identify the economically optimal alternative.

The third reason is more philosophical and relates to the somewhat subjective nature in addressing the uncertainties associated with future costs and benefits of preserving Mono Lake. The draft EIR preparers believe that the discounting of future costs and benefits is a public policy issue that should be decided by public trust agencies, not by consultants.

N8. Linearly Extrapolating between Different Water Levels Is Not Appropriate to Estimate Preservation Values

Summary of Comments

LADWP states that the conclusion in the draft EIR that preservation benefits and net economic benefits are maximized under the 6,390-Ft Alternative is completely determined by modeling assumptions that bear no relationship to the actual data collected. LADWP also states that the linear extrapolation is not the best fit to the data.

Response

Because budget constraints limited the information that could be obtained in the surveys, the draft EIR preparers, with agreement by the technical review team, including LADWP representatives, collected data on selected alternatives that covered the range of alternatives and then estimated values for intermediate alternatives by interpolation.

Analysis of the survey data indicated that public values were highest for Program B (a lake level of 6,390 feet), next highest for Program A (a lake level of 6,375 feet), and lowest for Program C (a lake level of 6,410 feet). Because the draft EIR preparers did not have estimates for other alternatives, a linear extrapolation was made between the 6,375-Ft Alterative and the 6,390-Ft Alternative to estimate preservation values associated with the 6383.5-Ft Alternative.

LADWP proposes an alternative extrapolation based on a nonlinear curve. The key difference between the two extrapolations is the location of the implied downturn in the valuation function. Because Program C is valued less than Programs A and B, the function must turn down at some lake level below Program C. The draft EIR preparers assumed that the function increases monotonically between Programs A and B and turns down at some lake level between Programs B and C. LADWP assumed that the function reaches its peak at some lake level between A and B and that values are decreasing at Program B.

The point at which the function turns down cannot be determined with certainty based on the available data. Both interpretations are possible. The draft EIR preparers believe that the assumed shape of the valuation function is appropriate.

List of Acros

List of Refs

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Chapter 7. Errata to the Draft Environmental Impact Report

INTRODUCTION

The following statements constitute errata to the draft EIR to correct errors, improve explanations, or otherwise modify information, based on the comments submitted on the draft EIR.

None of these changes constitute significant new information. These errata are important factual changes, but none of them require reevaluation of the conclusions of the draft EIR.

CHANGES TO THE DRAFT EIR CHAPTERS

Summary

On page S-7, last paragraph, add: "To the extent that the proposed project would add to the impacts of the city's diversions since 1941, or the two projects would jointly contribute to adverse impacts, those cumulative impacts are adverse impacts on the environment, which must be avoided or mitigated to the extent feasible, for purposes of CEQA. Even where the proposed project would reduce the impacts of the city's diversions since 1941, analysis of the net or cumulative effect of the city's diversions since 1941 and continued diversion as would be authorized under the proposed project is useful in determining what actions are appropriate to protect the public trust. Both kinds of cumulative impacts are identified, and mitigation measures are proposed, in this EIR."

On Table S-1, page 5 of 15, the entry under column "Effect on Parker and Walker Creeks" and for row "Point of reference" should be changed from "NA" to "Dewatered".

On Table S-1, page 6 of 15, replace with the revised table herein.

On Table S-2. First entry under "Vegetation", delete Rush Creek.

Chapter 1. Introduction

No changes are needed.

Chapter 2. Project Alternatives and Points of Reference

On page 2-27, after the first paragraph under "Basis in CEQA" add:

"Under CEQA, the focus of review is on the action proposed to be undertaken and on changes in existing physical conditions that will be affected by the proposed action, in this case amendment of the city's licenses. For purposes of CEQA, the impacts of other diversions are not cumulative impacts of the proposed project water right license amendments being considered by the SWRCB unless the proposed amendments would add to or otherwise jointly contribute to the impacts of the other diversions. To the extent that the water rights under review have individually or cumulatively harmed public trust uses, however, those impacts must be considered for the purpose of applying the public trust and reasonableness doctrines, even if the water right amendments ultimately adopted by the SWRCB do not make those public trust impacts any worse. This EIR discloses cumulative impacts and sets forth possible mitigation measures, both for purposes of CEQA analysis and for disclosure of previous and potential future changes in the environment that are relevant to public trust analysis.

Except under the No-Restriction and 6,372-Ft Alternatives, which would allow further reductions in Mono Lake elevations, none of the alternatives considered in this EIR would add to the adverse environmental impacts that have occurred as a result of the city's diversions since 1941, aside from possible further land use impacts from reductions in irrigated lands for grazing (at the discretion of LADWP). If an alternative would not add to or otherwise jointly contribute to adverse impacts of the city's diversions since 1941, the discussion of cumulative impacts and possible mitigation measures provides environmental information relevant to the SWRCB's review and modification of the water rights held by the City of Los Angeles, but does not constitute identification for purposes of CEQA of significant adverse impacts of the alternatives under consideration by the SWRCB."

Chapter 3A. Environmental Setting, Impacts and Assessments, and Methodology - Hydrology

On page 3A-15, first paragraph, delete last sentence.

Chapter 3B. Environmental Setting, Impacts, and Mitigation Measures - Water Quality

No changes are needed.

Chapter 3C. Environmental Setting, Impacts, and Mitigation Measures - Vegetation

Most of the errata for this chapter are needed to correct minor errors in the draft EIR. A planned pre-publication review by a designated technical expert was precluded by the deadline for release of the draft report and other commitments made by the reviewer.

On page 3C-3, 3rd paragraph, 1st sentence, change to "Pumice Valley is the eroded river-delta lakebed of Pleistocene Lake Russell."

On page 3C-3, replace the 4th paragraph with the following: "Below the narrows, Rush Creek flows through the `bottomlands,' a wide, gently sloping valley filled with stream alluvium. (This filling occurred during wetter times of the prehistoric period, when Mono Lake rose into the valley, causing Rush Creek to deposit its delta in the bottomlands.)"

On page 3C-4, "Persistence of Summer Flows", change 2nd sentence to ". . . some reaches of the first three of these streams. . . ".

On page 3C-5, the 1st paragraph after bullets, 1st sentence, delete "or the Narrows" and change "in 1930-35" to "between 1930 and 1934".

On page 3C-5 under "Channel Stability", delete 1st sentence.

On page 3C-6, 1st three paragraphs, change "incision" to "incision and channel widening".

On page 3C-6, 5th paragraph, change last clause to ". . . but continue to carry flows during the prediversion period."

On page 3C-7, under "Rush Creek", add to 1st sentence as follows: "Riparian vegetation conditions on Rush Creek were altered before the LADWP diversion period by *intensive sheep grazing, diversions for power production,* construction of Grant Lake reservoir, irrigation diversions to Pumice Valley and Cain Ranch, and the emergence of irrigation water at springs in the Rush Creek bottomlands."

On page 3C-7, under "Rush Creek", 2nd paragraph, 4th sentence, change to "Raising the dam eliminated approximately 90 acres of wetland and riparian vegetation. . . ."

On page 3C-10, under "Wilson Creek", change 3rd sentence to read "The increased flow and lake-level lowering cause significant channel incision" and change "Highway 31" to "Highway 167".

On page 3C-11, paragraph 6, sentence 2, replace "along the lake's west shore" with "along portions of the western, southern, and northern shorelands".

On page 3C-11, paragraph 6, last sentence (continues on page 3C-12), replace with: "Groundwater is discharged along the Mono Lake shorelands because gravity carries water downslope in shallow aquifers or along faults or because pressurized artesian water wells up from deep aquifers along faults and discharges as terrestrial springs along the shorelands or as underwater springs."

On page 3C-12, paragraph 2, second bullet, insert "rock fractures and joints" after the word "fault" on the third line of the bullet.

On page 3C-12, paragraph 5, sentences 2 and 3, replace with: "It develops on gently sloped lands composed of lakebed sediments. There, saline groundwater is drawn to the surface by capillary action and evaporates, leaving a salt residue that can develop into a thick powder or crust called `efflorescence'. The efflorescence is dissipated by wind and rain storms but continuously reforms as long as the saline groundwater persists. Gentle water table slopes and moderate to slow soil permeability prevent the water table from draining rapidly (Appendix Q)."

On page 3C-14, paragraph 5, sentence 1, change the total extent of wetlands to 748 acres and the total extent of marsh, wet meadow, alkali meadow, and wetland scrub habitat to 489 acres (see the response to Comment C2 in Chapter 4, "Major Issues and SWRCB Responses", for an explanation of the change).

On page 3C-15, paragraph 4, sentence 1, replace the first part of the sentence with: "The Rush Creek delta supported 38 acres of natural lagoon wetland and 133 acres of wet meadow and marsh wetland, and the Wilson and Lee Vining Creek . . ." (continue as in text).

On page 3C-21, last paragraph, sentence 2, add: "1986".

On page 3C-22, 4th full paragraph, change date in 1st sentence from "1985" to "1984".

On page 3C-23, change 1st sentence to "The potential maximum incision, or fall of the lake surface below the elevation of the stream delta plain, has increased from 13 feet during the floods of the 1960s to 24 feet at the point of reference."

On page 3C-23, 2nd paragraph, change "flows damaging to streambeds" to "flows damaging to stream*banks*".

On page 3C-25, 1st sentence, change date to "1984".

On page 3C-26, last paragraph, 1st sentence, change to "Since 1989, several channel modifications and revegetation projects have been implemented. . . ."

On page 3C-27, under "Post Office Creek", change "27 acres" to "2.7 acres".

On page 3C-27, under "Mill Creek", 1st paragraph, last sentence, change "severely incised" to "incised".

On page 3C-27, next to last line, change "6,420-foot elevation" to "6,428-foot elevation".

On page 3C-28, paragraph 3, first sentence after the bullets, change the total the lake fell to 45 feet, not 41 feet, and change to state there were four major lake transgressions, not three.

On page 3C-29, paragraph 1, sentence 1, add one additional springline at the 6,402-foot contour, which was formed by the transgression of 1958.

On page 3C-29, paragraph 2, last sentence, add the following to the end of the sentence: ". . . causing the streams to incise".

On page 3C-31, paragraph 2, sentence 1, revise to read that there was a net increase of 142 acres of vegetated wetland, over the 193 acres that existed before diversions (see the response to Comment C2 in Chapter 4, "Major Issues and SWRCB Responses", for details).

On page 3C-42, paragraph 4, sentence 2, delete the following phrase from the end of the sentence: ". . . and throughout the basin".

On page 3C-42, paragraph 4, sentence 3, clarify that streams will incise only after lake regression *if* the exposed lands are of a steeper gradient than the stream's equilibrium gradient.

On page 3C-42, paragraph 4, sentences 4 and 6, replace the word "terraces" with "lands".

On page 3C-42, paragraph 5, second bullet, note that this assumption applies only if the historical springs were not the result of irrigation contributions to groundwater that have subsequently been eliminated.

On page 3C-42, paragraph 5, third bullet, replace the phrase "normal maximum elevation" with "absolute maximum elevation".

On page 3C-43, paragraph 1, last bullet, replace the portion of the sentence following the comma with: "except for those portions of the few wetlands that are protected by natural grade control structures created by tufa-cemented strandlines and beaches (e.g., Simon Springs, Wilson Creek delta, South Tufa)".

On page 3C-53, 2nd full paragraph, change "No-Diversion Alternative" to "No-Restriction Alternative".

On page 3C-53, next-to-last paragraph, 2nd sentence, change "sufficient" to "insufficient".

On page 3C-56, paragraph 2, sentence 2, change ". . . rapidly leach lakebed sediment" to ". . . rapidly leach solutes from lakebed sediments".

On page 3C-58, paragraph 6, last sentence, note that the area of lake-fringing wetland would *increase* gradually (not decrease) until the lake reached 6,368 feet.

On page 3C-58, paragraph 7, sentence 3, delete "under" and change the last word of the sentence to "length" instead of "area".

On page 3C-61, add sentence to all of the "Mitigation Measures" paragraphs: "These measures would have visual effects, which may or may not be considered adverse; these effects should be considered on a case-by-case basis in selecting the appropriate mitigation measures."

On page 3C-62, paragraph 4, sentence 3, change to read: "At the high stand for this alternative, the lake would advance . . .".

On page 3C-69, paragraph 4, sentence 2, replace the second sentence with: "Lagoon formation could take 100 or more years to form after dynamic equilibrium began because the deeply entrenched creek channel would have to partially fill (Stine pers. comm.). This lagoon would, however, persist only until the channel had completely filled, at which point it would disappear or substantially diminish in size."

On page 3C-72, paragraph 2, sentence 2, replace with: "Lagoon formation could take 100 or more years to form after dynamic equilibrium began because the deeply entrenched creek channel would have to partially fill (Stine pers. comm.). This lagoon would, however, persist only until the channel had completely filled, at which point it would disappear or substantially diminish in size."

On page 3C-77, paragraph 7, sentence 2, add the following to the end of the sentence: ". . . but would be substantially faster than under the 6,410-Ft Alternative because less sediment would be required to fill the upper (and therefore narrower and shallower) portions of the deltas trench".

On page 3C-81, last paragraph, sentence 2, change "11,000 feet" to "5,000 feet".

On page 3C-82, paragraph 1, sentence 2, change the number "360" to "493" (see the response to Comment C2 in Chapter 4, "Major Issues and SWRCB Responses", for an explanation).

On page 3C-84, under "Past Gravel Extraction", change sentence 2 to read: "By 1967, the westside quarry . . .".

On page 3C-85, after "Present Interim Stream Restoration", change "LADWP" to "RTC".

On pages 3C-87 through 3C-89, in the "Significant Cumulative Adverse Effects" section, under "Lake-Fringing Wetlands", the acreage tradeoff should be between alkali lakebed and "lake" rather than "littoral" habitat.

On page 3C-91, paragraph 3, replace sentence 3 with: "A mitigation monitoring program is not provided in this document. If the SWRCB incorporates mitigation into the project to avoid or mitigate a significant adverse impact of the project on the existing environment, CEQA requires the SWRCB to adopt a reporting or monitoring program at the time it adopts or approves the project. If restoration is required to address public trust impacts of the city's diversions since 1941, and not to mitigate any adverse changes caused by the SWRCB's amendment of the city's water right licenses, a reporting or monitoring program would also be desirable."

On page 3C-93, under "Renovate the A-Ditch for Floodflow Spreading" add the following: "Severe erosion could result from such discharges. Use for irrigation is unreasonable, however, because 30 acre-feet of water per acre per year was historically required to grow pasture."

On page 3C-94, under "Plant Woody Riparian Vegetation Onsite", add to 1st sentence "... where such vegetation occurred naturally".

On page 3C-94, add mitigation measure: "Rewater Mill Creek. The feasibility of rewatering Mill Creek and its likely effect on riparian vegetation could be examined as a means to provide offsite compensation for losses of riparian vegetation."

On page 3C-94, paragraph 7, sentence 1, change "littoral" to "lake".

In Table 3C-10, add "low" and a footnote "g" to bank erosion potential for the prediversion conditions: "Based on absence of significant erosion during the floods of 1938, the prediversion erosion potential of these streams was probably low."

Chapter 3D. Environmental Setting, Impacts, and Mitigation Measures - Fishery Resources

Table S-1, page 6 of 15, is revised as included herein.

On page 3D-1, paragraph 1, revise sentence 1 as follows: "Mono Lake is a highly alkaline, saline lake that does not provide suitable habitat for fin fish."

On page 3D-5, paragraph 1, revise sentence 1 as follows: "Peak flows in Rush Creek during the snowmelt runoff period often reached 175 cfs under the influence of Southern California Edison's (SCE's) reservoir operations, although flows of more than 300 cfs occurred in wet years."

On page 3D-6, paragraph 4, revise sentence 6 as follows: "These springs and the associated high water table in the meadows supported dense stands of cottonwood and willows covering more than 150 acres (Stine 1991)."

On page 3D-14, paragraph 3, revise sentence 4 as follows: "In upper Lee Vining Creek, peak flows (June) range from 40 to 350 cfs, while low flows (October-April) range from 10 to 97 cfs (Jones & Stokes Associates 1993)."

On page 3D-14, paragraph 5, replace sentences 3 and 4 with: "Higher minimum-flow requirements were established in 1989 when the El Dorado County Superior Court entered a preliminary injunction requiring LADWP to allow sufficient water to pass its diversion facilities on Lee Vining Creek (and Rush Creek) to maintain the level of Mono Lake at or about 6,377 feet. This injunction specified water to be released into Lee Vining Creek at 60 cfs or at the rate of inflow into LADWP's diversion facility, if it is less. In June 1990, pursuant to the Caltrout I and Caltrout II decisions, the El Dorado County Superior Court entered a preliminary injunction establishing interim flow rates for Lee Vining Creek of 35 cfs from April through September, 25 cfs from October through March, and a spring channel maintenance flow of 160 cfs for 3 days every below-normal runoff year or for 30 days every normal to above-normal runoff year in even-numbered years only. In April 1991, the Court issued a preliminary injunction that requires LADWP to allow sufficient water to pass its diversion facilities to maintain the level of Mono Lake at or above 6,377 feet; the Court noted that the extra 60,000 af required by the June 1990 order would not sustain the level of Mono Lake at 6,377 feet."

On page 3D-15, paragraph 6, revise sentence 2 as follows: "The upper boundary of Segment 4 marks the beginning of an incised delta that extends to Mono Lake."

On page 3D-15, last paragraph, revise sentence 1 to "Segment 5 . . . is devoid of tall riparian vegetation and. . . ".

On page 3D-17, paragraph 6, revise sentence 1 as follows: "In 1970, increases in Rush Creek and tributary diversions virtually dewatered lower Rush Creek in subsequent years, except during times of exceptionally high runoff."

On page 3D-18, paragraph 3, replace sentences 2 and 3 with: "Higher minimum-flow requirements were established in 1989 when the El Dorado County Superior Court entered a preliminary injunction requiring LADWP to allow sufficient water to pass its diversion facilities on Rush Creek (and Lee Vining Creek) to maintain the level of Mono Lake at or about 6,377 feet. This injunction specified water to be released into Rush Creek at a rate between 85 and 100 cfs or at the rate of inflow into LADWP's diversion facility, if it is less. In June 1990, pursuant to the Caltrout I and Caltrout II decisions, the El Dorado County Superior Court entered a preliminary injunction establishing interim flow rates for Rush Creek of 40 cfs from April through September, 28 cfs from October through March, and a spring channel maintenance flow of 165 cfs for 3 days every below-normal runoff year or for 30 days every normal to above-normal runoff year in even-numbered years only. In April 1991, the Court issued a preliminary injunction that requires LADWP to allow sufficient water to pass its diversion facilities to maintain the level of Mono Lake at or above 6,377 feet; the Court noted that the extra 60,000 af required by the June 1990 order would not sustain the level of Mono Lake at 6,377 feet."

On page 3D-18, paragraph 5, revise sentences 2 and 3 as follows: "Detailed habitat mapping was not conducted because the conveyance channel is artificial. This segment, however, was included in Beak Consultants' IFIM study."

On page 3D-23, paragraph 1, revise sentence 3 as follows: "Likewise, flow in the Owens River gorge below Lake Crowley reservoir was eliminated from 1952 to 1991 because of water diversions for power production."

On page 3D-25, paragraph 5, revise the last sentence as follows: "Upper Owens River flows have been at natural rates since 1989, although flows were augmented in October 1991 for the purpose of conducting an instream flow study. (EBASCO Environmental et al. 1993.)"

On page 3D-28, paragraph 5, revise the last sentence as follows: "The principal nongame species are Owens sucker and Owens tui chub (Lahontan hybrids), which provide important forage for the trout."

On page 3D-31, paragraph 4, revise sentence 1 as follows: "Nongame species in the Middle Owens River include carp, threespine stickleback, Owens sucker, and Owens tui chub (Lahontan hybrids)."

On page 3D-33, paragraph 4, after the last sentence, add: "DFG's plans for the Lower Owens River also include restoring flows from the aqueduct intake to Owens Lake."

On page 3D-37, paragraph 4, revise sentence 4 as follows: "Native fish species in the Middle Owens River were not quantitatively evaluated because few, if any, data exist on their habitat preferences and sampling their populations would be extremely difficult."

On page 3D-38, paragraph 3, revise sentence 1 as follows: "Monthly WUA values for each life stage were then averaged for each year to determine an annual WUA value for each species and for each year in the 1940-1989 hydrologic period."

On page 3D-42, paragraph 2, revise sentence 1 as follows: "Water quality conditions in the affected streams are expected to remain at acceptable levels under all alternatives."

On page 3D-44, paragraph 4, revise sentence 1 as follows: "Compared to the 1989 point of reference, all alternatives except the No-Restriction Alternative would have substantial fishery benefits in the Mono Lake tributaries."

On page 3D-44, paragraph 4, revise sentence 3 as follows: "Similarly, it will be at least 50 years before any of the alternatives can restore and maintain pre-1941 fishery conditions."

On page 3D-68, paragraph 5, revise the last sentence as follows: "Consequently, habitat conditions would not be reduced over time under the 6,377-Ft Alternative and would therefore provide better overall aquatic habitat conditions than would the 6,372-Ft Alternative, which would not meet flushing flow requirements."

On page 3D-78, paragraph 2, after the semicolon in the third sentence, revise as follows: "during direct observation surveys at flows between 100 cfs and 200 cfs in May 1991, brown trout fry were found only in a few locations where such habitat was present (Jones & Stokes Associates 1992)."

On page 3D-98, paragraph 5, revise the last sentence as follows: "The increased flows since 1941 reduced adverse water temperature and water quality effects in the Upper Owens River, particularly below Hot Creek."

On page 3D-102, paragraph 1, revise the last sentence as follows: "Significant adverse water quality and water temperature effects on aquatic resources were naturally present below Hot Creek prior to LADWP exports."

On page 3D-103, paragraph 2, revise sentence 1 as follows: "None of the proposed EIR alternatives would succeed in restoring aquatic habitat and fish populations to prediversion levels within 50 years."

On page 3D-103, paragraph 2, revise sentences 3 and 4 as follows: "Because of additional habitat degradation associated with geomorphic and vegetative changes, mostly associated with LADWP's long-term diversions, restoration of continuous flows alone would not fully restore the habitat values or fisheries that existed before 1941. All alternatives, therefore, in the absence of mitigation, would continue to have significant adverse cumulative impacts on geomorphology and fish populations on major sections of Rush, Lee Vining, Parker, and Walker Creeks, particularly in the lower portions of Rush and Lee Vining Creeks."

On page 3D-108, replace the bullets in the second paragraph (referring to Lee Vining Creek) with the following data:

Month	Dry	Normal	Wet
Apr	37	54	54
May	37	54	95
Jun	37	54[a]	95[b]
Jul	37	54	95
Aug	37	54	95
Sep	37	54	54
Oct	25	40	40
Nov	25	40	40
Dec	25	40	40
Jan	25	40	40
Feb	25	40	40
Mar	25	40	40

[a] A channel flushing flow of 160 cfs for a minimum of 3 consecutive days during June is recommended. The channel flushing period should be extended as water is available.

[b] A channel flushing flow of 160 cfs for 30 consecutive days during late May, June, and July is recommended.

On pages 3D-108, 3D-109, and elsewhere change California Department of Fish and Game 1992a and 1992b to EBASCO Environmental 1993a and 1993b, respectively.

On page 3D-114, paragraph 1, revise sentence 3 as follows: "It is difficult to conclusively establish alternatives, instream flow requirements, or mitigation measures that will meet the court order because the pre-1941 fishery conditions (fish population characteristics or habitat features) cannot be accurately and precisely described in any quantitative terms."

On page 3D-115, paragraph 2, revise sentence 1 as follows: "Compared to the 1989 point of reference, all alternatives except the No-Restriction Alternative have substantial fishery benefits in the Mono Lake tributaries."

On page 3D-115, paragraph 2, revise sentence 3 as follows: "Similarly, it will be at least 50 years before any of the alternatives can restore and maintain pre-1941 fishery conditions."

On page 3D-119, add the following reference: "Stine, S. 1991. Extent of riparian vegetation on streams tributary to Mono Lake, 1930-1940; an assessment of the streamside woodlands and wetlands, and the environmental conditions that supported them. (Mono Basin EIR Auxiliary Report No. 1.) California State Water Resources Control Board. Sacramento, CA."

On page 3D-119, revise Stine 1992 citation as follows: "_______. 1992b. Past and present geomorphic, hydrologic, and vegetative conditions on Rush Creek. Prepared for Trihey & Associates, Walnut Creek, CA."

On page 3D-121, revise Stine personal communication as follows: "Stine, Scott, Ph.D. Geomorphologist. Berkeley, CA. January 14, 1992 - text of report given at Restoration Technical Committee."

On Table 3D-1, add tui chub (*Gila bicolor*) as a fish species reported to occur in Mono Basin.

Table 3D-8. This table is revised as included herein.

Chapter 3E. Environmental Setting - Aquatic Productivity of Mono Lake

On page 3E-2, paragraph 1, add ", Packard Foundation, National Geographic Society, and Santa Clara Audubon Society" after period in 1st sentence.

On page 3E-5, paragraph 2, delete sentence 2.

On page 3E-7, paragraph 4, revise paragraph to read: "Benefits of high salinity . . . less interspecies competition and less predation because very few organisms can tolerate such high levels."

On page 3E-13, revise sentence 2 as follows: "Only a portion of annual primary production influences brine shrimp production, and effects of meromixis on algal production may not be fully propagated up the food chain."

On page 3E-14, paragraph 4, sentence 4, change "Abert Lake in Oregon, which has a salinity of about 30 g/l, has about twice . . . " to "When Abert Lake in Oregon had a salinity of about 30 g/l, it had about twice . . . ".

On page 3E-15, delete 1st complete sentence. Change 2nd complete sentence to read: "However, a leafy algae may have been . . . ". Add 3rd sentence: "Alternatively, the use of soft substrates in lieu of hard substrates may have caused a higher rate of fly pupa dislodgment."

On page 3E-19, 3rd paragraph, revise 1st sentence as follows: "The model calculates mean daily density, biomass, and production for the May 1 through October 1 growing season."

On page 3E-22, 3rd paragraph, change 3rd sentence to read "When the grazing rate is below maximum (because algal biomass is below the feeding saturation level), the rate is dependent . . . ".

On page 3E-23, 2nd paragraph, change final sentence to read: "However, the ovoviviparity results are difficult to interpret because percent . . . ".

On page 3E-24, 1st paragraph, change 2nd sentence to read "Mason (1967) found . . . ".

On page 3E-24, 1st paragraph, delete final sentence.

On page 3E-28, 2nd paragraph, change final sentence to read ". . . because submerged vegetation is not modeled".

On page 3E-32, change 3rd sentence to read "Total brine shrimp production increased about 167% between lake levels . . . ".

On page 3E-32, 2nd full paragraph, change 1st sentence to read ". . . observed range of values so that several equations describing the relationship between salinity and conductivity . . . ".

On Figure 3E-17, move "Mudstone (MS)" in legend to "Hard Substrate" list.

Chapter 3F. Environmental Setting, Impacts, and Mitigation Measures - Wildlife

No changes are needed.

Chapter 3G. Environmental Setting, Impacts, and Mitigation Measures - Land Use

On page 3G-3, second paragraph, change "Homestead Act of 1882" to "Homestead Act of 1862".

On page 3G-3, third paragraph, add citation for entire paragraph, "Fletcher 1987".

On page 3G-3, fourth paragraph, change citation (Fletcher 1987) to apply to entire paragraph. Also, revise third sentence to read: "In 1929, the census reported 11,500 acres irrigated in the basin (although Vorster [1985] believes a considerable portion had to be only intermittently irrigated)."

On page 3G-5, second paragraph, add sentence: "Vorster, however, believes that it would be difficult to sustain such irrigation diversions from Walker and Parker Creeks, especially in dry years, because the estimated diversion is larger than the two creek's average annual flow. He also believes the diversions from Rush Creek were larger than Rawson estimates."

On page 3G-7, second paragraph, last sentence, change "and for other purposes" to "and for the protection of historic water-dependent recreational and grazing uses of the federal lands."

On page 3G-14, first paragraph under "Mono Sheep Company", change location of company from "Barstow" to "Oildale".

On page 3G-20, third paragraph, second sentence, change "in the 1960s" to "in 1915".

On page 3G-20, fourth paragraph, change second sentence to read: "To address a lack of sufficient housing and the scarcity of land for Lee Vining's expansion, the Mono County General Plan has identified a community expansion area directly north of and adjacent to Lee Vining abutting U.S. Highway 395. The ultimate development of this expansion area will be dependent on the preparation of a specific plan and the willingness of LADWP to dispose of or lease this area."

On page 3G-21, first paragraph, last sentence, change to: "Quarries are also present at Black Point, in the southern portion of the Mono Craters, and east of Mono Craters."

On page 3G-24, fourth paragraph, last sentence, delete "also serving as the Mono Basin National Forest Scenic Area headquarters".

On page 3G-24, under "Objectives" add "For the most part, these objectives have been mandated by Congress."

On page 3G-26, fifth paragraph, first sentence, change "has been proposed" to "has been approved by the county". Delete the last sentence.

On page 3G-26, revise last paragraph to read "Mono County has recently approved an expansion of existing recreational facilities on the John Arcularius Ranch, allowing for 50 additional guest cabins and two single-family residences. Irrigation of the ranch's meadowland from the Upper Owens River would continue."

On page 3G-29, last paragraph, between third and fourth sentence, add "According to the scenic area enabling legislation, LADWP lands within the scenic area can by obtained only by donation or exchange."

On page 3G-34, under "Mitigation Measures" amend last sentence to read: "The USFS could acquire lands within the boundary of the Mono Basin National Forest Scenic Area where proposed development would conflict with the area's management plan."

On page 3G-37, last sentence under "Mitigation Measures for Significant Cumulative Impacts", delete "but lake release flows would be unaffected".

Chapter 3H. Air Quality

No changes are needed.

Chapter 3I. Environmental Setting, Impacts, and Mitigation Measures - Visual Resources

No changes are needed.

Chapter 3J. Environmental Setting, Impacts, and Mitigation Measures - Recreation Resources

On page 3J-6, second full paragraph, revise last sentence to read: "Recreational use of the Inyo National Forest . . . 8.3 million RVD in 1992."

On page 3J-14, first full paragraph, revise last sentence to read: "Flows in the Upper Owens River would not be significantly reduced by extractions of groundwater proposed for municipal use by the town of Mammoth Lakes (U.S. Forest Service 1992)."

On page 3J-17, paragraph 1, revised the first sentence to read: "The reach of the Owens River gorge just downstream from Long Valley Dam supports a moderate level of fishing, primarily for brown trout." The second sentence of this paragraph should be deleted.

On page 3J-26, second full paragraph, delete the last sentence.

On page 3J-42, revise the sentence following the first header entitled "Mitigation Measures" as follows: "The effects on sightseeing from tufa tower inundation and toppling could be reduced by construction of over-the-water boardwalks at South Tufa."

On page 3J-47, revise the sentence following the first header entitled "Mitigation Measures" as follows: "The effects on sightseeing from tufa tower inundation and toppling could be reduced by construction of over-the-water boardwalks at South Tufa."

On pages 3J-50 to 3J-51, add the following paragraph at the end of the section entitled "Related Impacts of Earlier Stream Diversions by LADWP - Mono Lake": "If additional mitigation for historical diversions is required to provide fishing opportunities before the fisheries of the lower tributaries are fully restored, off-site restoration projects (e.g., at Fish Springs in Inyo County) could be implemented."

Chapter 3K. Environmental Setting, Impacts, and Mitigation Measures - Cultural Resources

On page 3K-1, 3rd sentence, revise as follows: "Minimal effects might result from establishing higher or lower lake levels because few sites may be present on the relicted lands."

On page 3K-3, add the following sentence to the last paragraph under "Applicable Laws and Regulations": "Section 106 of the National Historic Preservation Act applies to sites on federal lands, requiring consultations with federal authorities."

On page 3K-4, 2nd paragraph under "Prediversion Conditions", 2nd sentence, change "Jeffrey pine" to "pinyon pine".

On page 3K-5, revise third sentence to read, "The Mono Lake Paiute are classed as a subgroup of the larger linguistic family of Numic-speaking Northern Paiute, while the Owens Valley Paiute speak dialects of Mono. Change the citation on the 4th sentence from "Hall 1983" to "Liljeblad and Fowler 1986".

On page 3K-10, 2nd paragraph, 4th sentence, revise to read: "Evidence exists of earlier occupation in Mono Basin (Hall 1990) and the Upper Owens River Basin. The latter occupancy is indicated by fluted points found at the Komodo site (Basgall 1984, 1987, 1988 *in* Goldberg et al. 1990).

On page 3K-11, 3rd paragraph, 1st sentence, add "obsidian quarries".

On page 3K-11, under "Mono Lake Margin", change 1st sentence to read: "Little of the area around Mono Lake has been systematically surveyed, and some resources have been identified near the present lake margin (Reynolds 1986)."

On page 3K-12, 3rd paragraph, revise 1st sentence as follows: "In terms of overall sensitivity of Mono Lake's margin for cultural resources, additional unrecorded sites may be located below 6,440 feet because Native American occupancy could have occurred when the lake level was lower than during the historical period." In the 3rd sentence, delete "however".

On page 3K-14, change last sentence under "Restoration Activities" to read: "In addition, stream or wetland restoration or revegetation could conflict with Native American gathering practices." .

Chapter 3L. Environmental Setting, Impacts, and Mitigation Measures - Water Supply

On page 3L-9, paragraph 3, sentence 1, revise as follows: '**Groundwater**. LADWP currently obtains an average of 112,000 af/yr from local groundwater basins, including the San Fernando Basin (92,300 af/yr), the Sylmar Basin (3,100 af/yr), and the Central Basin (15,000 af/yr)."

On pages 3L-9 and 3L-10, delete the last two sentences in the last paragraph beginning on page 3L-9 and replace with the following: "According to LADWP, the recently completed Inyo/Owens groundwater pumping agreement does not limit the amount of water than can be pumped from the Owens Valley to a particular number. The amount is limited by vegetation condition and groundwater surface elevation, among other factors."

On page 3L-33, paragraph 3, revise sentences 1, 2, and 3 as follows: "The Central Valley Project (CVP) Improvement Act (Title XXXIV of Public Law 102-575) allows for restructuring California's Central Valley Project. Under this bill, farmers receiving federal CVP water will be able to voluntarily sell their water to municipalities. Consequently, urban shortages could be reduced by the purchase of irrigation supplies."

On page 3L-34, paragraph 1, sentence 1, replace "the SWP" with "MWD". Add the following to the end of the paragraph: "This potential yield increase is currently uncertain because of potential restrictions on exports from the Delta."

On page 3L-34, paragraph 2, delete sentence 2 and revise sentence 1 as follows: "For impacts on MWD and its customers, projects that could affect MWD's future water supply include potential changes in exports from the Bay-Delta as a result of the proposed SWRCB long-term water quality and water rights decision, proposed water quality standards presently being developed by the U.S. Environmental Protection Agency, constraints on operation of Delta export facilities by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to protect threatened or endangered species, requirements under the CVP Improvement Act to utilize 800,000 af of CVP water for environmental purposes, potential increase in yield from SWP facilities and programs, changes in the availability of Colorado River supplies, and potential water transfers under the CVP Improvement Act. On balance, these projects, in conjunction with the adverse impacts associated with each of the project alternatives would probably lower MWD's total supplies."

Table 3L-3 is revised with addition of a new column for "Year 2011 Yield" as included herein.

Chapter 3M. Environmental Setting, Impacts, and Mitigation Measures - Power Generation

No changes are needed.

Chapter 3N. Environmental Setting, Impacts, and Mitigation Measures - Economics

No changes are needed.

CHANGES TO THE DRAFT EIR APPENDICES

Appendix E. Special-Status Species in Mono Basin and Upper Owens River Basin

On page F-2, paragraph 6, revise sentence 3 as follows: "A population of mountain yellow-legged frogs with two to three thousand individuals was counted by USFS during summer 1993. USFS protects this habitat area by restricting grazing from the drainage where they are located."

Appendix F. Vegetation and Substrate Classification and Descriptions

Table F-2 is revised as included herein (the version in the draft EIR was a preliminary draft inadvertently included).

Appendix H. Drought Analysis

Tables H-6 through H-12 are revised as included herein.

Appendix I. Natural History of the Mono Lake Alkali Fly

On page I-3, change 1st sentence to read "Mono Lake alkali fly have few predators or competitors."

Appendix L. Alkali Fly Productivity Model

On page L-14, change 1st complete sentence to read: ". . . third instar development time (15 days at 20°C) to . . . ".

On Figure L-11a, change Y axis label to read "Density (thousands of individual /m^2)".

On Figure L-11b, change Y axis label to read "Density (thousands of individuals /m^2)".

Appendix M. Brine Shrimp Productivity Model

On page M-2, change last sentence to read " . . . and Melack 1992)".

On page M-4, change 1st complete sentence to read: "The computed relationship (Jellison 1992) between EC and salinity is: . . . ".

Appendix V. Visual Resources

On Figure V-4, in the note, change "Rush Creek" to "Lee Vining Creek".

Appendix Y. Applicable Policies of the Mono County General Plan

List of Refs

Table of Contents

Chapter 8. List of Preparers of Final EIR

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David Larsen	Power Generation

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W. Michael Hanemann	Water Supply Economics

Vegetation	
Additional incision of the tributary streams	Construct hardened drop structures at the County Road crossings of Rush and Lee Vining Creeks
Erosion of the Parker and Walker Creek channels*	Limit high flows in the near term to 23 and 15 cfs, respectively, by shunting higher flows to Grant Lake reservoir; allow increases in these limits as habitats recover or restoration succeeds
Erosion of Rush and Lee Vining Creek channels*	Limit high flows in the near term to 350 and 250 cfs, respectively, shunting higher flows through the A-Ditch to Pumice Valley; allow increases in these limits as habitats recover or restoration succeeds
Cumulative losses of riparian vegetation and wetlands along the tributary streams**	Seasonally rewater available overflow and distributary channels on all four tributary streams on at least a biannual basis
	Limit livestock grazing along the existing and potential riparian corridors through fencing or suspension of range use
	Plant woody riparian vegetation where absent along the tributary streams based on testing of soil condition and groundwater depth; prevent vehicular access
	Create freshwater ponds and riparian thickets at Cain Ranch and along lower Rush Creek
	Plant or protect woody riparian vegetation offsite in Mono Basin if onsite mitigation is insufficient
Losses of lakebed wetlands*,**	Create lakebed wetlands (for project impacts) and ponds (for cumulative impacts) where water supply is available using habitat restoration technologies
Channel instability along the Upper Owens River**	Adopt ramping standards for streamflow changes; limit export volumes so a flow of 300 cfs is not exceeded in the river channel below East Portal
Fisheries	
Reduction in adult and spawning habitat**	Establish minimum instream flow requirements that promote reestablishment and maintenance of prediversion fisheries and develop and implement appropriate habitat restoration plans, including gravel restoration plans
Adverse effects of high streamflows*	Limit flows in Rush Creek to 350 cfs at all times
	Limit flows in Lee Vining Creek to 250 cfs at all times
	Ramp flow changes at unimpaired historical rates
	Establish channel maintenance and flushing criteria
	Discharge higher flows into overflow channels

Cultural Resources	
Loss or degradation of known or undiscovered cultural sites along tributary streams*	Identify areas of direct or indirect effect; survey areas for cultural resources; consult Native American community; and develop a cultural resource treatment plan that includes avoidance, monitoring ground disturbance, test excavation and data recovery, closure of access routes, and fencing as warranted
Water Supply	
Cost increase for sufficient supply*	LADWP identify and develop water reclamation projects; develop replacement supplies using Assembly Bill 444 funds; participate in water transfers program authorized by HR 929; participate in Metropolitan Water District's water reclamation and groundwater recovery rebate programs; implement and monitor compliance with all Best Management Practices identified in the Urban Water Master Plan

Table 4-1. Summary of Average Water Budget Terms in LAAMP 2.0 and LAAMP 3.3 for No-Restriction Alternative (TAF/yr)

		LAAMP 2.0 (Draft EIR)	LAAMP 3.3	Change
A.	**Mono Basin**			
	Runoff	+123.4	+123.4	
	Gains	+5.0	+5.0	
	Grant Lake reservoir evaporation	-2.1	-2.1	
	Irrigation	-8.7	-8.7	
	Releases to lake	-32.2	-29.7	±2.5
B.	**Long Valley**			
	West Portal	+85.0	+87.9	+2.9
	Runoff	+110.8	+110.8	
	Hot Springs	+27.7	+27.7	
	Tunnel make	+12.5	+12.5	
	Gains	+29.2	+38.9	+9.7
	Lake Crowley reservoir evaporation	-12.0	-12.0	
	Irrigation	-20.1	-20.1	
C.	**Round Valley**			
	Runoff	+65.7	+65.7	
	Birchim Canyon Springs	+11.6	+11.6	
	Gorge gains	+10.2	+10.2	
	Losses	-7.0	-7.0	
	Irrigation	-9.6	-9.6	
D.	**Bishop Area**			
	Runoff	+78.0	+78.0	
	Flowing wells	+4.6	+4.6	
	Pumping	+10.0	+9.7	-0.3
	Irrigation	-20.4	-20.4	
	Losses	-22.7	-22.7	
E.	**Laws Area**			
	Runoff	+2.6	+2.6	
	Fish Slough	+6.0	+6.0	
	Pumping	+20.4	+17.5	-2.9
	Irrigation	-11.2	-11.2	
	Losses	-4.7	-4.7	
	Spreading	-2.2	-2.5	-0.3

Table 4-1. Continued

		LAAMP 2.0 (Draft EIR)	LAAMP 3.3	Change
F.	**Big Pine Area**			
	Runoff	+51.4	+51.4	
	Keough Hot Springs	+0.9	+0.9	
	Pumping	+35.1	+32.2	-2.9
	Irrigation	-15.0	-15.0	
	Losses	-19.1	-19.1	
	Spreading	-1.8	-2.5	-0.7
	PV to Tinemaha Transit	-36.6	-36.6	
	Tinemaha evaporation	0.0	-4.9	-4.9
G.	**Tinemaha to Haiwee Area**			
	Runoff	+104.0	+104.0	
	Flowing wells	+4.6	+4.6	
	Pumping	+45.2	+47.7	-2.5
	Irrigation	-38.0	-38.0	
	Losses	-32.6	-32.6	
	Transit gain	-9.3	+9.3	+18.6
	Spreading	-6.2	-12.5	-6.3
	Haiwee Reservoir evaporation	0.0	-5.0	-5.0
	Spilling	-7.8	-14.6	-6.8
H.	**Total Owens Basin**			
	Runoff	+412.5	+412.5	
	Springs	+67.9	+67.9	
	Gains	+39.4	+58.4	+19.0
	Pumping	+110.7	+107.1	-3.6
	West Portal export	+85.0	+87.9	+2.9
	Irrigation	-114.8	-114.3	+0.5
	Losses	-132.0	-122.7	+9.3
	Evaporation	-14.1	-24.0	-9.9
	Spreading	-10.2	-15.9	-5.7
	Spilling (includes Lower Owens flow)	-7.8	-14.6	-6.8
	Transit loss to Los Angeles	-10.3	-15.1	-4.8

Table 4-2. No-Restriction Aqueduct Capacities and Constraints in LAAMP 2.0 and LAAMP 3.3

Aqueduct Facility	LAAMP 2.0	LAAMP 3.3	LADWP Recommended Values
Lee Vining conduit at Lee Vining Creek	300 cfs	300 cfs	280 cfs
Lee Vining conduit at Walker Creek	325 cfs	325 cfs	300 cfs
Lee Vining conduit at Parker Creek	350 cfs	350 cfs	325 cfs
Lee Vining Creek maximum flows	400 cfs	400 cfs	--
Rush Creek (Mono Gate #1) maximum flows	500 cfs	350 cfs	350 cfs
Grant Lake reservoir storage capacity	47,575 af	47,575 af	47,500 af
Grant Lake reservoir minimum target storage	20,000 af	11,500 af	11,000 af
Grant Lake reservoir outlet capacity	395 cfs	395 cfs	400 cfs
West Portal export capacity	290 cfs	290 cfs	365 cfs
Owens River below East Portal maximum flows	400 cfs	400 cfs	--
Rock Creek minimum flows at diversion			
Crowley Lake reservoir storage capacity	183,729 af	183,729 af	183,000 af
Crowley Lake reservoir minimum target storage	120,000 af	80,000 af	80,000 af
Crowley Lake reservoir outlet capacity	690 cfs	690 cfs	700 cfs
Pleasant Valley Reservoir outflow minimum	125 cfs	125 cfs	75 cfs
Pleasant Valley Reservoir outflow maximum	--	800 cfs	700 cfs
Tinemaha Reservoir storage capacity	10,000 af	6,300 af	6,300 af
Tinemaha Reservoir minimum storage target	0 af	1,700 af	1,700 af
Aqueduct capacity at Owens River	--	850 cfs	850 cfs
Tinemaha-Haiwee Reservoirs spreading capacity	450 cfs	450 cfs	--
Tinemaha-Haiwee Reservoirs groundwater pumping minimum	17 cfs	17 cfs	--
Tinemaha-Haiwee Reservoirs groundwater pumping maximum	183 cfs	183 cfs	--
S. Haiwee Reservoir storage capacity	10,000 af	27,500 af	27,500 af
S. Haiwee Reservoir minimum storage target	0	9,300 af	9,300 af
N. Haiwee Reservoir storage capacity	--	10,000 af	9,000 af
Haiwee Reservoir inflow capacity	--	900 cfs	900 cfs
Aqueduct capacity at Haiwee Reservoir outlet	800 cfs	750 cfs	750 cfs

Note: Other constraints are as specified in Auxiliary Report No. 18.

No-Restriction Alternative						
LAAMP 3.3	8.7	29.7	87.9	6,360.7	6,360.9	107.1
Draft EIR	8.7	32.2	85.0	6,362.2	6,363.1	110.7
Difference	0	-2.5	+2.9	-1.5	-2.2	-3.6
Point of Reference						
LAAMP 3.3	8.7	42.0	75.6	6,366.1	6,369.6	107.1
Draft EIR	8.7	44.6	72.7	6,368.2	6,370.8	110.7
Difference	0	-2.6	+2.9	-2.1	-1.2	-3.6
6,377-Ft Alternative						
LAAMP 3.3	0.7	85.2	40.0	6,379.9	6,387.5	107.1
Draft EIR	0.7	73.8	51.8	6,379.2	6,379.1	110.7
Difference	0	+11.4	-11.8	+0.7	+8.4	-3.6
6,383.5-Ft Alternative						
LAAMP 3.3	0.7	95.3	29.9	6,385.6	6,390.6	107.1
Draft EIR	0.7	88.0	37.7	6,385.2	6,384.8	110.7
Difference	0	+7.3	-7.8	+0.4	+5.8	-3.6
6,383.5-Ft (2nd 50 Years)						
LAAMP 3.3	0.7	85.0	40.2	6,387.0	6,390.5	107.1
Draft EIR	0.7	82.2	43.5	6,385.8	6,384.9	110.7
Difference	0	+2.8	-3.3	+1.2	+5.6	-3.6
6,390-Ft Alternative						
LAAMP 3.3	0.7	102.3	23.0	6,387.6	6,395.2	107.1
Draft EIR	0.7	95.9	29.8	6,387.5	6,390.1	110.7
Difference	0	+6.4	-6.8	+0.1	+5.1	-3.6
6,390-Ft (2nd 50 Years)						
LAAMP 3.3	0.7	90.4	34.8	6,392.5	6,395.2	107.1
Draft EIR	0.7	88.7	37.0	6,391.6	6,390.2	110.7
Difference	0	1.7	-2.2	+0.9	+5.0	-3.6
DFG-Recommended Flows						
LAAMP 3.3	0.7	97.7	27.5	6,383.0	6,394.5	107.1
DFG Flows (2nd 50 Years)						
LAAMP 3.3	0.7	97.7	27.5	6,394.7	6,399.9	107.1
DFG Flows and 6,390-Ft Alternative						
LAAMP 3.3	0.7	105.6	19.6	6,387.1	6,398.1	107.1
DFG Flows and 6,390-Ft Alternative (2nd 50 Years)						
LAAMP 3.3	0.7	97.7	27.5	6,397.4	6401.4	107.1

No-Restriction Alternative					
LAAMP 3.3	114.3	15.9	15.6	468.7	453.6
Draft EIR	114.8	10.2	7.8	445.9	435.6
Difference	-0.5	+5.7	+7.8	+22.8	+18.0
Point of Reference					
LAAMP 3.3	113.2	13.7	14.4	461.4	446.3
Draft EIR	109.7	10.4	8.6	437.8	427.5
Difference	+3.5	+3.3	+5.8	+23.6	+18.8
6,377-Ft Alternative					
LAAMP 3.3	112.1	13.1	15.8	426.8	411.7
Draft EIR	108.3	15.7	12.1	412.2	401.9
Difference	+3.8	-2.6	+3.7	+14.6	+9.8
6,383.5-Ft Alternative					
LAAMP 3.3	111.9	12.8	15.9	417.4	402.3
Draft EIR	106.5	13.1	11.0	403.2	392.9
Difference	+5.4	-0.3	+4.9	+14.2	+9.4
6,383.5-Ft (2nd 50 Years)					
LAAMP 3.3	112.2	12.9	15.8	427.1	412.0
Draft EIR	107.1	13.5	11.0	408.0	397.7
Difference	+5.1	-0.6	+4.8	19.1	+14.3
6,390-Ft Alternative					
LAAMP 3.3	111.7	12.7	15.2	411.2	396.1
Draft EIR	106.2	13.2	10.5	398.6	388.3
Difference	+5.5	-0.5	+4.7	+12.6	+7.8
6,390-Ft (2nd 50 Years)					
LAAMP 3.3	112.0	12.8	15.6	422.2	407.1
Draft EIR	106.8	13.7	11.3	404.3	394.0
Difference	+5.2	-0.9	+3.3	+17.9	+13.1
DFG-Recommended Flows					
LAAMP 3.3	111.8	12.8	15.0	415.8	400.7
DFG Flows (2nd 50 Years)					
LAAMP 3.3	111.8	12.8	15.0	415.8	400.7
DFG Flows and 6,390-Ft Alternative					
LAAMP 3.3	111.7	12.6	14.9	408.3	393.2
DFG Flows and 6,390-Ft Alternative (2nd 50 Years)					
LAAMP 3.3	111.8	12.8	15.0	415.8	400.7

Wet Year Minimum Flows (cfs)

Lee Vining	54.0	95.0	160.0	95.0	95.0	54.0	40.0	40.0	40.0	40.0	40.0	40.0	47,827
Walker	6.0	6.0	9.2	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	3,986
Parker	9.0	9.0	13.1	9.0	9.0	9.0	6.0	6.0	6.0	6.0	6.0	6.0	5,667
Rush	84.0	100.0	194.0	100.0	100.0	100.0	93.0	71.0	71.0	57.0	54.0	54.0	64,958
Total													122,437

Normal Year Minimum Flows (cfs)

Lee Vining	54.0	54.0	65.0	54.0	54.0	54.0	40.0	40.0	40.0	40.0	40.0	40.0	34,634
Walker	6.0	6.0	9.2	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	3,986
Parker	9.0	9.0	13.1	9.0	9.0	9.0	6.0	6.0	6.0	6.0	6.0	6.0	5,667
Rush	59.0	100.0	143.0	100.0	93.0	69.0	58.0	40.0	40.0	44.0	48.0	52.0	51,027
Total													95,313

Dry Year Minimum Flows (cfs)

Lee Vining	37.0	37.0	37.0	37.0	37.0	37.0	25.0	25.0	25.0	25.0	25.0	25.0	22,416
Walker	6.0	6.0	6.0	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	3,796
Parker	9.0	9.0	9.0	9.0	9.0	9.0	6.0	6.0	6.0	6.0	6.0	6.0	5,423
Rush	35.0	75.0	72.0	45.0	42.0	40.0	36.0	30.0	30.0	31.0	32.0	34.0	30,272
Total													61,907
Overall													94,057