MONO LAKE BASIN
WATER RIGHT DECISION 1631

Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources at Mono Lake and in the Mono Lake Basin

(Water Right Licenses 10191 and 10192, Applications 8042 and 8043, City of Los Angeles, Licensee)

September 28, 1994

STATE OF CALIFORNIA
WATER RESOURCES CONTROL BOARD

STATE OF CALIFORNIA
Pete Wilson, Governor

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STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Amendment of the City of Los Angeles' Water Right Licenses for Diversion of Water From Streams Tributary to Mono Lake (Water Right Licenses 10191 and 10192, Applications 8042 and 8043) CITY OF LOS ANGELES, Licensee	DECISION 1631 SOURCE: Lee Vining Creek Walker Creek Parker Creek Rush Creek COUNTY: Mono

DECISION AND ORDER AMENDING WATER RIGHT LICENSES TO ESTABLISH FISHERY PROTECTION FLOWS IN STREAMS TRIBUTARY TO MONO LAKE AND TO PROTECT PUBLIC TRUST RESOURCES AT MONO LAKE AND IN THE MONO LAKE BASIN

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- 11:2 — ending page and line number
- 10:5 — beginning page and line number
- XXXI — volume number
- RT — reporter's transcript

Citations to Exhibits:

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- SWRCB — abbreviation for the party submitting the exhibit

STATE OF CALIFORNIA
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DECISION AND ORDER AMENDING WATER RIGHT LICENSES TO ESTABLISH FISHERY PROTECTION FLOWS IN STREAMS TRIBUTARY TO MONO LAKE AND TO PROTECT PUBLIC TRUST RESOURCES AT MONO LAKE AND IN THE MONO LAKE BASIN

BY THE BOARD:

1.0 INTRODUCTION

In 1940, the City of Los Angeles and the City of Los Angeles Department of Water and Power (hereinafter "Los Angeles" or LADWP") received permits to divert water from four streams that are tributary to Mono Lake in Mono County, California. The permits authorized diversion of water for municipal use and hydroelectric power production. At the time it issued the permits, the Department of Public Works, Division of Water Resources (a predecessor to the present State Water Resources Control Board) concluded that the California Water Code required issuance of the permits despite anticipated damage to Mono Lake and other natural resources.

Los Angeles developed the proposed project and received Licenses 10191 and 10192 confirming its water rights in 1974. Los Angeles' diversions of water from the Mono Basin between 1941 and 1982 resulted in approximately a 45-foot decline in the water level of Mono Lake, approximately a 30 percent reduction in the surface area of the lake, and substantial damage to the environment. In 1979, the National Audubon Society, the Mono Lake Committee, and others filed the first in a series of lawsuits which challenged Los Angeles' water diversions in the Mono Basin. The resulting court decisions helped clarify the legal framework governing the State Water Resources Control Board's (SWRCB) present reexamination of the water rights previously granted to Los Angeles.

In addressing the issues involved in amending Los Angeles' water rights, this decision begins with a summary of the factual background, relevant legal requirements, the environmental review process, the evidentiary hearing, and the positions of the various parties. Next, the subjects of instream flows and other conditions needed to restore and maintain fish resources in the four affected streams are addressed. This decision then addresses additional measures needed for protection of other public trust resources in the Mono Basin. In recognition of the outstanding ecological significance of Mono Lake, this decision designates Mono Lake as an Outstanding National Resource Water.

In determining the appropriate amendments to Los Angeles' water right licenses for protection of public trust resources, the decision considers the effects which those amendments will have on the Los Angeles water and power supply and on the environment. The SWRCB's findings and conclusions are summarized in Section 9.0 of the decision. The appropriate amendments to Los Angeles' water right licenses are set forth in the order at the end of the decision.

The order amends the licenses to set quantified instream flow requirements for the protection of fish in each of the four streams from which Los Angeles diverts water. The order also establishes water diversion criteria to protect wildlife and other environmental resources in the Mono Basin. The water diversion criteria: (1) prohibit the export of water from the Mono Basin until the water level of Mono Lake reaches 6,377 feet above mean sea level; and (2) restrict Mono Basin water exports in a manner that is intended to result in the water level of Mono

Lake rising to an elevation of 6,391 feet in approximately 20 years.

The higher water level will protect nesting habitat for California gulls and other birds using the islands in Mono lake, maintain the long-term productivity of the Mono Lake brine shrimp and brine fly populations, enhance the scenic quality of the Mono Basin, meet applicable water quality standards, and reduce blowing dust from presently exposed lakebed areas in order to protect health and comply with federal air quality standards. The order also requires Los Angeles to prepare restoration plans to restore the four streams from which it diverts water and to restore a portion of the waterfowl habitat which was lost due to the decline of Mono Lake. Once the water level of 6,391 feet is reached, it is expected that Los Angeles will be able to export approximately 30.8 thousand acre-feet of water per year from the Mono Basin.

2.0 BACKGROUND

This portion of the decision summarizes the geographical, historical and legal background information underlying the SWRCB's consideration of amendments to Los Angeles' water right licenses.[1]

2.1 The Mono Basin

The Mono Basin is a closed basin located east of the crest of the Sierra Nevada Mountains (Figure 1). The basin is widely recognized for its scenic qualities, with the most prominent feature being Mono Lake. The Mono Basin National Forest Scenic Area was established in 1984 in recognition of the panoramic views and scenery of the Mono Basin. One of the distinctive scenic features of Mono Lake is the presence of conspicuous mineral deposits known as tufa towers, many of which are located

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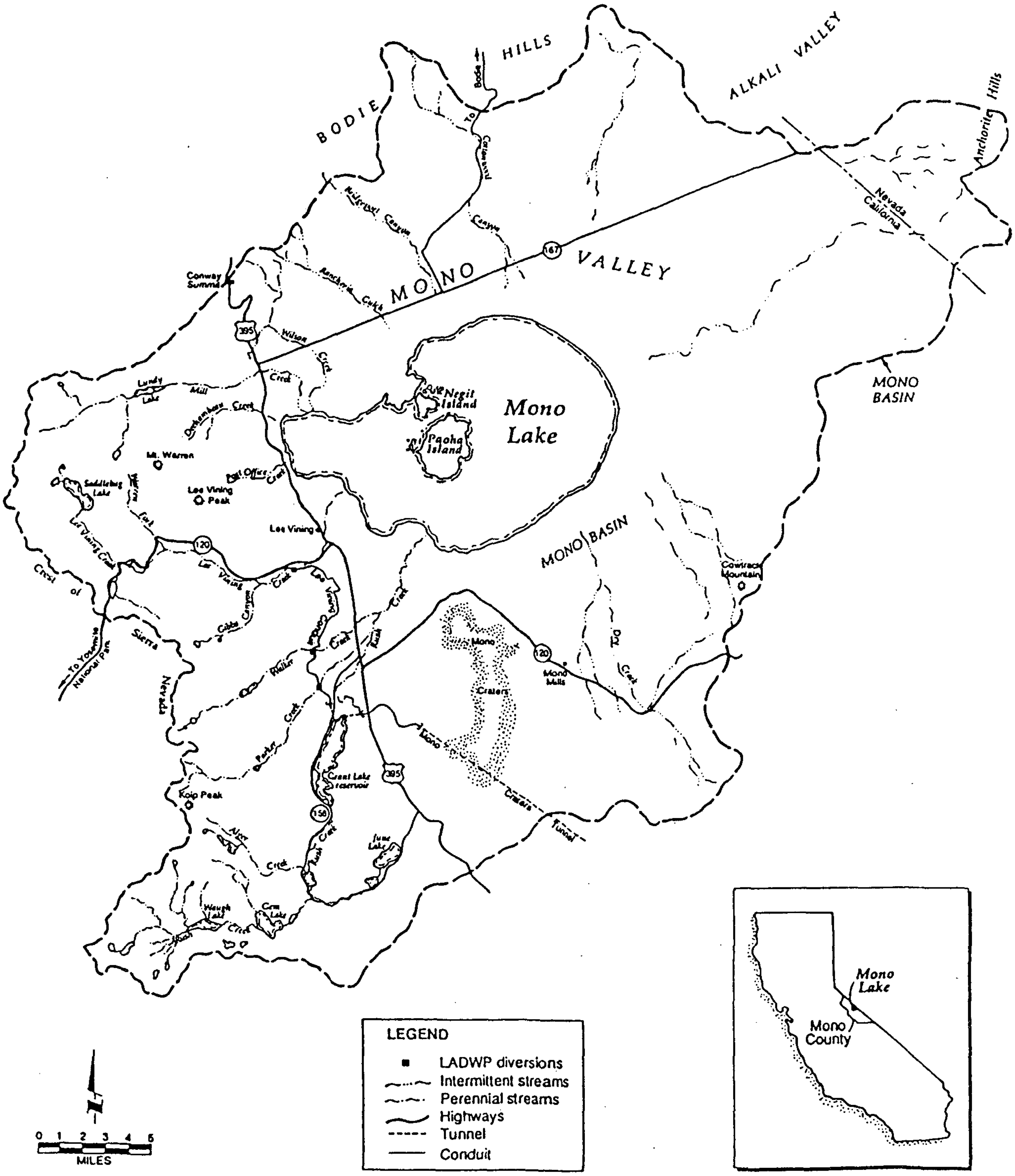
[1] *Unless otherwise noted, the background information in Sections 2.1 and 2.2 of this decision is from SWRCB Exhibit 7, "Draft Environmental Impact Report for Review of the Mono Basin Water Rights of the City of Los Angeles," May 1993.*

FIGURE 1



Source: Jones & Stokes Associates

within the Mono Lake Tufa State Reserve which was established in 1982.

The high salinity and alkalinity of Mono Lake have given rise to a unique ecological system of lake dwelling invertebrates that provide food for large numbers of migrating and nesting birds. Mono Lake is the site of the State's largest breeding colony of California gulls.

Mono Lake is a terminal lake in a watershed with no outlet. The historic water level and salinity of the lake have fluctuated considerably in response to natural conditions. Since 1941, the water elevation of Mono Lake has been affected by LADWP's diversion of water from four tributary streams. The water elevation of Mono Lake fell from 6,417 feet in 1941 to an historic low of 6,372 feet in 1982. The water elevation in the spring of 1994 was approximately 6,375 feet above mean sea level. The surface area of the lake declined from 54,924 acres in 1941 to approximately 37,688 acres in 1982. (SWRCB 7, Appendix A, Table A-1.)

2.2 LADWP Water Diversion Project

LADWP diverts water from Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek to Grant Lake Reservoir located on Rush Creek. The water then is exported from the Mono Basin through the Mono Craters Tunnel approximately 11 miles to the upper Owens River. The Mono Basin water commingles with water in the upper Owens River and flows south to Lake Crowley, a regulating reservoir on the upper Owens River. Water released from Lake Crowley is diverted through three hydroelectic power plants, Pleasant Valley Reservoir and Tinemaha Reservoir before entering the Los Angeles Aqueduct south of Bishop in Inyo County. The Los Angeles Aqueduct leads to Fairmont Reservoir in Los Angeles County from which it is distributed for a variety of municipal uses in the City of Los Angeles.

Prior to 1970, diversions from the Mono Basin were limited by the capacity of the Los Angeles Aqueduct. By 1970, however, the aqueduct system had been expanded and full diversion of flows from Lee Vining, Walker, Parker, and Rush Creeks became common during periods of average runoff. From 1974 to 1989, the City of Los Angeles diverted an average of 83,000 acre-feet of water per year from the Mono Basin. (SWRCB 7, p. 1-2.)

2.3 Issuance of Water Right Permits and Licenses

The appropriative water rights under which LADWP diverts water from the four Mono Basin streams were initiated by the filing of Water Right Applications 8042 and 8043 in 1934. The applications were approved on April 11, 1940 and permits were subsequently issued by the Department of Public Works, Division of Water Resources, a predecessor agency to the present SWRCB. The Department of Public Works recognized that the proposed water diversions would adversely affect the Mono Basin, but concluded that it was required to approve the project. This conclusion was based on the provision of the Water Commission Act (now codified as Water Code Section 1254) which states that action upon applications to appropriate water shall be guided by the policy that domestic use is the highest use of water. (Department of Public Works, Division of Water Resources Decision 455, April 11, 1940.)

Following completion of the second barrel of the Los Angeles Aqueduct in 1970, LADWP was able to divert the full flow of the four streams during periods of average runoff. In 1974, the SWRCB issued Water Right Licenses 10191 and 10192 which confirmed the city's rights to divert water from the four streams. License 10191 authorizes storage and direct diversion of water for municipal use. The total amount which may be beneficially used in one year is 147,700 acre-feet. License 10192 authorizes storage and direct diversion of water for hydroelectric power generation. The combined rate of direct diversion under both licenses is limited to 200 cubic feet per second (cfs).

2.4 Court Decisions Affecting Amendment of Water Right Licenses

The City of Los Angeles' diversion of water from the Mono Basin has been the subject of extensive litigation over the past fifteen years, resulting in three appellate court decisions which provide guidance regarding amendment of the water right licenses. In addition, the city has been subject to several preliminary injunctions governing water diversions on an interim basis. These court decisions are discussed below.

2.4.1 *National Audubon Society v. Superior Court*

In 1979, the National Audubon Society, the Mono Lake Committee, Friends of the Earth, and four Mono Basin landowners filed suit against the City of Los Angeles seeking to force the city into allowing more water to flow to Mono Lake. The plaintiffs argued that the city's diversions of water from the Mono Lake tributaries resulted in damage to Mono Lake in violation of the public trust doctrine. Traditionally, the public trust doctrine has been held to protect the public interest in navigation, commerce, and fishing on navigable waters.[2] More recently, the doctrine has been interpreted to protect a variety of natural resources and activities in the vicinity of navigable waters and nonnavigable tributaries of navigable waters.

The National Audubon Society suit eventually reached the California Supreme Court which entered its decision in 1983. (National Audubon Society v. Superior Court 33 Cal.3d 419, [189 Cal.Rptr. 346] cert. denied, 464 U.S. 977.) In discussing the applicability of the public trust doctrine to the relief sought by plaintiffs, the court stated:

> "The principal values plaintiffs seek to protect...are recreational and ecological--the scenic views of the lake and its shore, the purity of the air and the use of the lake for nesting and feeding by birds. Under Marks v. Whitney, supra, 6 Cal.3d 251, 98 Cal.Rptr. 790, 491 P.2d 374, it is clear that protection of these

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[2] *The California Supreme Court has also recognized that the public trust doctrine applies to protection of fish in nonnavigable streams. (People v. Truckee Lumber Co. (1897) 116 Cal. 397 [48 P. 374].)*

values is among the purposes of the public trust." (Id. at 435, 189 Cal.Rptr. at 356.)

The Audubon decision examined the relationship between the public trust doctrine and the California appropriative water rights system.[3] The Court recognized that in some cases the public interest served by water diversions may outweigh harm to public trust resources, but it held that harm to public trust resources should be avoided or minimized if feasible. (Id. at 427, 189 Cal.Rptr. at 349.) The Court went on to state that under Article X, Section 2 of the California Constitution: "All uses of water, including public trust uses, must conform to the standard of reasonable use." (Id. at 444, 189 Cal.Rptr. at 362.) The Court concluded that Los Angeles' water rights were granted without consideration of the effects of the diversions on the public trust resources of the Mono Basin and that, therefore, a responsible body should reconsider the allocation of water from the Mono Basin streams. (Id. at 447 and 452, 189 Cal.Rptr. at 365 and 369.) The Court also ruled that the SWRCB and the courts have concurrent jurisdiction to consider the effect of water diversions on public trust resources.

2.4.2 *California Trout v. State Water Resources Control Board*

In 1985, California Trout, Inc., the National Audubon Society and the Mono Lake Committee filed suit seeking a court order directing the SWRCB to rescind Los Angeles' water right licenses. The plaintiffs argued that the licenses should be rescinded because they did not include a condition requiring bypass of water for protection of fish in the four affected streams as required by Section 5946 of the Fish and Game Code. In 1989, the California Court of Appeal directed that the SWRCB amend the

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[3] *In describing the relationship between the public trust doctrine and California's appropriative water rights system the Court stated:*

> *"The public trust doctrine and the appropriative water rights system are parts of an integrated system of water law. The public trust doctrine serves the function in that integrated system of preserving the continuing sovereign power of the state to protect public trust uses, a power which precludes anyone from acquiring a vested right to harm the public trust and imposes a continuing duty on the state to take such uses into account in allocating water resources." (Id., 33 Cal.3d at 453, 189 Cal.Rptr. at 369.)*

city's licenses to include the condition required by Fish and Game Code Section 5946. (California Trout Inc. v. State Water Resources Control Board ("Cal Trout I") 218 Cal.App. 187 [255 Cal.Rptr. 184, 213].)

In 1990, the Court of Appeal entered a second decision which specified the following language to be added as a condition to the city's licenses:

> "In accordance with the requirements of Fish and Game Code section 5946, this license is conditioned upon full compliance with section 5937 of the Fish and Game Code. The licensee shall release sufficient water into the streams from its dams to reestablish and maintain the fisheries which existed in them prior to its diversion." (California Trout Inc. v. Superior Court ("Cal Trout II") 218 Cal.App 187 [266 Cal.Rptr.788].)

The Court of Appeal left determination of the precise long-term flow rates to the SWRCB and assigned the task of setting interim flow requirements to the Superior Court. (Id. at 212, 266 Cal.Rptr. at 803 and 804.) On April 4, 1990, the SWRCB amended the licenses to include the general condition specified by the court. The specific flow rates which are to be added as conditions of the licenses are discussed in Sections 5.0 through 5.4.3 below.

2.4.3 *Interim Relief and Stay Order of El Dorado County Superior Court*

Currently, all pending lawsuits concerning LADWP's water diversions in the Mono Basin are coordinated under the title of Mono Lake Water Rights Cases in the Superior Court for El Dorado County. (El Dorado County, Superior Court Coordinated Proceeding Nos. 2284 and 2288.) On December 6, 1989, the Superior Court entered a preliminary injunction which ordered that LADWP must allow sufficient water to pass its Mono Basin diversion facilities to restore and maintain the water level of Mono Lake at elevation 6,377 feet. On June 14, 1990, the Superior Court entered a preliminary injunction that established interim flows for the protection of fish in all four Mono Basin streams from which Los Angeles diverts water under its licenses. The interim flow requirements presently in effect were set in an amended order entered by the Superior Court on July 26, 1990.

On April 17, 1991, the Superior Court renewed the preliminary injunction requiring LADWP to bypass sufficient water to maintain the water level of Mono Lake at or above 6,377 feet. In order to comply with the preliminary injunctions, the city has not exported any water from the Mono Basin since 1989 except for a small amount needed to conduct a fishery study on the upper Owens River.

On September 29, 1989, upon motion of the SWRCB, the Superior Court entered an order staying further judicial proceedings on the merits of the coordinated litigation pending completion of the SWRCB's review of the city's water right licenses or September 1, 1993, whichever came first. By order dated June 8, 1993, the Court extended the stay of proceedings until the earlier of September 1, 1994 or completion of this Board's proceedings. The process which the SWRCB has used in developing amendments to the city's water right licenses is summarized in Sections 3.0 through 3.3.3 below. The Superior Court has continued to exercise jurisdiction over interim relief questions pending SWRCB amendment of the licenses.

2.5 Physical Solution Doctrine

In resolving disputes involving competing uses of water, California courts have frequently considered whether there is a "physical solution" available by which competing needs can best be served. (Peabody v. Vallejo, 2 Cal.2d 351, 383-384 [40 P.2d 486] (1935); City of Lodi v. East Bay Municipal Util. Dist., 7 Cal.2d 316 [60 P.2d 439] (1936).) Adoption of a physical solution is consistent with the constitutional goal of promoting maximum beneficial use of the State's water resources. The SWRCB has previously concluded that the physical solution doctrine can be employed to establish a flow regime for protection of fish in which the required releases of water from storage exceed the rate of inflow to a reservoir at a particular time. (SWRCB Order WR 90-16, pp. 8-9.) In the present situation, the California

Court of Appeal decision recognized that, as the price of continued appropriation of water, an appropriator can be compelled to take reasonable steps to restore the streams and fisheries. (California Trout Inc. v. Superior Court, supra., 218 Cal.App.3d at 210, n.6 [266 Cal.Rptr. at 801-802, n.6].)

Thus, in establishing the flow requirements necessary to comply with Fish and Game Code Section 5937 in the present situation, the SWRCB has examined the relationship between flows and fishery habitat, as well as the availability of other measures which would help restore the fishery while allowing diversion of some water for municipal use. (See Sections 5.0 through 5.3.) Similarly, in examining the use of water at Mono Lake for providing waterfowl habitat, this decision acknowledges that there are alternative ways of restoring a portion of the lost waterfowl habitat without requiring a return to the pre-1941 lake elevation. (See Section 6.4.7.)

2.6 Summary of Legal Framework Governing Amendment of Los Angeles' Water Right Licenses

All diversions and use of water in California are subject to the mandate of Article X, Section 2 of the California Constitution to maximize the beneficial use of water and to prevent the wasteful or unreasonable use, method of use, or method of diversion. The Audubon decision establishes that the SWRCB has the additional responsibility to consider the effect of water diversions upon interests protected by the public trust and to avoid or minimize harm to public trust uses to the extent feasible. The public trust has been held to protect a broad range of values including fishing, hunting, swimming, boating, recreation, scenic values, air quality, and wildlife habitat. (National Audubon Society v. Superior Court, supra., 33 Cal.3d at 434 and 435, 189 Cal.Rptr. at 356.) The California Supreme Court concluded that the lack of consideration to protection of public trust uses at the time that the City of Los Angeles acquired its appropriative water rights in the Mono Basin requires that this Board or the courts take "a new and objective look at the water resources of the Mono Basin." (Id., 33 Cal.3d at 452, 189 Cal.Rptr. at 369.)

The SWRCB's review of Los Angeles' water rights is subject to Fish and Game Code Section 5946 which applies to permits and licenses for water diversions in portions of Inyo and Mono Counties. Section 5946 requires that the licenses be conditioned upon full compliance with Fish and Game Code Section 5937. In this instance, the Court of Appeal has interpreted the applicable law to require that LADWP must release sufficient water into the streams "to reestablish and maintain the fisheries which existed in them prior to its diversion of water." ("Cal Trout II," supra., 218 Cal.App.3d at 213, 266 Cal.Rptr. at 803 and 804.) With respect to flows needed for protection of fish, the Court of Appeal ruled that "the Legislature has already balanced the competing claims for water from the streams affected by section 5946 and determined to give priority to the preservation of their fisheries." (Id., 218 Cal.App.3d at 201, 266 Cal.Rptr. at 796.)

In accordance with the judicial decisions discussed above, the SWRCB's approach is to determine what flows are needed for protection of fish. Then the decision addresses the need for additional water and other measures to protect public trust resources at Mono Lake and the surrounding area in view of the competing uses of water by Los Angeles. Finally, the California Environmental Quality Act ("CEQA," Public Resources Code Section 21000, et seq.) requires addressing how best to mitigate or avoid potential adverse environmental impacts that may occur as a result of the changes in Mono Basin water diversions required by this decision.

3.0 PROCESS FOR REVIEW OF MONO BASIN WATER RIGHTS

In reviewing Los Angeles' water rights and competing uses to be made of Mono Basin water resources, the SWRCB has utilized information developed through preparation of an environmental impact report and other evidence presented during the course of a lengthy water right hearing. In evaluating anticipated effects of alternative proposals for regulating the city's diversions, the SWRCB considered evidence presented at the hearing as well as projections developed using computer models introduced into evidence during the hearing.

3.1 Environmental Impact Report

On September 11, 1989, the SWRCB held a public hearing to provide an opportunity for interested parties to comment on the suggested scope of the SWRCB's review of Mono Basin water diversions, public trust uses of Mono Basin water, and other beneficial uses of water diverted from the Mono Basin. Interested parties were also invited to comment on the scope of the environmental impact report (EIR) being prepared as part of the SWRCB's review.

On October 10, 1989, SWRCB staff established five technical advisory groups to assist in identifying specific environmental issues to be addressed in the Draft EIR and to help identify relevant information that could be used in the environmental review process. Participants in the technical advisory groups included representatives of federal, state and local governments (including the City of Los Angeles), environmental groups, colleges and universities, private consultants and members of the public. The groups met for varying lengths of time, with the technical advisory group on hydrology and aqueduct operations continuing to meet into early 1994.

The Notice of Preparation for the EIR was issued on January 4, 1990. The notice was mailed to over 500 groups and individuals and widely published in newspapers. SWRCB staff prepared a scope of work and requested proposals for preparation of an EIR from over 40 resource management consulting firms. The proposals that were submitted were reviewed by SWRCB staff, Los Angeles, and a joint review team composed of representatives from Mono County, California Trout, Inc., the U.S. Forest Service, the Department of Fish and Game (DFG), the National Audubon Society and the Mono Lake Committee. Jones and Stokes Associates, Inc. was selected as the primary EIR contractor in June 1990, and numerous other scientists having expertise on the Mono Basin were retained as subcontractors.

In preparing the draft EIR, the consultant considered information from numerous sources including: a 1987 National Academy of Sciences report titled, "The Mono Basin Ecosystem: Effects of

Changing Lake Level;" a 1988 report prepared by the University of California, Riverside, Water Resources Center titled, "The Future of Mono Lake: Report of the Community and Organization Research Institute (CORI) Blue Ribbon Panel;" and the United States Forest Service's 1990 "Final Environmental Impact Statement and Comprehensive Management Plan, Mono Basin National Forest Scenic Area."

A three-volume draft EIR was distributed for public comment on May 26, 1993. Twenty-eight auxiliary reports on various subjects were also prepared. Numerous governmental agencies, environmental groups, and individuals submitted comments on the Draft EIR. Many of the consultants who assisted in preparing the Draft EIR presented testimony at the water right hearing.

In accordance with provisions of the California Environmental Quality Act, the Final EIR identifies measures that are considered necessary to avoid, reduce, or mitigate potential adverse environmental impacts resulting from this decision. This decision includes findings of overriding considerations with respect to those adverse environmental effects which cannot feasibly be reduced or mitigated below a level of significance. (Title 14, Cal. Code of Regs., Section 15093.)

3.2 <u>Water Right Hearing</u>

Following a prehearing conference on April 19, 1993, the SWRCB issued a hearing notice on June 30, 1993 regarding amendment of Los Angeles' water right licenses for diversion of water from streams tributary to Mono Lake. The June 30, 1993 hearing notice explained that the SWRCB intended to amend the licenses to establish quantified instream flow requirements as necessary to comply with the public trust doctrine, the California Fish and Game Code, and judicial rulings requiring that the specified flows be sufficient to reestablish and maintain fisheries equivalent to those which existed prior to the diversion of water by Los Angeles. The notice also explained that the SWRCB intended to amend Los Angeles' Water Right Licenses 10191 and 10192 to specify water surface elevation requirements for Mono

Lake and other conditions necessary to provide appropriate protection for public trust resources and the beneficial uses of water of Mono Lake and its tributaries.

In addition to identifying the procedures governing participation in the evidentiary portion of the water right hearing, the hearing notice provided that interested parties could present non-evidentiary policy statements on the issues under consideration. Hearing sessions for receipt of policy statements were held in Los Angeles, Mammoth Lakes, and Sacramento.

The evidentiary hearing began on October 20, 1993 and ended on February 18, 1994. The evidentiary hearing was held in Sacramento with the exception of one day in Lee Vining to receive testimony from Mono Basin residents. Board Member Marc Del Piero served as hearing officer. There were over 40 hearing days, including three days for non-evidentiary policy statements. Testimony was provided by more than 125 witnesses, and over 1,000 exhibits were introduced into evidence. Parties participating in the evidentiary hearing were allowed until March 21, 1994 to submit legal briefs and until April 29, 1994 to submit reply briefs.

3.3 <u>Use of Computer Models to Assist in Evaluating Anticipated Effects of Alternative Proposals For Regulating Mono Basin Water Diversions</u>

Much of the evidence presented during the hearing was developed through use of computer modeling. Computer models were utilized to help evaluate or predict: (1) the amount of fishery habitat available at different flow levels; (2) the impacts of various alternative water diversion scenarios on the water elevation of Mono Lake and the water supply available to Los Angeles; (3) expected runoff under different hydrologic conditions; and (4) the anticipated economic cost of alternative approaches to regulating water diversions.

Computer models can be used to: (1) estimate conditions that are not readily susceptible to direct measurement and, (2) to estimate future conditions or effects that would be expected to occur under various assumed conditions. In situations where a computer model provides the only feasible way of evaluating expected conditions, the results produced by a computer model may provide the best evidence available to the decision-maker.

Sections 3.3.1 and 3.3.3 briefly describe the computer models used in reaching this decision or which will be used in implementing requirements of this decision. In each case, the SWRCB recognizes that there is a degree of uncertainty inherent in computer modeling. Nevertheless, the record indicates that the computer models discussed in Sections 3.3.1 through 3.3.3 below provide the best available tools for evaluating the particular conditions or effects analyzed by the respective models. With regard to evaluation of economic effects, the SWRCB did not rely on the computer modeling results submitted by LADWP or California Trout, Inc. for the reasons explained in Section 7.1.5.

3.3.1 *IFIM/PHABSIM Fisheries Flow Models*

The DFG flow recommendations for fish protection in Lee Vining Creek, Rush Creek, and the upper Owens River were based upon evaluation of the relationship between trout habitat and flow as determined using the Instream Flow Incremental Methodology (IFIM) and the Physical Habitat Simulation Model (PHABSIM). (DFG 3, p. 2.) The EIR consultant did a similar fishery study for the middle Owens River. (SWRCB 13W, p. 2-1.)

The fishery study consultants collected on-site data and measurements of various parameters such as water depth, velocity, substrate, and cover conditions. The data were used to develop hydraulic models of the streams in question. The hydraulic models, and information on fish habitat criteria, were utilized to determine the amount of weighted useable area (WUA) available to various life stages of target species at different flows. Data showing the relationship between flows and weighted useable area, together with information on other factors affecting the fishery, were then used to develop recommended streamflow regimes for the species of interest. (DFG 117, p. 1-18.)

Although in some instances the flow requirements established in this decision vary from the recommendations set forth in the various fishery studies, the SWRCB believes that the determinations of weighted useable area for identified lifestages of specified species provide a reasonable basis for estimating the amount of habitat available at differing levels of flow. Further discussion regarding fishery habitat on the streams under consideration is provided in Sections 5.0 through 5.4.4 below.

3.3.2 *Los Angeles Aqueduct Monthly Planning (LAAMP) Model*

The water supply and lake level impacts of various methods of regulating LADWP's water diversions were estimated using the Los Angeles Aqueduct Monthly Planning Model (LAAMP Model) which was developed as part of the environmental impact report process. The LAAMP Model was developed as a tool to simulate the relationships between flows in the tributary streams, Mono Lake surface elevation, and water deliveries to Los Angeles through the Los Angeles Aqueduct. In using the LAAMP Model to predict various anticipated effects of different water diversion scenarios, average monthly streamflow data are used for the 50-year period of record covering runoff years 1940 through 1989. The LAAMP Model was developed to allow the user to account for operational objectives, physical constraints of diversion facilities and reservoirs, and applicable agreements governing LADWP's water diversion and storage facilities.

Expert testimony was presented by the EIR consultants and others regarding predicted impacts on water supply, lake level and flows of various alternatives identified in the Draft EIR and variations of those alternatives. In response to comments on the LAAMP Model used in preparing the Draft EIR (LAAMP Version 2.0), an Operations Modeling Technical Advisory Group met during the course of the hearing to consider revisions to the LAAMP model to improve its predictive capability.[4] Following revisions to the model, the EIR consultants presented testimony and exhibits regarding effects of various diversion scenarios on lake level and on the water supply available to Los Angeles as determined through use of the revised LAAMP model. (SWRCB 40 through SWRCB 48; RT XXXV, pp. 13-105.)

Two revised versions of the model, designated as LAAMP Version 3.3 and LAAMP Version 3.31 were received into evidence. (SWRCB 49.)[5] As discussed in Section 7.1.2 below, the SWRCB used LAAMP Version 3.31 to assist in evaluating the anticipated impacts of the requirements established by this decision.

3.3.3 *LADWP Runoff Forecast Model*

Hydrologic classifications or year types are relative indicators of the water available in a hydrologic basin due to all types of precipitation and runoff. In order to reflect the variation in flows which occurs under natural conditions, DFG's fishery flow recommendations for Lee Vining Creek and Rush Creek vary depending upon the amount of runoff expected in a given year. DFG's "dry year" classifications include the years having runoff which would be exceeded in 80 percent of all water years while "wet years" are considered to be those years having runoff that would be exceeded in only 20 percent of all water years. "Normal years" are those years which fall in between the 20 percent and 80 percent range. (DFG 170A, p. 1.)[6] In terms of average runoff equating to the various year type classifications for the Mono

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[4] *In addition to SWRCB staff and the EIR consultants, participants in the Operation Modeling Technical Advisory Group meetings included representatives of the Los Angeles Department of Water and Power, the Department of Fish and Game, and Peter Vorster who testified on behalf of the Mono Lake Committee, National Audubon Society and California Trout, Inc.*

[5] *The changes which were made in LAAMP Version 3.3 are described in SWRCB Exhibit 40. In addition to the changes made in Version 3.3, LAAMP Version 3.31 corrects a minor error relating to how the "fish flow deficits" were treated. This correction changes the annual results by approximately 100 acre-feet. (RT XXV, pp. 34 and 35.)*

[6] *In the case of DFG's channel maintenance and flushing flow recommendations for Rush Creek, DFG further divided the "normal year' category into wet-normal, normal, and dry-normal, with each of the ranges occurring 20 percent of the time. (DFG 170A.)*

Basin, a dry year is a year having 68.5 percent or less of average runoff, a wet year is a year having 136.5 percent or more of average runoff and a normal year is any year having between 68.5 percent and 136.5 percent of average runoff. The average runoff value is based on a fifty-year moving average of runoff which is recalculated every five years. (LADWP 133, p. 1.)

LADWP prepares runoff forecasts for the Mono Basin to assist in determining the amount of water expected to be available from the Los Angeles Aqueduct. (LADWP 55, p. 8.) The LADWP forecasts correspond to the runoff year which goes from April 1 through March 31. The forecasts are made near the first of the month in February, March, April, and May. LADWP uses precipitation data, snow survey data and weather forecasts as input data for LADWP's Runoff Forecast Model. (LADWP 147, p. 1.) Most precipitation in the Mono Basin generally has occurred by May 1, so the May 1 forecast is reasonably accurate. (LADWP 52, p. 7.) For purposes of determining the applicable flow requirements for fishery protection, as well as for channel maintenance and flushing purposes, the conditions which are added to LADWP's water right licenses by this decision refer to runoff year type classifications of wet, normal and dry years based on projections from the LADWP Runoff Forecasting Model for the Mono Basin.

4.0 PARTIES PARTICIPATING IN EVIDENTIARY HEARING

The parties who participated in the evidentiary hearing were the California Air Resources Board (ARB), the California Department of Fish and Game (DFG), the California State Lands Commission (SLC), the California Department of Parks and Recreation (DPR), California Trout, Inc. (CT), the City of Los Angeles and the City of Los Angeles Department of Water and Power (Los Angeles or LADWP), the Great Basin Unified Air Pollution Control District (GBUAPCD), Haselton Associates (HASELTON), the National Audubon Society and the Mono Lake Committee (NAS&MLC), the Sierra Club (SC), the Metropolitan Water District of Southern California (MWD), the United States Fish and Wildlife Service (USFWS), the

United States Forest Service (USFS), and the United States Environmental Protection Agency (USEPA).[7]

In addition to evidence presented by the parties, SWRCB staff introduced documents from the files relevant to the SWRCB's review process and called upon the EIR consultant to present testimony and exhibits relative to preparation of the Draft EIR and subjects analyzed in that document.

The large number of parties and issues involved makes it impractical to summarize each party's position with respect to each specific issue considered. In general, many of the parties urge the SWRCB to adopt the DFG streamflow recommendations and to establish a minimum lake level at or above 6,390 feet in order to protect various public trust resources of the Mono Basin. The National Audubon Society and Mono Lake Committee recommend adoption of the DFG streamflow recommendations and a managed lake level of 6,405 feet. LADWP introduced a revised version of its Mono Lake Management Plan which calls for a lake level of 6,377 feet, and which provides for specified minimum streamflows in the four affected streams. Frank Haselton, appearing on behalf of John Arcularius and the Arcularius Ranch, urges that consideration be given to protection of the fishery in the upper Owens River. The Metropolitan Water District of Southern California presented evidence regarding future water supplies available to its service area, but made no recommendations regarding amendment of Los Angeles' water rights.

Following the close of the evidentiary hearing, several of the parties submitted legal briefs summarizing their positions, arguments and recommendations on various issues.

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[7] *The abbreviation shown in parentheses for each of the specified parties is used when citing exhibits introduced by a particular party at the hearing.*

5.0 RESTORATION AND PROTECTION OF FISHERY RESOURCES IN THE MONO BASIN

As discussed in Section 2.6 above, the SWRCB's first task in this instance is to determine the flows needed to reestablish and maintain the fisheries that existed prior to LADWP's diversion of water from the four Mono Basin streams. DFG conducted detailed fishery studies and presented recommendations regarding minimum flows for protection of fish in each of the four Mono Basin streams from which Los Angeles diverts water. Alternative streamflow recommendations for Rush and Lee Vining Creeks were presented by LADWP. In addition to presenting evidence regarding minimum flow recommendations for providing fishery habitat, the parties also introduced considerable evidence regarding the desirability of periodic channel maintenance or flushing flows.

Following evaluation of evidence regarding desired streamflows, this decision considers other related measures to help reestablish and maintain pre-project fishery resources. Flows and other fishery restoration measures are discussed on a stream-by-stream basis beginning with the northernmost stream from which LADWP diverts water and proceeding southward.

5.1 Lee Vining Creek

5.1.1 *Pre-Project Conditions*

The fishery that existed in Lee Vining Creek prior to diversion of water by Los Angeles was described by former DFG employee Eldon Vestal as a good trout fishery which sustained catchable brown trout averaging 8 to 10 inches in length. (CT 5.) There were several other accounts that depicted the fishery as a good trout stream with an abundance of 8 to 10 inch trout, with some trout reaching 13 to 15 inches. (NAS&MLC 124, p. 14.) The Draft EIR summarized testimony from 1990 proceedings in El Dorado Superior Court which indicated that plantings of hatchery reared trout fingerlings and catchable rainbow trout were common in the early 1900s. In 1940, the predominate fish in Lee Vining Creek were brown trout. Small pockets of rainbow trout were present along with the rare occurrence of eastern brook trout. (SWRCB 7 Vol. 1, p. 3 D-7.)

No definitive evidence of pre-diversion fish populations in Lee Vining Creek was presented. Based on the evidence presented, we conclude that the pre-project fishery in Lee Vining Creek primarily consisted of brown trout augmented by planting of brown trout fingerlings and catchable rainbow trout. The planted fish probably contributed to the high angling success. The instream flow requirements established in this decision are designed to provide the conditions necessary to maintain a resident brown trout fishery similar to that which existed in Lee Vining Creek prior to the diversion of water by LADWP.

The physical conditions on Lee Vining Creek prior to 1941 were the subject of extensive testimony and numerous exhibits. (E.g., SWRCB 7, LADWP 7 and 9, NAS&MLC 116, 120, 124, 125, 127, 129, 136 and 175.) A large number of the same documents were submitted by several of the interested parties. In addition to the testimony of Eldon Vestal and several long-time residents of the Mono Lake area, the SWRCB heard testimony from several expert witnesses who had reviewed aerial photographs, hydrologic records and other documentary evidence relevant to the physical conditions on Lee Vining Creek prior to the LADWP diversions. Despite the amount of testimony and exhibits, detailed information regarding the pre-1941 physical conditions in Lee Vining Creek is limited.

The Trihey and Associates report titled "Comparison of Historic and Existing Conditions on Lower Lee Vining Creek, Mono County, California" by Mitchell Katzel (NAS&MLC 116), summarized much of the historical information presented in the exhibits mentioned above. The Trihey and Associates report also was based upon technical studies and investigations conducted by a multidisciplinary planning team which included individuals who testified on behalf of various parties, including LADWP, NAS&MLC, and DFG. The report concluded that there has been little geomorphic or vegetative change between the LADWP diversion dam and Highway 395. (NAS&MLC 116, p. 1.) Most of the impacts of the exportation of water by LADWP occurred below Highway 395. Fire in the early 1950s destroyed much of the riparian vegetation. Livestock grazing also impacted the riparian vegetation and caused the local breakdown of stream banks. Once the riparian vegetation was in decline, the combined effects of fire, grazing and the limited water supply contributed to a near total loss of vegetation in the area described as segment 3 in the report. Additional information regarding riparian vegetation is provided in Section 6.3 below.

Prior to the diversion of water by LADWP, lower Lee Vining Creek was a multiple channel system characterized by a single main channel and between two and five subsidiary channels. The total main channel length between Highway 395 and the county road was approximately 9,800 feet and the total subsidiary channel length was approximately 15,600 feet. Both the main and subsidiary channels were generally narrow, consisting of deep water habitat which was provided by moderate flows. The main channel width was approximately 13 feet and subsidiary channels ranged from 5 to 8 feet wide. High streamflows readily increased water depth in the main and subsidiary channels. High streamflows also over topped the bank and deposited organic rich sediment on the floodplain. (NAS&MLC 175.)

5.1.2 *Flows for Providing Fishery Habitat*

The major instream flow study on Lee Vining Creek was conducted during 1990 and 1991 by the firm of Aquatic Systems Research under the direction of DFG. This comprehensive investigation used the instream flow incremental methodology (IFIM) in order to determine instream flow requirements for brown trout in lower Lee Vining Creek. Study elements included: delineating and quantifying existing aquatic habitat; assessment of historic and existing hydrology; development of weighted useable area/stream discharge relationships for brown trout fry, juvenile, adult and spawning life stages; estimation of existing fish populations by habitat type; examination of fluvial geomorphology; monitoring and simulating water temperature; and assessment of riparian vegetation, factors that lead to ice formation and fish food availability. The DFG study evaluated flows for the main channel of Lee Vining Creek, but made no flow recommendations for additional channels.

DFG presented recommendations for instantaneous flow releases to lower Lee Vining Creek on a monthly basis based on information contained in "The Lee Vining Creek Stream Evaluation Report 93-2, Volumes 1 and 2," dated July 1993. (DFG 54 and 55.) The flows in the 1993 report were presented as DFG's recommendations for maintaining fish in good condition pursuant to Fish and Game Code Sections 5937 and 5946. (DFG 3, p. 4.) At the time the Draft EIR was circulated for review and comment, the instream flow information which DFG had provided to the EIR consultant was based on a report from DFG labeled "Draft Final, July 13, 1992." The information in DFG's final report is considerably different than the information in the 1992 report which was used in preparing the Draft EIR.

The LADWP Mono Lake Management Plan describes proposed operational criteria which LADWP contends will maintain Mono Basin resources, while creating sufficient flexibility to operate the water diversion system efficiently and allow for emergency response. (LADWP 53, pp. 36-50.) The LADWP Mono Lake Management Plan proposes minimum monthly instream flows along with occasional channel maintenance flows. These instream flow recommendations were intended to mimic the natural hydrology. (LADWP 53, Section 2, p. 40; LADWP 154, pp. 1-13.) A revised LADWP Mono Lake Management Plan, as described in the written testimony of Mr. William Hasencamp, proposes a new set of recommended instream flows for Lee Vining, Parker, Walker and Rush Creeks. (LADWP 133.) The revised instream flows are proposed as part of a management scheme which LADWP contends would maintain the fisheries while evening out releases of water needed to maintain the water elevation of Mono Lake. (LADWP 154, p. 2, Table 1.)

The NAS&MLC presented testimony by Mr. Woody Trihey and Ms. Jean Baldridge which provided an instream flow evaluation of possible effects upon stream conditions of various flows regimes. This recommendation was based upon the review of DFG's instream flow studies and comparison of the restoration treatments implemented for the Restoration Technical Committee. (NAS&MLC 1X, pp. 2-7.)

In a letter to SWRCB staff dated August 30, 1993, Mr. Trihey discussed his observations on Lee Vining Creek during various flow events and the subsequent effects upon the restoration treatments which were implemented as part of the interim stream restoration program under the direction of the El Dorado County Superior Court. (NAS&MLC 104.)

Pending establishment of long-term flow requirements by the SWRCB, the El Dorado County Superior Court heard evidence and issued an order dated June 14, 1990 which set interim instream flows for Lee Vining Creek and the other three streams from which LADWP diverts water. Table 1 below shows the minimum instream flow recommendations of DFG, the flows from the original and revised versions of the LADWP Mono Lake Management Plan, and the interim flows established by the Superior Court. Table 1 also shows the flows which the SWRCB finds to be appropriate to reestablish and maintain the fisheries which existed in Lee Vining Creek before LADWP began its diversion. The basis for determination of the Lee Vining Creek instream flow requirements is discussed following the table.

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TABLE 1: LEE VINING CREEK INSTREAM FLOW RECOMMENDATIONS/REQUIREMENTS*

HYDROLOGIC YEAR		MONTH	DFG	SWRCB	LADWP	LADWP REVISED	INTERIM
	DRY	APRIL	37	37	25	25	35
		MAY	37	37	25	30	35
		JUNE	37	37	25	35	35
		JULY	37	37	25	35	35
		AUGUST	37	37	25	30	35
		SEPTEMBER	37	37	25	20	35
		OCTOBER	25	25	15	20	25
		NOVEMBER	25	25	15	20	25
		DECEMBER	25	25	15	20	25
		JANUARY	25	25	15	20	25
		FEBRUARY	25	25	15	20	25
		MARCH	25	25	15	20	25
	NORMAL	APRIL	54	54	25	25	35
		MAY	54	54	25	30	35
		JUNE	54	54	25	35	35
		JULY	54	54	25	35	35
		AUGUST	54	54	25	30	35
		SEPTEMBER	54	54	25	25	35
		OCTOBER	40	40	15	20	25
		NOVEMBER	40	40	15	20	25
		DECEMBER	40	40	15	20	25
		JANUARY	40	40	15	20	25
		FEBRUARY	40	40	15	20	25
		MARCH	40	40	15	20	25
	WET	APRIL	54	54	25	25	35
		MAY	95	54	25	30	35
		JUNE	95	54	25	35	35
		JULY	95	54	25	35	35
		AUGUST	95	54	25	30	35
		SEPTEMBER	54	54	25	25	35
		OCTOBER	40	40	15	20	25
		NOVEMBER	40	40	15	20	25
		DECEMBER	40	40	15	20	25
		JANUARY	40	40	15	20	25
		FEBRUARY	40	40	15	20	25
		MARCH	40	40	15	20	25

*All flows are in cubic feet per second (cfs)

DFG Exhibits 54 and 55 identify streamflow regimes for dry, normal and wet hydrologic conditions which DFG believes would meet the needs of trout in Lee Vining Creek. DFG biologist Gary Smith testified that the recommended flows are minimum instantaneous flow recommendations. DFG recommends maintaining either the specified flows or the natural flow, whichever is less. (RT XXXIX, 9:13-9:16.) In this case, the inflow to the LADWP conduit diversion facility is considered to be the natural flow. The DFG instream flow recommendations are measured as releases from the LADWP conduit diversion facility to Lee Vining Creek.

The criteria used by DFG to develop streamflow recommendations for brown trout in lower Lee Vining Creek for dry hydrologic years are described as follows:

(a) Provide 90 percent of maximum spawning habitat from October 1 through December 31;
(b) Maintain spawning streamflows from January 1 through March 31; and,
(c) Provide 80 percent of maximum adult habitat from April 1 through September 30. (DFG 54, p. 161, Table 34.)

DFG considered that the availability of adult and spawning habitat was a limiting factor. Consequently, providing habitat for adults and spawning life stages was emphasized in order to develop a viable and dynamic self-sustaining resident brown trout fishery. The period of the year that adult habitat is a limiting factor is from April 1 through September 30. Spawning of brown trout generally occurs during the months of October through December. Maintenance of the spawning flow regime from December through April would provide a minimum flow for adults during winter conditions and also provide protection of the redds until all fry have emerged.

Weighted useable area/streamflow relationships for fry, juvenile, adult and spawning brown trout were developed using the physical habitat simulation model (PHABSIM) within the IFIM model technique. The results reported as weighted useable area (WUA), in totals for the entire lower Lee Vining Creek, are found in DFG Exhibit 55. (DFG 55, pp. 142-147, Tables B-5 to B-8.) The results of the WUA analysis for adult and spawning life stages are presented in Tables 2 and 3 below:

TABLE 2: ADULT BROWN TROUT WEIGHTED USEABLE AREA (WUA) LEE VINING CREEK

WUA SQ FT.	CFS	PERCENTAGE
65,495	95	100%
58,946	54	90%
52,396	37	80%
45,846	25	70%
39,297	20	60%

TABLE 3: SPAWNING HABITAT WEIGHTED USEABLE AREA (WUA) LEE VINING CREEK

WUA SQ FT.	CFS	PERCENTAGE
11,405	40	100%
10,264	25	90%
9,124	20	80%
7,983	15	70%
6,843	13	60%

Examination of the weighted useable area/streamflow relationships presented in Table 2 indicates that habitat for adults increases slowly as flows increase above 37 cfs. Spawning flows of 25 cfs for October 1 through March 31 provide 90 percent of the maximum WUA for spawning while at the same time providing 70 percent of the maximum WUA for adults from January through March 31. The limited availability of spawning habitat substantiates the need to provide this particular kind of habitat in all hydrologic year types in order to ensure the continuation of the fishery. The DFG criteria indicate that DFG's target is to maintain 90 percent of spawning habitat and 80 percent of adult habitat. (DFG 54, p. 161.) Exhibit DFG 54 explains that providing 80 percent to

100 percent of habitat is the target for all life stages of brown trout in Lee Vining Creek. (DFG 54, p. 160.)

In discussing findings from other researchers, Dr. Tom Hardy, a fishery biologist testifying on behalf of LADWP, testified that "...no objective criteria has been validated to guide investigators on what percentage reduction of optimal habitat represents a significant impact or at what exceedence value associated with either optimal or median habitat represents adequate protection for the aquatic resources." (LADWP 132, pp. 2-3.) Dr. Hardy testified that several instream flow studies that he had participated in targeted a range of 80 percent to 85 percent of the maximum WUA as optimal habitat conditions. (LADWP 17, p. 58.) The LADWP Mono Lake Management Plan recommends flows of 15 cfs from October 1 to March 31 which corresponds to 68 percent of the maximum WUA for spawning and 56 percent of the maximum WUA for adults. (LADWP 53, p. 40 Table A.) The 25 cfs figure for April 1 through September 30 corresponds to 70 percent of the maximum WUA for adults. Thus, the LADWP plan suggests flows which produce less WUA than recommended by DFG and less than applied in several other studies in which Dr. Hardy participated.

LADWP did not revise its recommendation of the flows needed for maintenance of the fishery, but its revised Mono Lake Management Plan recommended a revised flow regime based on the need for increased flows to maintain the water level in Mono Lake. The flows in the revised management plan range from 20 to 35 cfs from April through September, which correspond to a range of approximately 64 percent to 80 percent of the maximum WUA for adult brown trout. With the exception of the months of June and July, the instream flow recommendations of the revised LADWP Mono Lake Management Plan are below the percentages recommended by DFG.

The criteria DFG used to develop streamflow recommendations for brown trout in lower Lee Vining Creek for normal hydrologic years include:

(a) Provide 100 percent of maximum spawning habitat from October 1 through December 31;

(b) Maintain spawning streamflows from January 1 through March 31; and

(c) Provide 90 percent of maximum adult habitat from April 1 through September 30. (DFG 54, p. 162, Table 35.)

A flow of 40 cfs from October 1 through March 31 would provide 100 percent of the maximum WUA for spawning and 80 percent of the maximum WUA's for adults. A flow of 54 cfs would provide 90 percent of the maximum WUA for adults. (Tables 2 and 3 above.)

The criteria DFG employed to develop streamflow recommendations for brown trout in lower Lee Vining Creek for wet hydrologic years include:

(a) Provide 100 percent of maximum spawning habitat from October 1 through December 31;

(b) Maintain spawning streamflows from January 1 through March 31;

(c) Provide 90 percent of adult habitat during April and September, to consider the needs of late emerging fry, the seasonal transition in streamflow and to simulate natural conditions; and,

(d) Provide 100 percent of maximum adult habitat from May 1 through August 31. (DFG 54, p. 161, Table 34.)

Testifying on behalf of NAS&MLC, Mr. Trihey stated that "winter streamflows between 20 and 40 cfs, and summer streamflows between 40 and 100 cfs, would be very compatible with the restoration work completed thus far on Lee Vining Creek." (NAS&MLC 104, p. 2.) Routine flows above 60 cfs begin to exceed velocities preferred by trout in Lee Vining Creek downstream of LADWP's diversion. However, at flows above 60 cfs, it would be beneficial to rewater two of the ancillary channels in order to provide refuge habitat from high stream velocities. These two ancillary channels are the ancillary channel which parallels Highway 120 in DFG study reach segment 2 and the ancillary channel in DFG study segment 3 referred to by the Restoration Planning Team as channel 3A-4. (DFG 54, NAS&MLC 125.) If flows above 160 cfs are to occur frequently during the next 10 to 15 years, then spawning gravels in segment 1 should be periodically checked and replaced as needed. Such gravels were naturally deposited in segment 1 prior to 1941, but the LADWP diversion dam stopped this natural process. (NAS&MLC IX, p. 6.)

The two instream flow recommendations provided to the SWRCB are those in DFG's Lee Vining Creek Stream Evaluation Report 93-2 (DFG 54 & 55) and the flows described in the revised LADWP Mono Lake Management Plan. The DFG report recommended instream flows to maintain fish in good condition pursuant to Fish and Game Code Sections 5937 and 5946. (DFG 3, p. 4.) The DFG's instream flow recommendations were also presented as flows needed to re-establish and maintain the conditions that benefitted the fishery prior to Los Angeles' diversions. (RT XX, 71:12-71:15.) DFG's study was based upon data collected utilizing the previously described IFIM and PHABSIM.

The LADWP recommendation was based upon evaluation of flows needed to maintain the fishery, historic hydrology, past operational practices and the need for additional flows to meet Mono Lake level objectives. In contrast to the DFG flow recommendations, LADWP recommended the same flows for all hydrologic year types. Although the flows recommended by LADWP would sustain a fishery at some level in Lee Vining Creek, the SWRCB concludes that those flows would not be sufficient to reestablish and maintain the fishery that existed prior to LADWP's diversion of water.

During wet hydrologic years, DFG recommended an increase in the May, June, July and August flows from 54 cfs to 95 cfs. (See Table 1 above.) The rationale, described in DFG Exhibit 54, used for the selection of this increase is to provide 90 percent to 100 percent of the maximum WUA for adult brown trout, 74 percent to 82 percent of the maximum fry habitat, 97 percent to 98 percent of the maximum juvenile habitat and to provide 100 percent of the maximum WUA for spawning.

LADWP argued that providing 80 percent to 85 percent of the maximum WUA would maintain a viable fishery and that it is not appropriate to select 100 percent of the maximum WUA. Instead, LADWP contends it is more appropriate to select the point of change where a significant increase in instream flow results in small increases in habitat. (LADWP 17, p. 58.)

The instream flow requirements established in this decision for May through August of wet hydrologic years are different than the DFG and LADWP recommendations. Examination of the flows associated with 90 percent and 100 percent of the maximum WUA for adult brown trout suggests that a significant flow increase is required to gain 10 percent in WUA. Ninety percent of WUA is provided at a flow of 54 cfs, whereas 100 percent of WUA would require 95 cfs. A reduction of flow from 95 to 54 cfs actually results in a slight increase in useable habitat for juvenile trout which are also present during the April through September period.

In his written testimony, Mr. Trihey concludes that "...the restoration treatments implemented thus far will provide good to very good fish habitat (e.g., depth and velocity for adult and juvenile fish) over a broad range of streamflows." (NAS&MLC 1X, p. 2.) A minimum instream flow requirement of 54 cfs for April through September would provide 90 percent of the maximum WUA for adults and 98 percent of the maximum WUA for juveniles. In combination with the restoration work already completed and the other fishery protection measures established in this decision, a flow of 54 cfs for April through September in both normal and wet years will be sufficient to restore and maintain the fishery that existed in Lee Vining Creek before LADWP began its Mono Basin diversions.

With the exception of the flow requirements for May through August of wet years, we adopt the fishery flow recommendations proposed by DFG for Lee Vining Creek. Based on the evidence presented we conclude that the following flows below the Lee Vining conduit diversion facility will maintain fish in good condition pursuant to Fish and Game Code Section 5937 and that the specified flows are needed to reestablish and maintain a fishery similar to that which existed in Lee Vining Creek prior to the export of water by LADWP.

TABLE 4: INSTREAM FLOW REQUIREMENTS FOR LEE VINING CREEK*

DRY HYDROLOGIC CONDITIONS-LEE VINING CREEK	
APRIL 1 THROUGH SEPTEMBER 30	37 CFS
OCTOBER 1 THROUGH MARCH 31	25 CFS
NORMAL HYDROLOGIC CONDITIONS-LEE VINING CREEK	
APRIL 1 THROUGH SEPTEMBER 30	54 CFS
OCTOBER 1 THROUGH MARCH 31	40 CFS
WET HYDROLOGIC CONDITIONS-LEE VINING CREEK	
APRIL 1 THROUGH SEPTEMBER 30	54 CFS
OCTOBER 1 THROUGH MARCH 31	40 CFS

* The instream flow requirements are the flows specified in the table or the inflow to LADWP's point of diversion, whichever is less.

5.1.3 *Channel Maintenance and Flushing Flows*

The DFG channel maintenance and flushing flow recommendations for Lee Vining Creek were presented by Dr. G. Mathias Kondolf in DFG Exhibit 170, later superseded by DFG Exhibit 170A. Dr. Kondolf's written testimony described the scope of his research in the Mono Basin. (DFG 11.) The result of his reseach on Lee Vining Creek is included in the Stream Evaluation Report on Lee Vining Creek prepared by Aquatic System Research. (DFG 54 and 55.) DFG's Exhibit 170 proposed a specific channel maintenance and flushing flow requirement for dry, normal and wet hydrologic conditions. The revised exhibit (DFG 170A) reflects a revised ramping flow recommendation of 20 percent maximum change in streamflow per 24-hour period during the ascending flow change and a 15 percent maximum change per 24 hour period during the descending flow. (RT XXXIX, 87:21-88:7.) The ramping rate recommendation for Lee

Vining Creek takes into account the availability of upstream flows and LADWP's inablity to regulate flows in Lee Vining Creek through release of water from storage. Table 5 presents DFG's channel maintenance and flushing flow recommendations for Lee Vining Creek for the different hydrological year types.

TABLE 5: CHANNEL MAINTENANCE & FLUSHING FLOW REQUIREMENTS LEE VINING CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	160 CFS FOR A MINIMUM OF THREE DAYS DURING MAY, JUNE OR JULY
WET YEAR	160 CFS FOR 30 CONSECUTIVE DAYS DURING MAY, JUNE OR JULY
RAMPING RATE - 20% CHANGE DURING ASCENDING FLOW AND 15% DURING DESCENDING FLOWS PER 24 HOURS	

The ramping requirement applies to changes in flow made by LADWP. LADWP is not required to compensate for natural fluctuations in flow.

Testifying on behalf of LADWP, Dr. Robert Beschta acknowledged that ramping rates should be developed to prevent exceptionally rapid changes in flows and that the occurrence of peak flows of varying timing and magnitude should also be captured in the flow regimes for Lee Vining Creek. (LADWP 9, Section 2, p. 23.) The LADWP proposal for channel maintenance and flushing flows for Lee Vining Creek is set forth in LADWP Exhibit 133, Table 2.

Witnesses testifying on behalf of DFG and LADWP both acknowledged the need for and provided recommendations regarding channel maintenance and flushing flows. LADWP provided little testimony in support of the numbers recommended in its Management Plan for channel maintenance and flushing purposes. The explanation provided in support of the DFG recommendation was more detailed and specific regarding the procedures used to develop the recommendation. Consequently, for purposes of this decision, the SWRCB adopts the channel maintenance and flushing flow requirements for Lee Vining Creek below the LADWP diversion facility as proposed by DFG and as set forth in Table 5 above. The justification for this requirement is based upon the documentation provided by DFG, NAS&MLC and LADWP. (DFG 168 and 170A; NAS&MLC 1X; and LADWP 9.)

5.1.4 *Additional Measures to Assist Restoration of Pre-Project Fishery*

The long period of little or no flow in the four Mono Basin streams from which LADWP diverts water resulted in significant losses of riparian vegetation and other deterioration of channel conditions. In addition to testimony regarding recommended flow regimes needed for fishery habitat and channel maintenance, there was considerable evidence presented regarding the potential need for other measures which would assist in restoring the four streams. During the period of the preliminary injunction, considerable restoration work on Lee Vining Creek has already been completed under the supervision of the Restoration Technical Committee at the direction of the El Dorado County Superior Court.

Mr. Trihey, testifying on behalf of NAS&MLC and Cal Trout, described the extensive restoration treatment performed by Trihey and Associates under the direction of the Restoration Technical Committee. These treatments are described in a number of NAS&MLC exhibits. (NAS&MLC 106, 107, 108, 110, 111, 112, 115, 116, 119, 120, 123, 125, 126, 127, 128, 129, 130, 131, 132, 136, 175, 217.) Cal Trout also submitted many of these same exhibits. During his testimony, Mr. Trihey summarized the treatments that had been completed at the time of the hearing. He suggested that the restoration work completed thus far on Lee Vining Creek has significantly improved the amount and quality of the fish habitat in the portion of the stream affected by LADWP diversions. (NAS&MLC 1Y, p. 17.)

As mentioned previously, Mr. Trihey's written testimony states that the restoration treatments implemented by the time of the hearing "will provide good to very good fish habitat (e.g., depth and velocity for adult and juvenile fish) over a broad range of stream flows." (NAS&MLC 1x, p. 2.) Mr. Trihey indicated that, with completion of a few minor tasks, the stream will do well in time. (RT XXVIII, 21:20-22:12.)

The additional treatments recommended by Mr. Trihey to complete the restoration of the conditions that benefitted the prediversion fishery on Lee Vining Creek include the following:

> Segment 1--minor improvements to boulder weirs which were installed to hold spawning gravel in place during periods of channel maintenance flows, removal of willows from a developing side channel at restoration site LV 1.6, and replacement of approximately 300 cubic yards of spawning gravel at restoration sites LV 1.1, 1.4, 1.6 and LV 1.7;
>
> Segment 2--no further work is required;
>
> Segment 3--add approximately 100 cubic yards of spawning gravel to rewatered channels, place and anchor large woody debris along the main channel, remove excess sediment deposits from the B-1 channel, develop pool habitat in segment 3-d and implement phase II of the revegetation plan. (NAS&MLC 1Y, pp. 17-18.)

LADWP presented testimony by Dr. Beschta that the most important restoration activity for Lee Vining Creek is the return of continuous flows to the creek. The elimination of grazing in the riparian corridor and the reestablishment of streamflows has created conditions which are allowing the successful establishment and growth of riparian vegetation. Dr. Beschta believes that structural approaches to restoration provide little functional improvement to stream or riparian systems and may actually be counterproductive to providing sustainable fisheries habitat. The only structural modification he recommended was the construction of a sediment bypass system at the Lee Vining Creek diversion. He recommended that the flows released should: mimic the undisturbed flow regime; include ramping constraints; and that the minimum flow designed for the fishery should always be allowed to bypass the diversion. (LADWP 9, Section 2, pp. 22-23, 39.)

Restoration which occurs through natural processes is likely to be less dependent upon continued human intervention. In some situations, however, active intervention is necessary in order to restore conditions that benefitted the fishery in Lee Vining Creek. The record supports the conclusion that, in addition to the flow requirements discussed above, the following measures should be undertaken to restore and maintain in good condition the fishery that existed in Lee Vining Creek prior to the diversion of water by LADWP:

1. A sediment bypass system should be constructed at the Lee Vining Creek diversion.

2. Livestock grazing should be prohibited within the lower Lee Vining Creek riparian corridor for a minimum of ten years from the date of this order. Any resumption of grazing in the future should be subject to approval by the Chief of the Division of Water Rights of a plan prepared by LADWP in consultation with DFG.

3. Boulder weirs as described by Mr. Trihey in NAS&MLC Exhibit 1Y should be anchored sufficiently to hold the spawning gravel in place during the anticipated channel maintenance and flushing flows.

4. Two auxiliary flood flow channels should be reopened. The auxiliary stream channel that parallels Highway 120 should be reconnected to the main channel. The channel described by the Restoration Planning Team as 3A-4 should also be reconnected to the main channel. The alteration of the stream and the auxiliary channels should be kept at a minimum in order to minimize disturbance of the riparian area.

5. LADWP should evaluate the need for spawning gravel distribution in Lee Vining Creek below the LADWP diversion facility.

6. Vegetation disturbed by construction for any of the restoration activities required by this order should be restored. Revegetation should commence as soon as construction activities have been completed.

7. LADWP should install a continuous recording device satisfactory to the Chief of the Division of Water Rights to measure the flow at the Lee Vining Creek diversion and the flow in the stream immediately below the Lee Vining Creek diversion.

8. LADWP should consult with DFG regarding the revegetation necessary to maintain fish in good condition in Lee Vining Creek.

The installation of a continuous flow recording device and the prohibition of grazing in the riparian corridor can be implemented without the need for a lengthy planning period. The other measures specified above should be addressed in the stream restoration plan required to be prepared under the provisions of this decision.

5.2 Walker Creek

5.2.1 *Pre-Project Conditions*

In comparison to amount of evidence presented regarding Lee Vining and Rush Creeks, very little information was presented concerning pre-1941 conditions on Walker Creek. DFG's recommendations for instream flows and restoration requirements on Walker Creek are presented in the Walker Creek Stream Evaluation Report 92-1, Volumes 1 and 2. (DFG 56 and 57.)

The descriptions and accounts of the pre-1941 fishery are limited to brief descriptions provided by Eldon Vestal in his written testimony as it related to Rush Creek. (CT 5.) Mr. Vestal testified that both Parker Creek and Walker Creek were continuous in their natural condition, especially during wetter years. Both of these streams provided important nursery and breeding areas for Rush Creek, as well as supporting a local fishery. (CT 5, p. 14.) The descriptions of pre-1941 conditions on Walker Creek discussed in DFG Exhibit 56 were collected from documents and transcripts of proceedings in the El Dorado County Superior Court. (DFG 56, p. 20, citing Reporter's Transcripts of proceedings on May 3 and 4, 1990.)

Walker Creek was impacted by grazing and irrigation prior to the diversion of water for export by LADWP in 1941. The continued grazing and irrigation diversions, combined with the export of water beginning in 1941, severely degraded the aquatic and riparian environments. Complete diversions of the entire streamflow for export and irrigation occurred several months annually. (DFG 56, p. i.)

Walker Creek was planted with fish in the early 1900s under intermittent flow conditions from in-basin irrigation practices. The fishery continued to exist near the confluence with Rush Creek, as water was maintained in this segment by accretion from springs in the lower reaches. Brook trout and Lahonton cutthroat trout were introduced to Walker Creek in 1932 and 1933, in addition to brown trout, which continued to be planted in Rush Creek through about 1942. (DFG 56, p. 8.) The Walker Creek fishery endured until the mid-1950s under intermittent streamflow conditions. (DFG 56, p. 8.)

There is limited information available regarding the pre-project fishery that existed on Walker Creek. The record indicates that Walker Creek supported a limited trout fishery, the extent of which is unknown. The fishery may have naturally experienced periodic dewatering of the main stream channel but fish were able to move upstream or downstream into Rush Creek as instream flows subsided.

5.2.2 *Instream Flows for Fishery Protection*

DFG prepared the Walker Creek Instream Flow Report 92-1 in cooperation with LADWP. (DFG 56 and DFG 57.) Ebasco Environmental (Ebasco) of Sacramento was jointly selected by DFG and LADWP to conduct the investigation. The purpose of the study was to provide a plan to restore and optimize the presently degraded aquatic and riparian environments in lower Walker Creek.

DFG recommended the instream flows shown in Table 6, to maintain fish in good condition as required by Fish and Game Code Sections 5937 and 5946, until the stream reaches dynamic equilibrium and a more exact evaluation can be conducted. (DFG 3, p. 6.) In effect, DFG recommends continuation of the flow regime developed by the El Dorado Superior Court as set forth in its "Order Setting Interim Flows" dated June 14, 1990. LADWP recommended the same instream flows for protection of fish in Walker Creek. (LADWP 133, p. 2.) The recommended minimum flow requirements do not vary based on dry, normal or wet hydrologic year types. LADWP and DFG recommend that the minimum instream flow requirement be the flow specified in Table 6 or the inflow to the Walker Creek diversion facility, whichever is less. Based on the evidence presented, the SWRCB concludes that LADWP's licenses should be amended to include the minimum instream flow requirements specified in Table 6 below or the inflow to the Walker Creek diversion facility, whichever is less.

TABLE 6: WALKER CREEK INSTREAM FLOW REQUIREMENTS*

MONTH	STREAMFLOW
APRIL	6.0
MAY	6.0
JUNE	6.0
JULY	6.0
AUGUST	6.0
SEPTEMBER	6.0
OCTOBER	4.5
NOVEMBER	4.5
DECEMBER	4.5
JANUARY	4.5
FEBRUARY	4.5
MARCH	4.5

*All flows are in cubic feet per second (cfs)

5.2.3 *Channel Maintenance and Flushing Flows*

DFG presented channel maintenance and flushing flow recommendations for Walker Creek in DFG Exhibits 56 and 170A. The original recommendation was for 15 to 30 cfs initially for 1 to 4 days during the snowmelt season. During wet years flows up to 30 cfs could be released to provide more flushing. The original recommendation was later revised to the flows specified in Table 7. (DFG 170A.) The ramping rate applies only if LADWP is diverting water for export. If LADWP is not diverting water, flows may fluctuate in accordance with the inflow to the diversion facility. Based on the evidence provided in support of the channel maintenance and flushing flows recommended by DFG, the SWRCB concludes that the evidence supports adoption of a channel maintenance and flushing flow requirement for Walker Creek as recommended by DFG and as specified in Table 7 below.

TABLE 7: CHANNEL MAINTENANCE AND FLUSHING FLOWS FOR LOWER WALKER CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	No Requirement
NORMAL YEAR	15 to 30 cfs for 1 to 4 days between May 1 and July 31
WET YEAR	15 to 30 cfs for 1 to 4 days between May 1 and July 31
RAMPING RATE - 10% CHANGE IN STREAMFLOW PER 24 HOURS	

The ramping requirement applies to changes in flow made by LADWP. LADWP is not required to compensate for natural fluctuations in flow.

5.2.4 *Additional Measures to Assist the Restoration of the Pre-Project Fishery*

In 1990, the Walker Creek channel was modified in anticipation of rewatering pursuant to the Superior Court order setting interim flows. The modifications included removal of sediments and sod to increase channel capacity, closing of irrigation channels, and removal of channel obstructions such as soils, berms and small loose woody debris. Restoration of flow to Walker Creek in October 1990 created a continuous instream flow to the confluence with Rush Creek. DFG planted approximately 550 hatchery reared brown trout on November 29, 1990. By July 1991, both hatchery and wild brown trout were in Walker Creek downstream of the LADWP diversion facility. (DFG 56, p. 44.)

The DFG reported that the new streamflows, along with the use of livestock exclosure fences to protect riparian areas from grazing, allowed renewed growth of riparian vegetation which in turn provided cover and food supplies for fish. (DFG 56, p. 44.) The instream flow recommendation was intended to provide protective habitat until an instream flow study could be conducted and optimal flows were in place. The 1992 DFG report states:

> "Fish habitat from the conduit to Rush Creek has been provided for under the present flow regime (Ebasco Environmental 1991, 1992). This regime has supported healthy trout and diverse populations of aquatic invertebrates. Further, summer water temperatures have been within the optimum range for trout, and the

channel location appeared stable." (DFG 56, p. 118; DFG 64, p. 75.)

The restoration monitoring of Parker and Walker Creeks conducted by Ebasco for LADWP documented the physical and biological condition of these creeks before and after channel modifications and after rewatering. (DFG 64, p. 1.) Streamflows in Walker Creek measured directly below the diversion dam during January through March, and August through November, ranged from 1 to 13 cfs. During much of the year, flows were below the 6.0 cfs specified in the Superior Court order due to insufficient flows upstream of the diversion facility. (DFG 64, p. i.)

The monitoring program concluded that summer temperatures did not appear to pose a threat to self-sustaining brown trout populations. Several other factors may pose a threat to brown trout. These may include low winter flows and low water temperatures causing instream icing and the blockage of migration routes by the LADWP diversion facility, Parshall flumes and the Highway 395 culvert. Wild fish captured below the diversion facility indicate recruitment from upstream as these fish evidently passed through the conduit bypass pipe. However, the Parshall flumes and the Highway 395 culvert have prevented upstream migration from Rush Creek beyond those points. (DFG 64, p. 73.)

The Walker Creek study described several degraded conditions that are considered limiting to the fishery. (DFG 56.) The primary concern is the need for stable instream flows. Extensive livestock grazing has resulted in the loss of a significant amount of the riparian vegetation and the deterioration of the defined banks and channels. Dewatering of the main channel for irrigation stranded fish and deprived the riparian vegetation of water. Construction and operation of the diversion facility by LADWP blocked fish migration and trapped sediments and gravel.

DFG recommends the construction and operation of a bypass system around the LADWP diversion facility to restore fish passage, allow sediment and gravel transport, and to improve benthic drift. The design of this system should consider restoration of the contiguous stream condition while maintaining diversion capabilities. The bypass system should be designed to prevent the entrapment of fish in the bypass facility and should be screened to prevent fish from entering the conduit. (DFG 56, p. 56.) Until the bypass channel is operational, spawning gravel should be distributed below the diversion facility to maintain gravel distribution to downstream areas. (DFG 56, p. 57.)

To reduce entrainment of fish in the irrigation channels, all diversions should be screened to prevent fish from entering. To optimize habitat conditions, DFG recommended locating all intakes for irrigation at the diversion dam, screening the intake, and conveying irrigation water to the irrigation channels via rigid or flexible pipe. Relocating the intakes to the diversion facility would eliminate the need to operate and maintain instream diversion structures. (DFG 56, p. 57.)

The SWRCB concludes that Walker Creek is maintaining a self-sustaining brown trout fishery. The evidence indicates that the riparian vegetation has shown considerable improvement since the 1990 rewatering and the elimination of grazing. Any future revegetation programs should be based upon evaluation of site-specific needs. Fish passage is restricted by the Parshall flumes, the LADWP diversion dam, and the Highway 395 culvert. Fish populations are still low, possibly due to limited flows available as recovery from drought continues and due to blockage of upstream and downstream migration.

The plans described by DFG indicate that the need for implementing many of the potential restoration measures depends upon field conditions. Due to changing land use practices and ongoing restoration activities such as livestock exclosure fencing, aquatic and riparian losses are decreasing and the need for some of the restoration measures recommended in the DFG report may also decrease. In addition, construction of livestock exclosure fences and continued instream flows could increase natural regeneration and reduce the need for site revegetation.

Therefore, the DFG report concludes that need should be confirmed before implementing specific recommended restoration measures. (DFG 56, pp. 118-119.)

The evidence in the record supports the conclusion that, in addition to the flow requirements discussed above, the following other measures should be undertaken to restore and maintain in good condition the fishery that existed in Walker Creek prior to the diversion of water by LADWP:

1. A fish and sediment bypass system should be constructed around the Walker Creek diversion facility.

2. Livestock grazing should be prohibited within the lower Walker Creek riparian corridor downstream of the LADWP diversion point for a minimum of ten years from the date of this order. Any resumption of grazing in the future should be subject to approval by the Chief of the Divsion of Water Rights of a plan prepared by LADWP in consultation with DFG.

3. Minimum flows released to maintain the fishery should remain in the stream channel and should not be diverted for any use other than maintenance of the Walker Creek fishery.

4. Spawning gravel should be distributed below the LADWP Walker Creek diversion facility until such time as the bypass stream has become operational.

5. If LADWP continues irrigation from Walker Creek, then all irrigation facilities should be constructed and operated in a manner that does not not impede fish passage and screened to prevent fish from becoming stranded in irrigation channels.

6. Vegetation disturbed by construction for any of the restoration activities required by this decision should be restored and revegetation should commence as soon as construction activities have been completed.

7. LADWP should consult with DFG regarding the revegetation that may be necessary to maintain fish in good condition in Walker Creek.

8. LADWP should install and maintain continuous recording devices satisfactory to the Chief of the Division of Water Rights to measure the streamflow above the Walker Creek diversion facility and the flow immediately below the diversion facility.

The installation of a continuous flow recording device and the prohibition of grazing in the riparian corridor can be implemented without the need for a lengthy planning period. The other measures specified above should be addressed in the stream restoration plan to be prepared under the provisions of this decision.

5.3 Parker Creek

5.3.1 *Pre-Project Conditions*

As in the case of Walker Creek, relatively little evidence was presented regarding pre-1941 conditions on Parker Creek. DFG's recommendations for instream flows and restoration measures for Parker Creek are presented in the Parker Creek Stream Evaluation Report 92-2, Volumes 1 and 2, dated December 1992, prepared by Ebasco Environmental. (DFG 58 and DFG 59.)

Prior to the diversion of water by LADWP in 1941, Parker Creek supported a trout fishery. The riparian corridor was typically willow thickets and deciduous hardwood forest. Ebasco used 1929 aerial photographs to determine the extent of the pre-diversion riparian corridor. These photographs were compared to 1990 aerial photographs to determine the gains or losses in the riparian corridor following the start of water diversions by LADWP.

The pre-1941 aquatic environment was degraded by extensive livestock grazing and water diversions for irrigation. (DFG 58, pp. 1-3; LADWP 9, Section 2 pp. 21-22.) Prior to 1941, Parker

Creek was planted with brown trout, Lahonton cutthroat trout and brook trout. The fishery continued to exist with intermittent flow conditions through the 1950s. (DFG 58, p. 8.) Parker Creek was rewatered in 1990, and shortly thereafter it was stocked with brown trout by DFG.

5.3.2 *Instream Flows for Fishery Protection*

DFG prepared the Parker Creek Instream Flow Report 92-2 in cooperation with LADWP. (DFG 58.) Ebasco Environmental (Ebasco) of Sacramento was jointly selected by DFG and LADWP to perform the investigation. The objectives of the study were to develop a plan to restore and optimize the degraded aquatic and riparian environments of lower Parker Creek. From 1940 to 1990, the streamflow was diverted at the LADWP diversion facility, and the downstream channel remained dewatered for several months annually (DFG 58, p. i.) Except during periods of very high natural runoff or local irrigation, the annual dewatering of Parker Creek eliminated both aquatic habitats and biological resources, and desiccated riparian habitats. (DFG 58, p. 2.)

DFG recommended the instream flows shown in Table 8 to maintain fish in good condition as required by Fish and Game Code Section 5937 until the stream reaches dynamic equilibrium and a more exact evaluation can be conducted. (DFG 3, p. 6.) LADWP recommended the same instream flows as DFG. (LADWP 133, p. 2.) As in the case of Walker Creek, the minimum flows recommended by DFG are the same as the minimum flows required by the El Dorado Superior Court in its "Order Setting Interim Flows" dated June 14, 1990. The recommended flow requirements do not vary based on dry, normal or wet hydrologic year types. LADWP and DFG recommend that the minimum flow requirements be the flow specified in Table 8 below or the inflow to the Parker Creek diversion facility, whichever is less. Based on the evidence presented, the SWRCB concludes that LADWP's licenses should be amended to include the minimum instream flow requirements specified in Table 8 or the inflow to the Parker Creek diversion facility, whichever is less.

TABLE 8: PARKER CREEK INSTREAM FLOW REQUIREMENTS*

MONTH	STREAMFLOW
APRIL	9.0
MAY	9.0
JUNE	9.0
JULY	9.0
AUGUST	9.0
SEPTEMBER	9.0
OCTOBER	6.0
NOVEMBER	6.0
DECEMBER	6.0
JANUARY	6.0
FEBRUARY	6.0
MARCH	6.0

*All flows are in cubic feet per second (cfs)

5.3.3 *Channel Maintenance and Flushing Flows*

DFG presented its initial channel maintenance and flushing flow recommendations for Parker Creek in DFG Exhibits 3 and 58. The original recommendation of 25 to 40 cfs for one to four days each year was later revised to the flows specified below in Table 9. (DFG 170A.) The ramping rate applies only if LADWP is diverting water for export. If LADWP is not diverting water, flows may fluctuate in accordance with the inflow to the diversion facility. If LADWP is diverting water, the ramping rate shall be a 10 percent change in streamflow per 24 hours. (DFG 170A.) Based on the evidence provided in support of the channel maintenance and flushing flows recommended by DFG, the SWRCB concludes that the evidence supports adoption of a channel maintenance and flushing flow requirement for lower Parker Creek as recommended by DFG and as specified in Table 9 below. (DFG 168 and 170A.)

TABLE 9: CHANNEL MAINTENANCE AND FLUSHING FLOWS FOR LOWER PARKER CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	25 to 40 CFS FOR 1-4 DAYS BETWEEN MAY 1 AND JULY 31
WET YEAR	25 to 40 CFS FOR 1-4 DAYS BETWEEN MAY 1 AND JULY 31
RAMPING RATE - NOT TO EXCEED A 10% CHANGE IN STREAMFLOW PER 24 HOURS	

The ramping requirement applies to changes in flow made by LADWP. LADWP is not required to compensate for natural fluctuations in flow.

5.3.4 *Additional Measures to Assist the Restoration of Pre-Project Fishery*

In 1990, the Parker Creek channel was modified in anticipation of rewatering pursuant to the Superior Court order setting interim flows. The modifications included removal of sediments and sod, closing of irrigation diversion channels, and removal of channel obstructions such as the Parker Plug, soils, berms and small loose woody debris. Restoration of flows to Parker Creek in October of 1990 created a continuous instream flow to the confluence with Rush Creek. DFG planted brown trout in Parker Creek below the LADWP diversion facility on November 29, 1990 and August 8, 1991. (DFG 58, p. 45.) DFG reported that the new streamflows, along with the use of livestock exclosure fences to protect riparian areas from grazing, allowed renewed growth of riparian vegetation which in turn has provided cover and food supplies for fish.

The Parker Creek report describes various degraded conditions which could be limiting for the fishery. The primary concern is the need for stable instream flows. Extensive livestock grazing resulted in the loss of much of the riparian vegetation and the deterioration of the defined banks and channels. Irrigation also added to the degradation of Parker Creek by dewatering the main channel and stranding fish. (DFG 58.)

The channel modifications completed prior to the rewatering of Parker Creek in 1990 improved the aquatic and riparian habitat. However, if some of the stable woody debris had not been previously removed as part of that process, it would have created fish habitat structures upon rewatering. (DFG 58, p.119.) Natural recovery of the aquatic and riparian habitat was apparent in 1991, approximately one year after the channel had been rewatered. Nevertheless, degradation of aquatic habitat remained due to a number of factors. Among the problems identified in the DFG report was trapping of sediment (including spawning gravels) at the diversion facility, and possible entrainment of fish at the diversion conduit. The conduit diversion dam, Parshall flumes and the Highway 395 culvert remain as barriers to fish migration. (DFG 58, p. 119.)

The restoration monitoring of Parker and Walker Creeks conducted by Ebasco for LADWP documented the physical and biological condition of these streams before and after channel modifications, and after rewatering. (DFG 64, p. 1.) Mean daily streamflows between November 19, 1990 and October 31, 1991 downstream of the Parshall flume on Parker Creek ranged from 0.5 to 30.9 cfs. During much of the year, flows were below the 9.0 and 6.0 cfs specified in the Superior Court order due to insufficient flows upstream of the diversion facility. (DFG 64, p. 51.)

The Ebasco monitoring program concluded that there is some recruitment of wild fish from the upstream population to lower Parker Creek. The Parshall flume and the Highway 395 culvert have inhibited upstream movement of fish from Rush Creek into Parker Creek beyond those structures. (DFG 64, p. 73.) The fish populations were sampled in lower Parker Creek in 1991. The results indicated an absence of hatchery reared trout and a low number of wild trout. (DFG 64, p. 63 Table 3-11.) There is some evidence that low winter flows in Parker Creek in combination with low water temperatures may have led to development of instream ice conditions reducing the survival of hatchery fish planted in Parker Creek in 1990. (DFG 64, p. 73.) Monitoring of water temperatures in Parker Creek indicated that mean daily temperatures did not exceed 15.5° C, and the highest maximum temperature recorded is 17.5°C which is below the upper limit of the optimal temperature range for brown trout of 19.0° C. (DFG 64, p. 60, Table 3-10; DFG 64, p. 73.)

DFG recommends the construction and operation of a bypass system around the LADWP diversion facility to restore fish passage and allow sediment bypass. The design of this system should consider restoration of the contiguous stream condition while maintaining diversion capabilities. The bypass system should be designed to prevent the entrapment of fish in the bypass facility and should be screened to prevent fish from entering the conduit. (DFG 58, p. 57.) DFG also recommends removal of fish migration barriers and revegetation for areas not experiencing natural habitat recovery. (DFG 58, p. 119.)

As in the case of Walker Creek, DFG advises that the need for implementing many of the restoration measures it has identified depends upon field conditions. Due to changing land use practices and ongoing restoration activities such as livestock exclosure fencing, aquatic and riparian losses are decreasing and the need for some of the restoration measures recommended in the DFG plan may also decrease. DFG also advises that construction of livestock exclosure fences and continuation of instream flows could increase natural regeneration and reduce the need for site revegetation. Therefore, the DFG report concludes that need should be confirmed before implementing specific recommended restoration measures. (DFG 58, pp. 118-119.)

Based on the evidence presented, the SWRCB concludes that Parker Creek supported a brown trout fishery prior to the export of water by LADWP. Although extensive grazing existed in the riparian corridor, the riparian corridor was more extensive than that which exists today. Natural recovery has begun since the rewatering of Parker Creek was required by court order in 1990. Restoration activities such as removal of the Parker plug, channel modification prior to rewatering, livestock exclosure fences, maintenance of continuous streamflows and planting of brown trout have resulted in a significant improvement of the aquatic and riparian habitat. The evidence in the record supports the conclusion that, in addition to the flow requirements specified above, the following measures should be undertaken to restore and maintain in good condition the fishery as it existed in Parker Creek prior to the diversion of water by LADWP:

1. A fish and sediment bypass system should be constructed around the Parker Creek diversion facility.

2. Livestock grazing should be prohibited within the Parker Creek riparian corridor downstream of the LADWP diversion point for a minimum of ten years from the date of this order. Any resumption of grazing in the future should be subject to approval by the Chief of the Divsion of Water Rights of a plan prepared by LADWP in consultation with DFG.

3. Minimum flows released to maintain the fishery should remain in the stream channel. No diversion or use of this water should be authorized for any use other than maintenance of the Parker Creek fishery.

4. Spawning gravel should be distributed below the LADWP Parker Creek diversion facility until such time as the bypass stream has become operational.

5. If LADWP continues irrigation from Parker Creek, then all irrigation facilities should be constructed and operated in a manner that does not not impede fish passage and screened to prevent fish from becoming stranded in irrigation channels.

6. Vegetation disturbed by construction for any of the restoration activities required by this order should be restored and revegetation should commence as soon as construction activities have been completed.

7. LADWP should consult with DFG regarding revegetation that may be necessary to maintain fish in good condition in Parker Creek.

8. LADWP should install and maintain continuous recording devices satisfactory to the Chief of the Division of Water Rights to measure the streamflow above the diversion facility and the flow immediately below the diversion facility.

Installation of a continuous flow recording device and the prohibition of grazing in the riparian corridor can be implemented without need for a lengthy planning period. The other measures specified above should be addressed in the stream restoration plan required to be prepared under the provisions of this decision.

5.4 Rush Creek

5.4.1 *Pre-Project Conditions*

Rush Creek is the largest tributary to Mono Lake. Numerous reports were submitted in these proceedings concerning stream and riparian conditions on Rush Creek prior to the diversion of water by the City of Los Angeles. (e.g., SWRCB 7; NAS&MLC 123, 125, 126, 133, 134, 136, 137, 264, and 265; CT 1, 5, 5B, 5S, and 8; and LADWP 1, 4, 7, 9, 15, 17, 19, 21, 43, 132, 136, 137, et al.) Trihey and Associates summarized a number of these documents in an attempt to describe the pre-1941 conditions on Rush Creek. (NAS&MLC 137.) The majority of the descriptions of the pre-project fishery are either the direct account of Eldon Vestal or they reference his testimony in the Superior Court or material he prepared for this proceeding.

Mr. Vestal's testimony indicates he was familiar with the Rush Creek fishery as it existed prior to the diversion of water by LADWP in 1941. His experience included a Test Stream Study on Rush Creek, review of the fish planting records for the region, and his overall experience in the Mono Basin. (CT 5, p. 8.) Mr. Vestal described DFG's activities, including hatchery and egg collection operations on Rush Creek. (CT 5F, 5G.) He also described the type and quantities of fish that were present prior to 1941, testifying that "...Rush Creek produced among the largest and hardiest trout in the region." (CT 5, p. 11.) DFG began planting brown trout in the 1930s in response to local angling pressure. Mr. Vestal indicated that he regularly observed brown trout, averaging 13 to 14 inches, in lower Rush Creek. Rush Creek was a popular fishing attraction from the 1920s through the 1940s because of the quality fishing.

Dr. Beschta testified that pre-project stream and riparian conditions on Rush Creek were similar to those summarized by Trihey and Associates. (LADWP 9, p. 137.) His testimony differed with regard to the effects of irrigation practices, grazing, the physical description of the stream channel and the riparian vegetation. Based on his interpretation of historic photographs and field observations, Dr. Beschta concluded that Rush Creek occupied a sinuous single thread channel throughout most of its length with channel widths of 30 feet or less and pools likely to occur at meander bends or where flows interacted with the root masses of mature streamside vegetation. Dr. Beschta believes that changes in channel pattern below Indian Ditch indicate grazing was causing the channel to widen and shallow. Dr. Beschta's written testimony states that the general braiding of the channel and reduced streamside vegetation are definite indicators of channel instability, widening, and shallowing. (LADWP 137, p. 4.) Dr. Beschta believes that the multi-channels were mostly irrigation ditches and overflow channels which were not watered throughout the year.

Prior to export of water from the Mono Basin, water diverted for irrigation onto both sides of the bottomlands assisted in maintaining high densities of woody plants away from the main channel. The water diverted for irrigation or subsurface seepage caused the occurrence of several ponded areas alongside Rush Creek downstream of the Narrows. (LADWP 137, p. 4.) Extensive grazing pressure had caused significant changes to understory plants but the overstory remained intact. Channel banks and water quality had been impacted by livestock grazing, but widespread channel changes had not yet occurred. From the Narrows downstream to the Indian Ditch diversion, there were long, smooth meanders. (LADWP 137, p. 1.)

Anglers considered Rush Creek to be a very good trout stream, producing trout weighing 3/4 to 2 pounds fairly consistently. Aquatic and riparian habitat conditions differed considerably above and below the Narrows. The Narrows is a granitic dike crossing Rush Creek approximately midway between Grant Lake and Mono Lake. (NAS&MLC 125, p. 16.)

For study purposes, Mr. Trihey divided Rush Creek below Grant Lake into 5 segments: segments 1, 2 and 3 above the Narrows and segments 4 and 5 below the Narrows. Prior to LADWP's diversions, small clusters of Jeffery Pine grew along the stream corridor and a continuous ribbon of willow and cottonwood extended along much of the corridor from the historic Grant Lake to the Narrows. The riparian vegetation directly below Grant Lake (segment 2) has changed little since 1940. Prior to 1941, this segment had some streamflow during all months except during extreme drought winter periods. Seepage and ponded water in the historic Grant Lake and forebay prevented the channel from becoming entirely dry. (NAS&MLC 122.)

The upper portion of segment 3 also remained flowing most of the time. A small amount of water was contributed from seepage from A-Ditch and South Parker Creek. The middle reach of segment 3 was at times dry below B-Ditch to the confluence of Parker Creek. The lower segment 3 remained flowing most of the time gaining water from springs, and Parker and Walker Creeks, although very little contribution came from Parker and Walker Creeks during the irrigation season. The upper portion of segment 3 consisted of dense willows interspersed with pine trees. Also present were several cutoff meander bends and secondary channels. This area probably provided good habitat for fish. In addition, the secondary channels probably contributed to a reduction in streambed and streambank scouring during periods of high runoff by shunting a portion of the flood flow out of the main channel and onto a floodplain. It is uncertain whether or not these channels remained watered outside of the high flow period. (NAS&MLC 125, p. 17.)

In segment 4 downstream of the Narrows, Rush Creek opens into a broad, flat floored valley called the "bottomlands". Dr. Stine testified that the bottomlands were characterized by a wide and dense riparian corridor, wooded marshlands, wet meadows, ponded water, abundant springs and a system of narrow, steep-sided, low-gradient perennial channels. (NAS&MLC 1W.) The spring flow in the bottomlands was a combination of natural and artificially induced flows resulting from irrigation on the Cain Ranch and in the Pumice Valley with an average annual application of 30,000 acre-feet. The spring systems and the natural high water table supported dense stands of riparian vegetation. (NAS&MLC 122.) Mr. Vestal reported that springs provided lush watercress beds that produced important trout foods. (CT 5, p. 14.)

In segment 5, which is below the meadows described in segment 4, little if any spring flow occurred. Dikes had been constructed between the County Road and Mono Lake. The dikes formed ponds and freshwater marshy areas. These ponds provided habitat for large brown trout and waterfowl. (DFG 137.) The fish and wildlife habitat provided by these ponds was present only because of the construction of dikes to store water.

Segments 4 and 5 remained flowing most of the time. Water was contributed from springs, Parker and Walker Creeks and some irrigation return flow. The flow in many of the auxiliary channels was supported by return flow from irrigation and subterranean contribution from springs. (NAS&MLC 122.)

Prior to 1941, healthy stands of vegetation were commonly found along all reaches of Rush Creek. The riparian zone was generally characterized by a dense multilayered canopy of trees, shrubs and herbaceous plants. Approximately 271 acres of woody vegetation and 131 acres of meadows were present along Rush Creek in 1940. Prior to the export of water by LADWP, there were only localized impacts to riparian vegetation. The area around B-Ditch and the old Highway 395 crossing was degraded from construction of the highway and/or construction of B-Ditch. (NAS&MLC 122 and 137, p. 5-1.)

Based on the evidence in the record, the SWRCB concludes that the pre-1941 fishery in Rush Creek was predominately a self-sustaining brown trout fishery with some rainbow trout present. In the 1930s through the 1940s, the fishery was augmented with planted fish to offset heavy fishing pressure. The fisheries above and below the Narrows were considerably different. The grazing and irrigation practices in the area above the Narrows had degraded the habitat considerably. Lower Rush Creek also experienced damage from grazing and limited water supply, but maintained a higher quality fishery.

5.4.2 *Flows for Providing Fishery Habitat*

DFG submitted DFG Exhibits 52 and 53, Rush Creek Stream Evaluation Report 91-2, Volumes 1 and 2, which were prepared by Beak Consultants, Inc. (Beak) as a cooperative study funded by LADWP and DFG. This report is based on a comprehensive investigation which used the instream flow incremental methodology (IFIM) to determine instream flow requirements for brown trout in Rush Creek, based on fieldwork done in 1987. The study was comprised of investigative elements designed to identify instream flow needs and to provide a basis for flow recommendations. Flow recommendations were based upon habitat availability and historic flow, and were modified on the basis of stream channel stability and streambed mobility. Table 34 of the report presents flow recommendations for brown trout in lower Rush Creek during dry, normal and wet hydrologic years. (DFG 52, p. 107, Table 34.)

DFG's instream flow recommendations in this proceeding are set forth in an addendum to the report which presents revised instream flow recommendations for Rush Creek. (DFG 52, Addendum to "Instream Flow Requirements for Brown Trout, Rush Creek, Mono County, Volume 1," California Department of Fish and Game Stream

Evaluation Report 91-2.) The written testimony of Gary Smith explains DFG's rationale for revising the instream flow recommendations in the Beak report. (DFG 3, p. 3.) Mr. Smith explained that, prior to the publication of the 1991 report, a trout spawning gravel replenishment program was implemented on Rush Creek by the Rush and Lee Vining Creeks Habitat Restoration Technical Committee. In view of the gravel replenishment program, Mr. Smith testified that an upper limit of 60 cfs on recommended flows was no longer applicable. He went on to state that he used the information found in Tables 33 and 34 of DFG Exhibit 52, to develop revised instream flow regimes for releases at Mono Gate One for dry, normal and wet hydrological conditions, as shown in the addendum to the report. (DFG 3; DFG 52, pp. 105 and 107, Tables 33 and 34.) The primary difference is that the revised recommendation proposes higher flows for the months of May through September, in excess of the initial recommendation of 60 cfs for that period.

LADWP submitted two instream flow recommendations for Rush Creek. The initial recommendation was presented in the original LADWP Mono Lake Management Plan. As discussed in Section 5.1.1 above, the LADWP plan was revised and a new instream flow recommendation was presented which includes the minimum flows for the fishery and additional flows to protect Mono Lake. (LADWP 133, p. 2, Table 1).

Table 10 below shows the various instream flow recommendations for Rush Creek presented during the SWRCB proceedings, in addition to the interim flows established by the El Dorado County Superior Court and the flow requirements established in this decision. The flows represented in the column labeled "Beak" are the flow recommendations described in DFG Exhibit 52. (DFG 52, p. 107, Table 34.) The flow recommendations in the column labeled "DFG" are DFG's present recommendations as shown in the addendum to DFG Exhibit 52 and as described in DFG Exhibit 3. LADWP's original flow recommendations are shown in the column labelled "LADWP," and their revised recommendations are shown in the column labelled "LADWP Revised." (LADWP 53, Section 2,

p. 38; LADWP 133, p. 2, Table 1.) The interim flows set by the Superior Court are shown in the last column of the Table 10, and the flow requirements established in this decision are shown in the column labelled "SWRCB."

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TABLE 10: RUSH CREEK INSTREAM FLOW RECOMMENDATIONS/REQUIREMENTS*

HYDROLOGIC YEAR		MONTH	BEAK	DFG	SWRCB	LADWP	LADWP REVISED	INTERIM
	DRY	APRIL	35	35	31	30	30	40
		MAY	60	75	31	30	35	40
		JUNE	60	72	31	30	40	40
		JULY	45	45	31	30	40	40
		AUGUST	42	42	31	30	35	40
		SEPTEMBER	40	40	31	30	30	40
		OCTOBER	36	36	36	20	25	28
		NOVEMBER	30	30	36	20	25	28
		DECEMBER	30	30	36	20	25	28
		JANUARY	31	31	36	20	25	28
		FEBRUARY	32	32	36	20	25	28
		MARCH	34	34	36	20	25	40
	NORMAL	APRIL	59	59	47	30	30	40
		MAY	60	100	47	30	35	40
		JUNE	60	100	47	30	40	40
		JULY	60	100	47	30	40	40
		AUGUST	60	93	47	30	35	40
		SEPTEMBER	60	69	47	30	30	40
		OCTOBER	58	58	44	20	25	28
		NOVEMBER	40	40	44	20	25	28
		DECEMBER	40	40	44	20	25	28
		JANUARY	44	44	44	20	25	28
		FEBRUARY	48	48	44	20	25	28
		MARCH	52	52	44	20	25	40
	WET	APRIL	60	84	68	30	30	40
		MAY	60	100	68	30	35	40
		JUNE	60	100	68	30	40	40
		JULY	60	100	68	30	40	40
		AUGUST	60	100	68	30	35	40
		SEPTEMBER	60	100	68	30	30	40
		OCTOBER	60	93	52	20	25	28
		NOVEMBER	56	71	52	20	25	28
		DECEMBER	56	71	52	20	25	28
		JANUARY	57	57	52	20	25	28
		FEBRUARY	54	54	52	20	25	28
		MARCH	54	54	52	20	25	40

*All flows are in cubic feet per second (cfs)

Mr. Trihey suggested that with a range of streamflows from 30 to 100 cfs (DFG's recommendation) the treatments that are in place will work well. Channel flushing and maintenance flows of 350 cfs would result in minimal erosion of streambed and banks. He also indicated that opening up the historic channels would lessen the erosive effects, and that the reemergence of riparian vegetation would solidify the channel and provide good refuge habitat for fish during overbank flows, thus allowing even higher flows without injury to the fishery. (NAS&MLC 1X, p. 12.)

The instream flow recommendations developed by DFG were characterized as providing for the maintenance of the brown trout population in lower Rush Creek. Instream flow recommendations were based on the goal of attempting to maintain the median ("50% exceedence") brown trout habitat that would occur in lower Rush Creek, for each of three hydrologic year types, in the absence of water storage and diversion at Grant Lake. (DFG 52, p. 103.) DFG Exhibit 52 suggests that maintenance of median habitat for brown trout will maintain the fish population.

Initially, DFG's use of median values for flow recommendations was modified to respond to the concern that the transport of spawning size substrate will begin at 60 cfs thus reducing spawning habitat if flows were in excess of 60 cfs. The Beak study recommended restricting flows to 60 cfs to avoid potential uncompensated losses of spawning size substrate in reaches 2 and 3. (DFG 52, p. 106.) In addition, in order to restrict the exposure of redds (trout spawning nests), DFG limited the reduction of flows during the spawning period by averaging the median flows recommended for those months. Additional modification of the median flow recommendations was made in an effort to mimic the seasonal flow regime of water entering Grant Lake. Water temperature was determined not to be a limiting factor for the range of flows from 19 cfs to 100 cfs. Consequently, water temperature was not used as a criterion in developing DFG's flow recommendations.

DFG utilized different criteria for developing instream flow recommendations for Rush Creek than were used for Lee Vining Creek. In the case of Rush Creek, DFG's consultants selected instream flows which would provide median habitat values for each year type based on historic inflow to Grant Lake. For Lee Vining Creek and the Upper Owens River, however, DFG's consultants based their recommendations on flows needed to provide a specified percentage of the maximum habitat available. (RT XX 48:1-49:20; DFG 62, pp. 213-214.) When asked to explain the reason for the different approaches, Mr. Smith responded that:

> "...the major difference between Rush and Lee Vining Creeks is the presence of Grant Reservoir. There is an ability to capture runoff in that lake and meter it out sometime in the future. That ability does not exist on Lee Vining Creek. If the habitat duration approach had been used on Lee Vining Creek, there would be no mechanism, to maintain the median habitat discharge." (RT XX, 48:2-48:12.)

DFG's original instream flow recommendation for Rush Creek would have required the release of water stored in Grant Lake whenever inflow to Grant Lake is less than the recommended minimum flows. During rebuttal testimony, however, Mr. Smith explained that DFG's revised recommendations would require LADWP to:

> "...release the numerical flows listed in the Rush Creek addendum for wet and normal water runoff years, until such time the inflow to Grant Lake drops below the recommended values. And at that time the inflow would equal the recommendation. Our recommendation is that the inflow equal the outflow. Until the dry runoff year recommendations are reached, at which time we would recommend that storage be released to maintain dry year runoff flows, regardless of...runoff year type." (RT XXXIX, 8:24-9:12.)

The use of different types of criteria to develop instream flow recommendations for Rush Creek and Lee Vining Creek was based upon the assumption that LADWP would be required to release water from storage at Grant Lake if needed to meet the required flows. DFG's present proposal, however, would not require release of water from storage in Grant Lake, except to meet dry-year flow requirements.

In view of the limited role which release of stored water from Grant Lake would play in meeting DFG's revised flow recommendations, it is more appropriate to determine instream flow requirements for Rush Creek based on a percentage of available habitat as was done for Lee Vining Creek. Therefore, as in the case of Lee Vining Creek, the instream flow requirements for Rush Creek established in this decision are based upon the percentage of maximum measured habitat for the life stages of primary concern, as determined from the amount of Weighted Useable Area (WUA) at different flows. (RT XX, 48:1-49:20.)

There is general agreement that adult habitat and spawning habitat in Rush Creek are limiting. Thus, it is important to target these two life stages in establishing instream flow requirements. (DFG 52; LADWP 1 and 130; NAS&MLC 1X.) In order to ensure that instream flows provided for certain life stages do not cause severe reductions in available habitat for other life stages, it is also important to compare the effects on fry and juvenile habitat of flows designed to maintain adult and spawning habitat.

In the Lee Vining Creek and the Upper Owens River DFG studies, the maximum WUA for each of the targeted life stages were reached at a value below the highest simulated flow. This was also the case for the Rush Creek DFG study with the exception of adult habitat WUAs. The WUA for adult brown trout in Rush Creek continued to increase at the highest simulated flow of 100 cfs. A comparison of the adult habitat types indicates the Mono Gate One return channel was the greatest contributor of adult WUAs in the study area at flows above 45 cfs. (DFG 52, p. 43.) Extrapolation for adult habitat at flows above 100 cfs indicates a continued increase of adult habitat in the return channel. However, adult habitat in other reaches of the Rush Creek study peaks and begins to decline at simulated flows below 100 cfs. (DFG 52, pp. 41-45.)

Thus, the relationship between WUA and flow in the return channel is not consistent with the relationship between flow and WUA in a natural channel. The return channel did not exist in 1941. In establishing flow requirements intended to restore and maintain the pre-1941 fishery, it is appropriate to consider the relationship between WUA and flow in the natural stream channel. Consequently, the SWRCB bases its flow requirements upon the assumption that the maximum WUA for adult brown trout occurs at a flow of 100 cfs.

The criteria DFG applied in determining flows in Lee Vining Creek were that the targeted life stages should be provided 80 percent of the maximum WUAs during dry hydrologic years, 90 percent during normal hydrologic years and 100 percent during wet hydrologic years. Similarly, in developing flow requirements for Rush Creek, this decision sets flow requirements for each year type based on percentages of the maximum WUAs available for the limiting life stages of Brown trout in Rush Creek. The percentages of WUA were derived from the data developed in the DFG study. (DFG 52, p. 41, Table 13.)

DFG's recommended flows for April through September of dry hydrologic years are based on providing habitat for the adult life stage. The recommended flows range from 35 cfs in April, peak at 75 cfs in May, and descend monthly to 72 cfs, 45 cfs, and 42 cfs, continuing down to 40 cfs in September. A flow of 35 cfs provides 84 percent and 75 cfs provides 96 percent of the maximum WUA for the adult life stage in lower Rush Creek. Using the criteria DFG applied to Lee Vining Creek, it is desirable to provide a minimum of 80 percent of the maximum WUA for the adult life stage during dry year conditions. Providing 80 percent of maximum WUA for adult brown trout corresponds to a flow of 31 cfs in Rush Creek for the months of April through September. Table 11 below shows the measured WUA values present for adult brown trout in Rush Creek at various flows.

TABLE 11: ADULT BROWN TROUT WEIGHTED USEABLE AREA (WUA) FOR RUSH CREEK

WUA SQ.FT.	CFS	PERCENTAGE
208,477	100	100%
198,053	68	95%
187,630	47	90%
166,782	31	80%
145,934	23	70%

The DFG spawning flow recommendations target the months of October through December and range from 30 cfs to 36 cfs. A flow rate of 30 cfs corresponds to approximately 71 percent of maximum WUA and 36 cfs corresponds to 80 percent of the maximum WUA for spawning. Therefore, providing 80 percent of the maximum WUA for spawning would require a flow of 36 cfs for October through December. In order to protect redds and emerging fry, the minimum flows in effect during the spawning period of October through December should also remain in effect during January through March.

TABLE 12: BROWN TROUT SPAWNING HABITAT WEIGHTED USEABLE AREA (WUA) RUSH CREEK

WUA SQ.FT.	CFS	PERCENTAGE
69,112	85	100%
65,656	52	95%
62,200	44	90%
55,289	36	80%
48,378	29	70%

Based on the above analysis, the SWRCB concludes that the minimum flow requirement for dry hydrologic years on Rush Creek should be 31 cfs for the months of April 1 through September 30 and 36 cfs from October through March. The dry year minimum flow requirements shall be be maintained, if necessary, by releases from storage until such time as the quantity of water in storage at Grant Lake declines to 11,500 acre-feet. Any time that Grant

Lake storage falls below 11,500 acre-feet (See Section 6.5 "Recreation") the instream flow requirement will revert to the dry year flow requirement or the inflow to Grant Lake, whichever is less.

The DFG recommended instream flow for Rush Creek during normal hydrologic conditions for the months of April through September ranges from 59 cfs to 100 cfs. A flow of 59 cfs corresponds to approximately 91 percent of the maximum WUA for adults and 100 cfs corresponds to 100 percent of the maximum WUA for adults. Applying the criteria utilized for Lee Vining Creek for this period (i.e., providing 90 percent of the maximum WUA) would result in a minimum flow of 47 cfs from April through September. Maintaining approximately 90 percent of the maximum WUA for spawning would require a flow of 44 cfs during the period of October through December. In order to protect redds and emerging fry, the minimum flow requirement should remain at 44 cfs from January through March.

Based on the analysis above, the SWRCB concludes that the minimum instream flow requirement for the protection of fish in Rush Creek during normal hydrologic years should be 47 cfs for the period April 1 through September 30 and 44 cfs for October 1 through March 31, or the inflow to Grant Lake, whichever is less.

During wet hydrologic years, DFG's recommended instream flows for Rush Creek are 84 cfs during the month of April, and 100 cfs for May through September. As discussed earlier in this section, the 100 cfs requirement was based upon the adoption of a gravel augmentation project by the Restoration Technical Committee. The Beak report indicates that flow in excess of 60 cfs may result in scouring and transporting spawning substrate through the system which would further reduce spawning habitat. (DFG 52, p. 106.) Mr. Smith testified, however, that following the gravel replenishment program established by the Restoration Technical Committee, the 60 cfs restriction was no longer applicable. (DFG 3, p. 3.)

At the time of the hearing, DFG had no information if the gravel replenishment program had worked, how often it would be necessary to add gravel, or how a monitoring program would be developed to evaluate the success of the gravel augmentation program. (RT XX, 72:21-75:9.) DFG did, however, recommend a monitoring program to evaluate the spawning gravel condition. (RT XX, 74:18-75:4.) Without a full understanding of the effects of 100 cfs on spawning substrate and what is required to implement a successful spawning gravel augmentation program, it would be inappropriate to require minimum flows for fishery protection which could reduce available spawning habitat.

Further, the Beak study (DFG 52 and 53) did not consider the contribution of water from Parker and Walker Creeks due to the fact that both streams were dry during the time that field data was collected. (RT XX 78:19-79:10.) Mr. Smith also testified that DFG did not consider the influence of these two streams when they developed the instream flow recommendation presented at the hearing. (RT XX, 78:19-80:1.) The minimum instream flow requirements for Parker and Walker Creeks, during the summer months, will provide additional flow at the conduit. The evidence is insufficient to determine how much of this flow will reach Rush Creek, but the contribution from Walker and Parker Creeks should increase the WUA for adults in lower Rush Creek. During October through March, the minimum instream flow requirements for Parker and Walker Creeks of 6.0 and 4.5 cfs, respectively, will also contribute to instream flows in lower Rush Creek.

Dr. Hardy testified that evaluation of the total WUA for each life stage should consider the point where the rapid increase in habitat begins to slow down and the continued increase of streamflow provides small increases in WUA for the particular life stage in question. Comparison of the adult WUA indicates that 90 percent of the maximum WUA requires 47 cfs, 95 percent of the maximum WUA requires 68 cfs and 100 percent of the maximum WUA requires 100 cfs. Thus, in the case of Rush Creek, it would require an additional 32 cfs in order to provide a 5 percent increase from 95 percent to 100 percent of WUA for the adult life stage. As discussed above, the increases in adult habitat as flows approach 100 cfs are attributable to increased habitat in the Mono Gate One return channel, not to increased habitat in the channel which supported the pre-diversion fishery.

In view of the issues discussed above concerning the DFG recommendation of 100 cfs for the months of May through September, the slow rate of increase in the WUA for adults versus the quantity of flow required, and the fact that the flow contribution from Parker Creek and Walker Creek was not accounted for in the DFG recommendation, the SWRCB concludes it would not be appropriate to require minimum flows at Mono Gate One corresponding to 100 percent of the WUA identified in the Beak study. (DFG 52.) Requiring wet year minimum instream flows at Mono Gate One which would provide 95 percent of the maximum WUA for adult brown trout in Rush Creek will provide sufficient flow for reestablishment and protection of the fishery.

Establishing a minimum instream flow requirement for releases from Mono Gate One to Rush Creek which corresponds to 95 percent of the WUA for adults results in a 68 cfs requirement from April 1 through September 30. Similarly, 95 percent of the WUA for spawning can be provided at 52 cfs. In order to protect spawning habitat, redds in the gravel and emerging fry, the 52 cfs requirement should remain in effect from October 1 through March 31 of wet hydrologic years. Los Angeles' water right licenses should be amended to require the release of these flows or the inflow to Grant Lake, whichever is less.

Table 13 below summarizes the instream flow requirements for Rush Creek established in this decision for dry, normal, and wet hydrologic year types.

TABLE 13: INSTREAM FLOW REQUIREMENTS FOR RUSH CREEK

DRY HYDROLOGIC CONDITIONS -RUSH CREEK	
APRIL 1 THROUGH SEPTEMBER 30	31 CFS[1]
OCTOBER 1 THROUGH MARCH 31	36 CFS[1]
NORMAL HYDROLOGIC CONDITIONS -RUSH CREEK	
APRIL 1 THROUGH SEPTEMBER 30	47 CFS[2]
OCTOBER 1 THROUGH MARCH 31	44 CFS[2]
WET HYDROLOGIC CONDITIONS -RUSH CREEK	
APRIL 1 THROUGH SEPTEMBER 30	68 CFS[2]
OCTOBER 1 THROUGH MARCH 31	52 CFS[2]

[1] These instream flows will be maintained, if necessary, with releases from storage until such time as Grant Lake reaches a volume of 11,500 AF. If storage falls below 11,500 AF, the instream flow requirement will change to the dry hydrologic year flow requirement or the inflow to Grant Lake, whichever is less.

[2] For normal and wet hydrologic conditions, flow requirements are the above instream flow requirements or the inflow to Grant Lake from Rush Creek, whichever is less. If the inflow to Grant Lake from Rush Creek drops below dry year instream requirements, then release from storage at Grant Lake to maintain dry instream flows as prescribed for dry year conditions is required until such time as Grant Lake reaches a volume of 11,500 AF.

5.4.3 *Channel Maintenance and Flushing Flows*

The DFG channel maintenance and flushing flow recommendations for Rush Creek were developed by Dr. G. Mathias Kondolf and presented as DFG Exhibit 168. Dr. Kondolf's initial recommendations were modified to conform with DFG's hydrologic classifications. The revised DFG recommendations for channel maintenance and flushing flows for Rush Creek are presented in Table 14 below, based on the numbers from DFG Exhibit 170A. These flows are within the capacity of the Mono Gate One return ditch as presented in Table 2 of SWRCB Exhibit 40.

TABLE 14: CHANNEL MAINTENANCE & FLUSHING FLOW REQUIREMENTS RUSH CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
DRY-NORMAL YEAR	NO REQUIREMENT
NORMAL YEAR	200 CFS FOR 5 DAYS
WET-NORMAL YEAR	300 CFS FOR 2 DAYS RAMP DOWN TO 200 CFS.MAINTAIN 200 CFS FOR 10 DAYS
WET YEAR	300 CFS FOR 2 DAYS RAMP DOWN TO 200 CFS.MAINTAIN 200 CFS FOR 10 DAYS
RAMPING RATE - NOT TO EXCEED A 10% CHANGE IN STREAMFLOW PER 24 HOURS	

Runoff year definition:			
	Dry	80-100% exceedence	(68.5% of average runoff)
	Dry-Normal	60-80% exceedence	(between 68.5% and 82.5% of average runoff)
	Normal	40-60% exceedence	(between 82-5% and 107% of average runoff)
	Normal-Wet	20-40% exceedence	(between 107% and 136.5% of average runoff)
	Wet	0-20% exceedence	(greater than 136.5% of average runoff)

The ramping requirement applies to changes in flow made by LADWP. LADWP is not required to compensate for natural fluctuations in flow.

Dr. Kondolf indicated that the 20 percent to 80 percent of runoff used for DFG's "normal" hydrologic year definition was too broad for normal hydrologic conditions. (DFG 168, pp. 10-11.) Instead, Dr. Kondolf divided the water years into five classifications as shown above.

Mr. Trihey testified that, based upon composition and stability of streambed material above the Narrows and the opportunity to rewater relic channels below the Narrows, the channel maintenance flows of 165 cfs prescribed in the interim court order could be increased to as much as 250 cfs. (NAS&MLC 104, p. 4 and NAS&MLC 1X, p. 11.) He further indicated that, if flows required to maintain a higher Mono Lake level elevation are above the minimum needed to maintain the fishery, Rush Creek can accommodate higher flows without substantial harm to the fishery. The best time for the higher flows would be during the snowmelt runoff. Mr. Trihey testified that, at 350 cfs, Rush Creek would experience minimal erosion of streambed and streambanks. (NAS&MLC 1X, p. 12.)

Dr. Beschta's testimony acknowledged that ramping constraints should be developed to prevent exceptionally rapid changes in flows. (LADWP 9, Section 2, p. 23.) As part of LADWP's revised Mono Lake Management Plan, LADWP recognized the need for establishing channel maintenance and flushing flows for Lee Vining and Rush Creeks and recommended channel maintenance and flushing flows somewhat lower than the DFG recommendation. (LADWP 154, p. 3, Table 2.) The channel maintenance and flushing flow recommendations presented by DFG were supported by the detailed testimony of an expert witness with experience in stream channel morphology. (DFG 168, 170A; NAS&MLC 1X.) Consequently, the SWRCB concludes that the weight of the evidence supports adoption of the channel maintenance and flushing flow requirement for Lower Rush Creek below Grant Lake as recommended by DFG and identified above in Table 14.

5.4.4 *Additional Measures to Assist in the Restoration of the Pre-Project Fishery*

The long period of little or no flow in Rush Creek below LADWP's point of diversion at Grant Lake resulted in significant losses of riparian vegetation and other deterioration of channel conditions. Several witnesses presented testimony regarding pre-1941 conditions on Rush Creek, restoration measures which have already been undertaken under the direction of the Restoration Technical Committee established by the Superior Court, and recommendations for further restoration work to help restore good fish habitat conditions.

Mr. Trihey's written testimony indicates that low or erratic streamflows adversely affected pre-1941 fish habitats and populations above the Narrows. (NAS&MLC 1Y, p. 29.) The conditions that benefitted the fishery above the Narrows were a well-developed riparian corridor, a functioning floodplain and a stable stream channel. The conditions that benefitted the fishery below the Narrows were persistent streamflows, very stable stream temperatures, abundant supply of spawning gravel, deep low velocity water, a functioning floodplain and a well developed riparian zone. (NAS&MLC 1Y, p. 30.)

The focus of the restoration work which Mr. Trihey has undertaken on behalf of the Restoration Technical Committee was:

> "...to restore the conditions which benefitted pre-1941 fish populations such that the pre-1941 fishery can be re-established and maintained as required by Cal Trout II. But given the present day institutional considerations, the existing channel morphology and some basic relationships in physical science it is not possible to fully restore (or even significantly approach restoring) all of the conditions of the Rush Creek bottomlands which benefitted the pre-1941 fish populations." (NAS&MLC 1Y, p. 30.)

The Restoration Planning Team conducted research as to the conditions which benefitted the pre-project fish populations in Rush Creek. Of the numerous restoration measures which the planning team prepared for consideration by the Restoration Technical Committee, Mr. Trihey identified the specific treatments that he considered appropriate to implement and accelerate the recovery of a quality fish population in Rush Creek. (RT XXVIII 33:7-33:18; NAS&MLC 105, pp. 3-9, Mr. Trihey's recommendations are identified with asterisk.) Mr. Trihey's list of restoration recommendations includes: the rewatering of several historic auxiliary channels and meander bends; the development and deepening of pools and runs; developing spawning and rearing habitat in overflow channels; the placement and anchoring of woody debris; developing and enhancing backwater and wetland areas; modifying and enforcing angling regulations to provide for the recovery of the fishery. (NAS&MLC 105, pp. 3-11.)

Trihey and Associates prepared a feasibility study evaluating the potential for rewatering the historic Rush Creek below Grant Dam. Mr. Trihey's recommendation to the Restoration Technical Committee was that if the Restoration Committee finds it desirable to rewater the historic channel of Rush Creek immediately below Grant Dam, it would be most cost effective and least complicated to implement one of the three options proposed under design alternative "D" (breaching the return ditch wall). (NAS&MLC 135, p. 18.) Rewatering of the historic channel below

Grant Lake was not among the restoration measures recommended by Mr. Trihey. (NAS&MLC 105, p. 3; RT XXVIII, 33:5-33:11.)

LADWP presented testimony by Dr. Beschta who recommended a number of interim and long-term restoration measures for Rush Creek. The four interim measures are: continued watering of the channel; elimination of grazing in the riparian corridor; placement of woody debris in channels after three to five years; and elimination of the current program of structurally modifying channels and adding gravel. (LADWP 9, Section 2 p. 23.) Long-term restoration measures recommended by Dr. Beschta include: flows that mimic the natural flow regime; flows equal to or exceeding minimum instream flow requirements for fisheries that always be allowed to bypass diversions; ramping constraints that are developed to prevent exceptionally rapid changes in flow; the occurrence of peak flows of varying timing and magnitude that are captured in flow regimes; and, within five to ten years, the seasonal rewatering of side channels allowed to occur without human intervention. (LADWP 9, Section 2 p. 23.)

In LADWP Exhibit 137, Dr. Beschta expanded his discussion of the restoration needs for Rush Creek. (LADWP 137, pp. 8-15.) He continued to emphasize that the most significant restoration measure is the return of continuous flows to Rush Creek. He recommended that the grazing moratorium should continue until at least the year 2000, after which the condition of the vegetation along the stream and bottomlands should be reevaluated. At that time, it may be possible to reintroduce grazing as long as the grazing does not interfere with the establishment, growth and succession of riparian dependent vegetation. Dr. Beschta reemphasized his opposition to structural modifications to Rush Creek or its bottomlands and recommended that building structures within or along the stream channel via cabling, rebar, the placement of large rocks, or any other means of anchoring should be prohibited. Dr. Beschta also recommended elimination of the culvert and road crossing at the Ford in the Rush Creek bottomlands. Road access onto the bottomlands should be limited in order to prevent vehicular traffic from damaging Rush Creek.

Finally, Dr. Beschta advised that it is not necessary to develop pool habitat for fish because the natural process will in time develop pools which he believes will be more stable than artifically constructed pools. (LADWP 137, pp. 8-15.)

DFG is a member of the Restoration Technical Committee which directed the development of several restoration plans by Trihey and Associates. However, DFG did not make specific recommendations regarding restoration treatments of the stream channel or riparian corridor for Rush Creek. Mr. Smith testified that DFG recommends the rewatering of the historic Rush Creek channel below Grant Lake, but did not identify which of the rewatering options developed by Trihey and Associates was preferred by DFG.

The evidence discussed above supports the conclusion that, in addition to the flow requirements, the following other measures should be undertaken to restore and maintain in good condition the fishery as it existed in Rush Creek prior to the diversion of water by LADWP.

1. Minimum flows released to maintain the fishery should remain in the stream channel and should not be diverted for any use other than maintenance of the Rush Creek fishery.

2. Livestock grazing should be prohibited within the Rush Creek riparian corridor for a minimum of ten years from the date of this order. Any resumption of grazing in the future should be subject to approval by the Chief of the Divsion of Water Rights of a plan prepared by LADWP in consultation with DFG.

3. LADWP should develop a program to place woody debris in the stream channel to provide fish habitat in accordance with a plan developed in consultation with the DFG.

4. LADWP should prepare a plan for rewatering side channels and meander bends in accordance with the procedure specified in

the order at the end of this decision. The plan should consider the following:

a. Reactivating A-Ditch to transport excess water away from Rush Creek during periods of high flow.

b. Providing small seasonal surface flows in relic channels and adjacent wetlands in the upper portion of the segment described as study reach 2 in DFG Exhibit 52.

c. Rewatering two meander bends below Highway 395 described in the middle of study reach 3 (DFG 52) and also described by Trihey and Associates. (NAS&MLC 125.)

d. Reactivating historic channels in the segment from the Narrows to the meadows crossing to accommodate high seasonal flows.

5. Road access in Rush Creek bottomlands should be restricted. Vehicular traffic should be restricted from entering or crossing Rush Creek or the Rush Creek riparian corridor except at designated locations.

6. Vegetation disturbed by construction for any of the restoration activities required by this order should be restored and revegetation should commence as soon as construction activities have been completed.

7. LADWP should consult with DFG to determine if additional revegetation is necessary to maintain the fish in good condition in Rush Creek.

8. LADWP should install and maintain a continuous recording device satisfactory to the Chief of the Division of Water Rights to measure the flow of Rush Creek into Grant Lake and the flow to the return ditch at Mono Gate One.

The installation of a continuous flow recording device and the prohibition of grazing in the riparian corridor can be implemented without the need for a lengthy planning period. The other measures specified above should be addressed in the stream restoration plan required to be prepared under the provisions of this decision.

5.5 Summary of Measures for Restoration and Protection of Fisheries

The evidence establishes that restoration of continuous flows to the four diverted streams is by far the most important single step to restore and maintain the fishery that existed prior to LADWP's diversions. Appropriate flow requirements for each stream are specified in the preceding sections. Providing channel maintenance and flushing flows for each stream will help maintain stream conditions that benefit the fishery and will promote the recovery of adjacent riparian areas. The ramping rates specified above will help to ensure that fish are not injured by changes in flow. If future information establishes that the flows specified for fishery protection should be revised, the SWRCB's continuing authority provides a means of making appropriate revisions. The order at the end of this decision includes a term setting forth the SWRCB's continuing authority over LADWP's licenses.

The evidence also establishes the need for a number of other measures to help restore and protect fish habitat in the four streams such as removal of livestock grazing, restriction of vehicular access, reopening historic side-channels and other measures specified in the findings regarding each specific stream. These measures should be addressed in the stream restoration plan which LADWP is required to develop and submit in accordance with the amended terms of its water right licenses as specified at the end of this decision.[8]

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[8] *The prohibition on grazing within designated riparian areas is effective upon entry of this decision. The stream restoration plan to be developed in accordance with the schedule specified in the order at the end of the decision should provide documentation of the livestock grazing exclusion in specific areas.*

Finally, evidence was presented regarding the desirability of changing fishing regulations during the period the fishery in the four streams is recovering. Fishing regulations are subject to the jurisdiction of the Fish and Game Commission rather than the SWRCB. The evidentiary record in the water right hearing, however, would strongly support imposition of a temporary moratorium on fishing in the stream reaches downstream of the LADWP diversions to assist in recovery of the fishery.

6.0 PROTECTION OF OTHER PUBLIC TRUST RESOURCES AND BENEFICIAL USES OF WATER WITHIN THE MONO BASIN

In addition to the fishery resources discussed above, there are a number of other public trust resources and beneficial uses of water affected by water management decisions in the Mono Basin. These include birds and other wildlife in the Mono Basin, the organisms in Mono Lake which provide food for birds, riparian vegetation, air quality, visual and recreational resources, and water quality. Sections 6.1 through 6.9 below address the protection of these resources.

6.1 Mono Lake Aquatic Productivity

The Mono Lake alkali fly (*Ephydra hians*) and the Mono Lake brine shrimp (*Artemia monica*) are the major food sources of the large bird populations at Mono Lake. The survival and reproduction of both species can be affected by changes in salinity of the water in Mono Lake. The salinity in Mono Lake is an inverse function of the quantity of water in the lake; as the water elevation rises, salinity decreases, and as the water elevation falls, salinity increases. The majority of the evidence presented regarding Mono Lake aquatic productivity was incorporated into the Draft EIR for the Review of the Mono Basin Water Rights of the City of Los Angeles and the supporting auxiliary reports. (SWRCB 7, 13h, 13l, 13m, 13n, 13o, 13p, and 13t.) LADWP presented several additional reports and the direct testimony of Dr. John Melack and Dr. William Kimmerer. (LADWP 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 41, 99, 100, 101, and 102.) DFG presented the direct testimony of Darrell Wong (DFG 1), and NAS&MLC submitted the direct testimony of Dr. David Herbst and supporting exhibits. (NAS&MLC 1G, 52, 64, 65, 66, 66A, 66B, 201, 201A, 202, 203, 218, 219, 238.)

Dr. Melack testified that he considers that Mono Lake is "healthy" and was healthy during the period in which he conducted his investigations of the aquatic productivity from 1979 to 1992. (LADWP 22, Section 1, p. 22.) Lake levels during this period ranged from a mean sea level (MSL) elevation of 6,372 feet to 6,381 feet. Dr. Melack stated that he could only testify to aquatic productivity conditions that existed during his investigations and that it would be inappropriate for him to speculate about possible effects on aquatic productivity of conditions that may exist at lake levels not observed during his studies. Dr. Melack acknowledged that increased salinity levels decreased the reproductive capability of brine shrimp under laboratory conditions. (RT X, 48:3-48:8.)

The evidence of the effect of increased salinity on brine shrimp is graphically displayed in Figure 2 of Auxiliary Report No. 12. (SWRCB 13 L, Figure 2.) The graphic presentations in Figure 2 of that report indicate that as salinity decreases to 50 grams per liter (g/l), the various life stages of brine shrimp improve. Auxiliary Report No. 12 concludes that "Predation and competition are likely to be significant factors in influencing shrimp productivity at lower salinities, while individual physiological constraints and *Atremia* interactions with nutrients and algae attain prominence at higher salinities." (SWRCB 13 L, p. 23.)

During five years (1983-1987) of Dr. Melack's study period, meromixis occurred. This condition is considered a rare event, which is described as a persistent salinity stratification which occurs when large freshwater inputs into a saline lake cause a lens of relatively dilute water to rest on top of a heavier layer of more saline water. (RT X, 41:17-41:20.) The onset of meromixis prevented the annual winter period of vertical mixing with consequent reductions of ambient ammonium levels in the mixed layer. This led to marked reductions in algal biomass and annual photosynthetic activity. (LADWP 22, Section 1, p. 15).

Conclusions drawn from the study of the interaction of brine shrimp with ammonium and algal biomass indicate that low food levels available during meromixis in the spring depress the survival of brine shrimp. (LADWP 22, Section 1, p. 15.)

Laboratory experiments and direct observations by Dr. Melack and his team of investigators indicate that the importance of nitrogen cycling to photosynthesis and the compensatory interaction between algae and brine shrimp is significant within moderate salinity ranges. The limiting factor to brine shrimp populations may be more related to availability of food supply than to salinity concentrations. Dr. Melack suggests that additional investigations are needed to develop a more precise understanding of the interactions between nitrogen, algal and the brine shrimp components of the pelagic ecosystem. (LADWP 22, Section 1, p. 15.)

A significant portion of the period during which Dr. Melack conducted his investigation occurred during the meromixis condition. Consequently, his conclusions represent the effects of meromixis to a large degree and, to a lesser degree, they represent the changes to the ecosystem which occur during the more common "monomixis" condition which exists when the water is more evenly mixed. Dr. Melack's team conducted an extensive monitoring program from 1982 to 1992 during which lake level and salinity changed. Despite this extended data record, Dr. Melack concluded that direct observation of effects of salinity on the *Artemia* population is difficult and unlikely to be detected even if present. It is likely that effects of salinity changes experienced during the 1982-1992 study period were obscured by effects due to meromixis. (SWRCB 13m.)

The University of California at Santa Barbara research team headed by Dr. Melack developed simulation models for forecasting conditions in Mono Lake at lake levels which are outside of those observed by his team. Two models were produced, a vertical mixing model and a plankton model. The vertical mixing model was designed to predict the likelihood of meromixis under various inflow regimes. The plankton model was designed to assess possible responses of the brine shrimp to different lake levels. The supporting documentation provided by the U.C. Santa Barbara team, indicated that both of these models are quite limited. Dr. Melack's written testimony indicates that the use of the vertical mixing model in the Draft EIR is inaccurate due to the possibility of missing mixing mechanisms and data insufficiencies. (LADWP 22, section 1, p. 21.) Dr. Melack also stated that the predictive value of the plankton model for conditions in Mono Lake possibly occurring at lake levels not observed is uncertain. (LADWP 22, Section 1, p. 22.) Dr. Melack acknowledged that a rise in the lake level from 6,377 to 6,390 feet in a monomictic condition would be a positive change. (RT X, 119:17-119:21.)

Dr. Herbst conducted experiments on brine shrimp growth at various salinities representing prediversion conditions (50 g/l), present conditions (100 g/l), and at the salinity which would be present at a lake level of approximately 6,390 feet (75 g/l). The results of this experiment indicate that brine shrimp hatched at all three salinities tested. However, fewer shrimp matured to the adult stage with each increase of salinity. Also, the shrimp that matured to adult stage were smaller in body size with each increase of salinity. (NAS&MLC 1g, p. 9; NAS&MLC 201, 202, and 203.)

Dr. Herbst also presented the results of his recent experiment titled "Salinity Limits Nitrogen Fixation in Sediments from Mono Lake, California." (NAS&MLC 65.) The conclusion of this experiment indicated that the increase in salinity over the past 50 years, from 50 g/l at pre-diversion conditions to near 100 g/l at present has been associated with a concurrent decline in nitrogen fixation. (NAS&MLC 65, p. 8.) Nitrogen availability is limiting with regard to the phytoplankton algal food resource of brine shrimp. The growth of benthic algae, an alkali fly food source, is also nitrogen limited. (NAS&MLC 1g, p. 11.)

NAS&MLC presented testimony by Dr. Herbst which indicated that the Mono Lake ecosystem has been significantly and measurably degraded as a result of the dropping of the lake level from pre-diversion levels to current levels. Dr. Herbst takes issue with the statement in the Draft EIR that the cumulative impacts of LADWP's diversions have had an unknown effect on alkali flies. Dr. Herbst believes that any lake level alternative below 6,390 feet has a significant adverse effects on the alkali fly. (NAS&MLC 1G, p. 2.) Dr. Herbst regards a lake level of 6,390 feet as the lower limit of the range of levels for which the aquatic productivity of Mono Lake is relatively high.

Dr. Herbst based his recommendations on several scientific investigations he conducted himself or as part of a team of investigators from 1982 through the latest study completed in 1993. (RT XXIII, 245:20; NAS&MLC 65.) Auxiliary Report No. 8 prepared by Dr. Herbst describes experiments designed to produce field data to assist with the evaluation of the effects of salinity on alkali flies. (SWRCB 13h.) The experiments "showed that productivity is significantly retarded at higher salinities (i.e., lower lake levels). Productivity at the current salinity of approximately 100 grams per liter ("g/l") is less than half that at the pre-diversion salinity of approximately 50 g/l." (NAS&MLC 1G, p. 6.)

Dr. Kimmerer, representing LADWP, testified that he and Dr. Herbst prepared the alkali fly productivity model for use in preparing the Draft EIR. His function was that of an expert modeler, rather than an expert on Mono Lake or alkali flies. (RT X, 63:10-64:2.) Due to the modifications made by the EIR consultant, Dr. Kimmerer considers the alkali fly model used in preparing the Draft EIR to be of no value. (LADWP 41, Section 3, p. 54.)

Dr. Herbst testified that the primary difference between the model which he and Dr. Kimmerer prepared and the modified model used in the Draft EIR is that the modified model relies on assumptions about birth and death rates which are arbitrary. The model developed by Dr. Herbst and Dr. Kimmerer was based upon empirical data obtained from field and laboratory studies. (NAS&MLC 1g, p. 7.) Although the two versions of the model produce similar results, Dr. Herbst indicated that the original version is more reliable. Both models indicate that increasing salinity has a pronounced effect upon alkali flies. (NAS&MLC 1g, p. 7.)

In summary, LADWP presented expert testimony that the Mono Lake ecosystem at lake levels of 6,372 to 6,381 feet is in a "healthy" condition. The testimony of LADWP's experts also indicates that increased salinity has caused decreased productivity of brine shrimp under laboratory conditions. Expert testimony presented by NAS&MLC indicates that increased salinity and other effects of lower lake levels had adverse effects upon both the alkali flies and the brine shrimp.

Based on the evidence presented, the SWRCB concludes that a water level in Mono Lake at or near 6,390 feet will maintain the aquatic productivity of the lake in good condition. Lake levels below 6,390 feet will have some negative effects to Mono Lake aquatic productivity although the extent of the adverse effect is difficult to quantify.

6.2 Hydrology, Riparian Vegetation and Meadow/Wetland Habitat

An extensive body of information has been compiled describing the pre-1941 and post-1941 hydrologic and vegetative conditions in the Mono Basin. Much of the information was presented in the Draft EIR and auxuliary reports, and additional information was presented at the evidentiary hearing. (e.g., SWRCB 3, 4, 7, 10 and 13a: NAS&MLC 116, 122, 125, 127, 137 and 175; and CT 5D, 5K, 5O, 5R and 15; and LADWP 7.)

6.2.1 *Pre-1941 Hydrologic Conditions*

Mono Basin streams have a long history of water diversions dating back to the 1860s. Water was diverted from Mono Basin streams for irrigation, milling, mining, hydroelectric power generation, stockwatering and domestic use. Irrigation water was diverted and moved from many of the basin's streams by a system of ditches and canals. Most diversions were during the irrigation season, although some continued throughout the year. (SWRCB 7, Vol. 1, 3C27-28.)

Diversion of Walker and Parker Creeks for irrigation began in the 1860s on the present day Cain Ranch and, by 1930, most of the flow was diverted for irrigation. (SWRCB 7, p. 3C-4.) The annual average runoff from Walker Creek is estimated at 5,400 acre-feet. The annual average runoff of Parker Creek is estimated at 9,100 acre-feet. (SWRCB 7, Vol. 1, p. 3A6-7). In the years immediately preceding LADWP's export of water from the Mono Basin, irrigation diversions from Walker Creek were approximately 4,000 acre-feet per year and irrigation diversions from Parker Creek were approximately 5,900 acre-feet per year. (LADWP 6, p. 130.)

Prior to 1915, no water storage existed on either Rush or Lee Vining Creeks. Dams were constructed at Gem Lake and Agnew Lake as part of a Rush Creek power project which began operation in 1916. (LADWP 7, Appendix I, p. VII.) A power project on Lee Vining Creek began operation on October 5, 1924. (LADWP 7, Appendix I, p. IX.) In 1915, a 10 foot high dam was constructed on Rush Creek to enlarge the capacity of Grant Lake. The height of the dam was increased to 20 feet in 1925 to provide additional storage for irrigation. (NAS&MLC 125, p. 3.)

During the 1920s and 1930s, the historical period of maximum irrigation, an average of 50 percent of the annual flow of Rush Creek was diverted into three major irrigation ditches between Grant Lake Dam and the old Highway 395 bridge. The A-Ditch and B-Ditch diversions caused local dewatering of Rush Creek between B-Ditch and the Parker Creek confluence. These diversions were used to apply large quantities of water (up to 45 acre-feet/acre) on the highly permeable substrates of Pumice Valley. (SWRCB 13a pp. 21-22.) Indian Ditch diverged approximately 2,000 feet downstream of the Rush Creek narrows and flowed parallel to the western side of Rush Creek to an area colloquially called the "lower meadowlands." Irrigation from Indian Ditch ceased shortly after 1940.

Lee Vining Creek water was diverted by six main irrigation canals and several minor diversions. O-Ditch which conveys irrigation water to streamside meadows above the USFS Ranger District compound is still in use. Lee Vining Ditch (aka Curry Ditch) diverged immediately above U.S. Highway 395 and was used until 1959 as a water supply for the town of Lee Vining and for irrigation of nearby land. The Ney and Jamison ditches diverted water from Lee Vining Creek below U.S. 395 to irrigate pastures on the west and east sides of the creek near the county road. Other ditches also diverted water for in-basin irrigation, but most were abandoned by the early 1950s. (SWRCB 13a, pp. 23-24 and SWRCB 7, Vol. 1, p. 3C-5.)

Pre-1941 agricultural and power diversions influenced local hydrologic and biotic conditions particularly on Rush Creek. During the early decades of this century, large quantities of water were diverted from Lee Vining, Walker, Parker, and Rush Creeks and applied to surrounding land. Combined diversions ranged from 46,000 acre-feet per year to 81,000 acre-feet per year with an average of 60,000 acre-feet per year for the period 1925 to 1929. (LADWP 6, p. 133.) Much of that water (less evapotranspiration) probably returned to the basin in shallow ground water tables that sometimes formed springs along the creeks or entered Mono Lake as unmeasured ground water inflow.

The history of diversions is an important factor in understanding the pre-1941 riparian communities because: (1) diversion of water dewatered some stream sections, at times leaving no surface flow; (2) irrigation diversions appear to have contributed substantially to springflow along the Rush Creek bottomlands and elsewhere, significantly augmenting the base flow of the stream while also supporting wetland and riparian communities (SWRCB 13a, p. 20; NAS&MLC 116, p. 13; and NAS&MLC 122, p. 5); and (3) upstream regulation by hydroelectric power projects increased the streamflows during the late summer and fall irrigation season. (LADWP 7, p. 5.)

In addition, grazing probably had an important impact on riparian vegetation. Twelve hundred to eighteen hundred head of cattle grazed the Cain Irrigation Company lands annually in the late 1920s from April to October. (LADWP 7, p. 9.) Dr. Platts testified that heavy grazing occurred along Rush Creek up to 1941. (LADWP 1, p. 2.) Grazing in the Mono Basin in general was heavy in 1940. On April 1, 1940, for example, 9,100 cattle, 825 horses and 25,000 sheep were grazed in the Mono Basin. (LADWP 1, p. 3.) Dr. Beschta testified that by 1940 extensive grazing had probably caused significant changes to plants along the streams in the Mono Basin, but the overstory canopies remained largely intact. Channel banks were impacted by grazing, but widespread channel changes had not yet occurred. (LADWP 9, p. 21.) Photographs by Eldon Vestal show indicators of localized bank and vegetative impacts probably due to livestock grazing. (CT 5M and 5O.) The high flow event of 1938 did not significantly alter stream channels, however, because riparian vegetation was sufficiently intact to resist erosive forces. (LADWP 9, p. 22.) Thus, the record shows that, prior to 1941, the long-term impact of grazing was localized and the riparian community was still intact and helped protect stream channels from erosion.

6.2.2 *Post-1941 Hydrologic Conditions*

LADWP constructed the present-day Grant Lake Dam in 1939 and 1940, thereby enlarging the existing Grant Lake to provide a maximum storage capacity of about 48,000 acre-feet. LADWP constructed diversion facilities on Lee Vining Creek, Walker Creek, and Parker Creeks so that flows could be diverted to Grant Lake through the Lee Vining Creek Conduit. The Lee Vining Creek Conduit has a capacity of approximately 300 cfs at Lee Vining Creek, 325 cfs at Walker Creek and 350 cfs at Parker Creek.

(NAS&MLC 125, p. 3; SWRCB 7, pp. 3A-14 and 15.) The 11 mile long Mono Craters Tunnel was constructed to convey water from the Mono Basin into the upper Owens River. In 1940, LADWP constructed Long Valley Dam to hold the Mono Basin exports in Crowley Reservoir. (SWRCB 7, Vol. 1, 3A-16.)

LADWP began diversions from the Mono Basin in April of 1941. Between April 1941 and March 1970, annual out-of-basin diversions averaged approximately 57,000 acre-feet per year. (NAS&MLC 125, p. 3.) In 1970, the LADWP Aqueduct facilities were enlarged with construction of the "second barrel" between Haiwee Reservoir and Los Angeles. The original aqueduct had a capacity of 500 cfs and an annual export capacity from all sources in the Owens Basin and the Mono Basin of about 360,000 acre-feet per year. With the addition of the second barrel, the aqueduct gained an additional 300 cfs capacity, increasing annual exports from the Owens and Mono Basins to about 585,000 acre-feet per year. (SWRCB 7, Vol. 1, p. 3A-17.) Annual Mono Basin exports increased to an average of 102,000 acre-feet per year through 1981 which represents 82 percent of the long-term average runoff from Rush Creek and Lee Vining Creek. (NAS&MLC 125-p. 3.) Between the late 1940s and mid-1980s, water exports resulted in the dewatering of the lower reaches of the four Mono Basin streams diverted by LADWP.

6.2.3 *Riparian Vegetation and Meadow/Wetland Habitats*
Riparian areas provide many ecological benefits including habitat for a diversity of wildlife, flood flow attenuation and bank stabilization, invertebrate food production for fish and wildlife, nutrients for aquatic systems, and recreational opportunities such as hiking, fishing, wildlife observation, camping and photography. (SWRCB 7, Vol. 2. p. 3C-7; SWRCB 7 Vol. 2; p. 3J-11.)

Riparian vegetation in the Mono Basin consists of trees and shrubs that occur on tributary floodplains, banks, springs or seeps. Meadow/wetland habitats are grasslands with waterlogged soils near the surface but without standing water for most of the year. (CT 15, p. 6-1.) Historically, riparian conifer forests dominated streamsides in the higher elevations and gave way to conifer-broadleaf forest and cottonwood-willow woodlands at successively lower elevations creating a generally continuous corridor from the montane forests of higher elevations to near the lakeshore of Mono Lake. (SWRCB 7, Vol. 1, p. 3F-10.) High ground water, irrigation, springs and the seasonal overbank flow provided the necessary water to support meadow/wetland habitats.

Prior to LADWP diversions, Lee Vining Creek had approximately 32 acres of seasonally wet meadow. This meadow was located west of Lee Vining Creek near the stream mouth above and below the county road and was irrigated by an unnamed ditch. Maintenance of the meadow was believed to be dependent on irrigation. It has since reverted to sagebrush. (SWRCB 13a, p. 59.)

Historically, wetland/meadow habitat on Rush Creek occurred on the floodplain, at hillside seeps or springs and in irrigated areas. Rush Creek had approximately 131 to 133 acres of meadow or wetland habitat along the creek. This does not include approximately 130 acres of lake fringing wetlands located on the Rush Creek delta. (SWRCB 7, Vol. 1, Table 3C-14; CT 15, pp. 6-12 and 6-13; and CT 5M, photograph of Rush Creek delta.) Most of the streamside habitat was located in the bottomlands.

6.2.4 *Effects of LADWP Water Exports on Riparian Vegetation*
Between 1941 and the 1960s, much of the riparian area along lower Rush, Parker, Walker and Lee Vining Creeks was desiccated due to the lack of flow in the diverted stream reaches. A fire in lower Lee Vining Canyon in the early 1950s destroyed much of that desiccated riparian community. Additionally, the reduction or cessation of irrigation from the "A" and "B" ditches impacted the Rush Creek bottomland springs, meadows and associated riparian community.

The diversion of water from the Mono Basin caused the water level in Mono Lake to drop 45 vertical feet to 6,372 feet at the historic low water level. The water level was approximately

6,375 feet in the winter of 1994. Due to the lowering of the lake and the deterioration of riparian vegetation, flood events in the late 1960s and early 1980s resulted in major incision of tributary deltas and streams. Incision into former floodplains drained shallow ground water tables and left former side channels stranded above the newly incised main stream channels. The high flows caused extensive erosion resulting in a shifting, widening and straightening of the primary stream channels due in part to the lack of stabilizing riparian vegetation. (SWRCB 13a, pp. 50-53 and pp. 61-64; CT 15, p. 2-1; and NAS&MLC 125 p. 3.) Reduced flows and widening of the channels eliminated overbank flooding which, in turn, reduced the vigor of riparian vegetation and wetlands. The loss of the riparian community had serious impacts on the fishery of Rush and Lee Vining Creeks. (CT 15, p. 5-3.)

The Draft EIR compares the pre-diversion riparian vegetation acreage on the four diverted tributary streams with the 1989 point of reference conditions. (SWRCB 7, Vol. 1, Chapter 3C, Table 3C-2.) A reach-by-reach description of the vegetation is found in Appendix P of the Draft EIR. (SWRCB 7, Appendix P, p. 11-21.) Based on the data in the Draft EIR, a total of 204.4 acres of mature woody riparian vegetation had been lost on the four streams by 1989. Losses of over 100 acres of meadow and wetland acreage had also occurred. The largest losses of riparian vegetation and meadows were in the Rush Creek bottomlands and lower Lee Vining Creek below U.S. Highway 395. Most of the riparian vegetation losses were directly due to the export of water from the Mono Basin.

During the period from 1941 to the 1980s, LADWP leased out grazing rights to its land in the area of all four diverted streams. There has been a significant decrease in the acreage of meadow habitat on Rush Creek compared to pre-1941 conditions. In 1989, approximately 40 acres of the streamside meadow or wetland habitat remained of the previous approximately 130 acres. (SWRCB 7, Vol. 1, Chapter 3C, Table 3C-14.) This loss of meadow and wetland area is believed to be due to the reduction or elimination of irrigation diversions, diversion of water from

Parker and Walker Creeks, the incision of Rush Creek and the lack of overbank flooding. (CT 15, pp. 6-13 to 6-15.) Continued grazing on the desiccated meadows has probably contributed to deterioration of the meadow and wetland habitats. (SWRCB 7, Vol. 1 p. 3C-81.)

6.2.5 *Stream Restoration Work and Riparian Vegetation*

As discussed in Sections 5.0 through 5.5, considerable stream restoration work has already been done at the direction of El Dorado County Superior Court, but there are additional measures that should be taken to help restore the fisheries in the four diverted streams.

LADWP presented two videotapes to document the natural recovery of riparian vegetation on Lee Vining Creek and Rush Creek between the "Narrows" and the "Ford." (LADWP 11 and 139.) The videotapes document prolific growth of vegetation in the stream reaches depicted, but testimony from Mr. Messick, who participated on the Restoration Technical Committee planning team, indicates that vegetation recovery has been highly variable and not continuous along the streams. The recovery is primarily along the edges of the existing main channels and those side channels which now carry water. Mr. Messick testified that there is little natural recovery on the floodplain area between the stream channels. Mr. Messick also testified that there is very little natural recovery in some sites just a few feet away from the stream. (RT XL, 16:3-16:18.)

Dr. Stine testified that much of the vegetation, depicted in LADWP Exhibit 139 as recently established, actually had been there longer than ten years. (RT XL, 90:1-90:17.) Some scenes from the videotape looking upstream on Lee Vining Creek from the county road depict a cobble floodplain with sparse riparian vegetation recovery. (LADWP 11.) Mr. Messick testified that cobble sites such as depicted in the videotape will take more than 20 to 40 years for natural recovery and that these sites are extensive on Lee Vining Creek. (RT XL, 55:14-15:22.) There are also similar sites on Rush Creek. Mr. Messick identified several reasons for the lack of uniform recovery:

(a) overbank flows that favor establishment of riparian species had not occurred in these areas since the streams were rewatered;

(b) the channels have been incised resulting in a lower water table which reduces the chances of establishing seedlings; and

(c) loss of topsoil, leaving the remaining surface which is composed of large gravel and cobbles and which is relatively hot and dry. (RT XL, 16:19-16:25 and 17:1-17:14.)

Mr. Messick believes that sites with shallow water tables are the sites to be considered for active restoration as opposed to those areas already experiencing rapid natural recovery. (RT XL, 56:1-56:21.) Mr. Messick believes that active intervention by planting riparian vegetation is feasible and would be very beneficial for Rush, Lee Vining, Walker and Parker Creeks. (RT XL, 43:13-43:24 and 45:1-45:19.)

Dr. Stine testified that Rush Creek will not reoccupy the abandoned channels without active intervention. He believes that by removing the cobble plugs in the now existing multiple abandoned channels and rewatering those channels, Rush Creek could very rapidly return to the multi-channeled system that existed previously. (RT XL, 102:1-102:21.) At the time of the hearing, the Restoration Technical Committee Planning Team was preparing a report on the feasibility of rewatering channels on Rush Creek. (RT XL, 121:8-122:3.) Dr. Stine believes that reoccupying former channels on Lee Vining Creek would be easier than on Rush Creek because of a somewhat different geomorphology. (RT XL, 103:13-103:22.) Dr. Stine also supports planting riparian vegetation to accelerate recovery on sites along Rush and Lee Vining Creeks. (RT XL, 104:1-105:12.)

6.2.6 *Conclusions Regarding Riparian Vegetation*

Based on the evidence discussed in Sections 5.1 through 6.2.5 above, we conclude that riparian and meadow areas in the Mono Basin were affected by pre-1941 land and water management practices in various ways. Grazing practices had adverse effects on riparian vegetation in some areas, but long-term impacts from grazing were localized and the riparian community remained intact and much more extensive than today. On the positive side, water diversions for irrigation in the pre-1941 period contributed to springflows in the Rush Creek bottomlands and provided water for vegetation in riparian and meadow areas.

There is widespread recognition that the changes in water management practices since 1941 due to Mono Basin water exports have had major adverse impacts on riparian areas. Some of those effects are irreversible; some could be mitigated by a return to the irrigation and water management practices that prevailed before 1941; some will be mitigated by the return of continuous flows and channel maintenance flows as discussed in preceding sections; and others could be mitigated by various other restoration measures.

No party to this proceeding has urged a general resumption of the water management practices which prevailed in the years preceding 1941, practices which at times resulted in diverting the entire streamflow for irrigation. Rather than resuming large-scale irrigation within the Mono Basin, most parties to this proceeding recommend providing continuous instream flows for fishery protection and requiring most of the available water to flow to Mono Lake in order to raise the lake level. Thus, it is not realistic to expect full restoration of pre-1941 meadow and riparian areas, some of which were dependent upon water diversion for irrigation.

As discussed in preceding sections of this decision, however, there are a number of reasonable measures which can be taken to help promote the recovery of Rush Creek, Lee Vining Creek, Parker Creek and Walker Creek. Measures such as maintenance of continuous instream flows, providing periodic channel maintenance flows, continued exclusion of grazing, reopening side channels, and restricting vehicular access to stream channels and flood plains will not only directly benefit recovery of fisheries, but will also promote recovery of riparian vegetation. As discussed in Section 5.5, this decision requires that LADWP prepare and submit a plan to address specified stream restoration measures. The SWRCB recognizes that considerable work already has been undertaken by the Restoration Technical Committee under the direction of the El Dorado County Superior Court. In addition to the measures specifically identified in Section 5.5 above and completion of work done at the direction of the Superior Court, the SWRCB believes that the stream restoration plan which LADWP submits to comply with this order must consider other potential measures identified in the Draft EIR to help restore riparian areas along the four streams.

6.3 Wildlife and Wildlife Habitat

The Draft EIR reports that historical observers recalled the Rush Creek bottomlands once supported abundant waterfowl, deer, mountain lions, bobcats, and coyotes. (SWRCB 7, Vol. 2, p. 3F-11.) Nearly 300 bird species have been identified at Mono Lake including 98 species of water birds. (SWRCB 7, Vol. 2, p. 3I-9.) Dr. Joseph Jehl Jr. testified that prior to diversions by LADWP, there were no Caspian Terns in the Mono Basin and the population of gulls was small. Dr. Jehl testified that phalaropes and grebes were present, but the population numbers are not known. Dr. Jehl believes that snowy plovers were present but knows of no confirming evidence. (RT XII, 125:20-126:9.) The numbers of ducks and geese in the Mono Basin were much greater than today. (See Section 6.3.7 below.)

In 1991, Jones and Stokes Associates conducted surveys to characterize the wildlife species inhabiting streamside, lakeshore, upland and island habitats in the Mono Basin and floodplain habitats on the upper Owens River. (SWRCB 7, Appendix D.) A complete list of the species observed during the survey is found in Table D-4 of Appendix D of the Draft EIR.

More detailed information concerning Mono Basin wildlife is provided in four Auxiliary Reports prepared for the Draft EIR.[9]

The sections which follow discuss wildlife habitat conditions prior to 1941, wildlife habitat conditions following many years of Mono Basin water exports, and several species of particular interest which were addressed at the hearing.

6.3.1 *Pre-1941 Land-Use and Wildlife Habitat Conditions*

As discussed in Section 6.2.1, large quantities of water were diverted from Mono Basin streams for in-basin irrigation prior to 1941. A report from 1880 indicated that more than 2,000 acres of sagebrush near Mono Lake had been converted to tillable farmland at that time. Farms were concentrated along Mill, Lee Vining, Walker, Parker and Rush Creeks. Pasture areas were created by expanding and irrigating natural meadows. (SWRCB 7, Vol. 2, p. 3G2-3.) In addition to agricultural land use, vacation homes and resorts were developed along the streams and near lakes at higher elevations.

Despite the agricultural development and other land-use changes that had occurred prior to 1941, the Mono Basin still sustained important wildlife habitats and wildlife populations. In preparing the Draft EIR, the consultant reviewed published literature and field notes of expert naturalists and interviewed long-time Mono Basin residents about their recollections of wildlife resources prior to 1940. Although few quantitative data are available that describe the prediversion wildlife resources

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[9] *Morrison, M. 1991. Vertebrate Surveys on Paoha Island and Adjacent Mainland, Mono Lake and Basin, California. Auxiliary Report #2 (SWRCB 13b);*

Harris, J. H. 1991. Wildlife Surveys in Riparian and Wetland Habitats in the Mono Lake Basin and Upper Owens Valley, California. Auxiliary Report #3 (SWRCB 13c);

Shivik, J. A., and R. L. Crabtree. 1992. Population Characteristics and Food Habits of Coyotes of the Northwest Shore of Mono Lake, with Emphasis on Visitation to California Gull Breeding Colonies. Auxiliary Report #6 (SWRCB 13f); and

Rubega, M. 1992. Feeding Limitations and Ecology of Red-necked Phalaropes at Mono Lake, with Incidental Observations on Other Species. Auxiliary Report #11 (SWRCB 13k.)

of the Mono Basin (SWRCB 7, Vol. 2, p. 3F-2.), it is undisputed that Mono Lake represents a major stopover point for migratory water birds in western North America. The lake also is an important nesting area for several species of birds. The wildlife habitats described below have been most influenced by the export of water from the Mono Basin.

Lake-Fringing Wetlands: Prior to Mono Basin water exports, Mono Lake supported varied lake-fringing wetlands formed from springs and seeps along its margins as well as unvegetated brackish shoreline lagoons. (SWRCB 7, Vol. 1, p. 3C-11.) An extensive discussion of the historic and modern distribution of lake-fringing wetlands and their geohydrology is contained in SWRCB Exhibits 7 (Appendix Q), 13aa, and 13u.

The EIR consultant delineated eighteen lake-fringing wetland areas at Mono Lake including Paoha Island. (SWRCB 7, Vol. 1, Table 3C-3.) These wetland areas include marshes, wet meadows, dry meadows, alkali meadows and lagoons. A more complete description of the lake-fringing vegetation classification system used in the Draft EIR is included in SWRCB Exhibit 7, Appendix F. A majority of the wetlands were natural, though some were the result of human modifications including irrigation, excavation, or impoundment such as the artificial duck ponds on the Rush Creek delta. (SWRCB 13u, pp. 4 and 21.)

Lake-fringing wetlands serve a number of functions including providing wildlife habitat. Prior to 1941, there were 617 acres of lake-fringing wetlands which included 260 acres of brackish lagoons, 175 acres of dune lagoons, 38 acres on the Rush Creek delta, 29 acres at Bridgeport Beach, 4 acres at Black Point, 3 acres at the Wilson and Mill Creek deltas and 6 acres at DeChambeau Marsh. (SWRCB 7, Appendix D, p. 26.) In addition, there were 356 acres of marsh, wet meadow, and wetland willow scrub. (SWRCB 7, Vol. 1, Table 3C-4.)

Mono Lake Islands and Islets: Mono Lake has two major islands, Negit and Paoha. While both are of relatively recent volcanic origin, there are differences in composition which have biological and lake management implications. Both islands and their islets are potential nesting areas for California gulls and terns.

Negit Island is a 1,700 year old composite volcano composed of two domes, a rocky cinder cone and several lava flows. Part of the island is covered with sandy and silty volcanic ash from the nearby Mono Craters. These areas have been colonized by a greasewood shrub layer. There are no freshwater sources on the island. At a lake elevation of 6,417 feet, Negit Island is flanked by smaller volcanic islets (Krakatoa, Little Norway, Twain, Steamboat and Java) locally covered with sand deposits ranging in size from .223 acres to approximately .010 acres. (SWRCB 13u, Appendix.) The rock composition of the islets and Negit Island resists erosion by waves. (SWRCB 13v, pp. 2-3.) However, the number and size of the islets depends upon the water level of Mono Lake. In 1940, Negit Island consisted of about 162 acres separated from the mainland by 2.5 miles of open water. (SWRCB 7, Vol. 2, p. 3F-3.)

Paoha Island is a large mass of compacted lakebed sediments (mudstones) that were uplifted in a volcanic event approximately 330 years ago. Paoha Island was approximately 1,236 acres in size in 1940. (SWRCB 7, Vol. 2, p. 3F-3.) The mudstones are far less durable than the volcanic material that makes up Negit Island and its islets. (SWRCB 13t, p. 21.) Great Basin scrub habitat, dominated by greasewood and sage, is the most abundant habitat type on Paoha Island. This habitat type provides nesting, escape, and resting cover, as well as foraging habitat for some species. Freshwater springs near the southeast side support emergent marshes and alkali meadows. These springs are an important source of freshwater for most species of terrestrial wildlife on the island. (SWRCB 7, Appendix D, pp. 27-28.) Two saline lakes are located on the northeast end of the island. The recently emerged Paoha islets are composed of the same unconsolidated lakebed sediments originating from a slide from the flank of Paoha Island. The Paoha islets were submerged until

1961 when the water level of Mono Lake fell below 6395 feet. (SWRCB 13v, Appendix.)

Waters of Mono Lake: Eared Grebes, red-necked phalaropes, Wilson's phalaropes, and many species of shorebirds and waterfowl use Mono Lake in the summer and fall for a feeding and resting area before continuing their annual migration. At prediversion elevations, Mono Lake had a salinity of approximately 48 grams/liter. (SWRCB 7, Vol. 1, Figure 3B-1.) Near the mouths of the tributary streams, a phenomena called "hypopycnal stratification" occurs in which the lighter fresh water flowing into the lake floats on the top of the denser saline water already in the lake. (RT XXI, 15:4-15:20; NAS&MLC 178, photo.) This fresh water lens may persist for some time before it becomes mixed by wind-induced waves with the saline water of the lake. (RT XXI, 17:12-17:25.) In many cases, the hypopycnal lenses of fresh water were adjacent to marshes. This important association tended to concentrate waterfowl in marsh areas as depicted in the Dombrowski map of Mono Lake prepared in the late 1940s. (NAS&MLC 176.) Waterfowl could sit in this fresh water lens and drink, rinse salts from their feathers, and be protected from predators, while freely moving back and forth to the adjacent wetlands. Waterfowl were hunted in these areas prior to Mono Basin water exports. (RT XXI, 44:8-44:18.)

Tributary Wildlife Habitats: The streams feeding Mono Lake originate high in the eastern slope of the Sierra Nevada. By the prediversion period, the riparian vegetation along these streams had developed into nearly continuous corridors stretching from Mono Lake to the upper watersheds. Wetlands and meadows at various places along the tributary streams were important wildlife habitats. Below the LADWP points of diversion, the four diverted tributaries supported a combined total of approximately 492 acres of mature woody riparian vegetation and 175 acres of meadow and wetland vegetation. (SWRCB 7, Vol. 1, Table 3C-2.) These areas were used by wildlife for nesting, foraging, resting, and as migratory corridors.

6.3.2 *Post-1941 Wildlife Habitats*

In the post-1941 period, there have been extended periods in which the four streams diverted by LADWP had little or no flow below the LADWP points of diversion. Relicted lakeshore habitats have changed in character, acreage, and quality. Island and islet habitats have experienced similar changes. The Draft EIR reports the net changes in acres for particular types of habitat between pre-1941 conditions and conditions examined as part of a 1991 wildlife habitat analysis. (SWRCB 7, Appendix D, Table D-5.) A summary of the changes in various types of habitat is provided below.

<u>Changes in Lake Fringing Wetlands</u>: By 1989, LADWP stream diversions and the lowering of Mono Lake resulted in the reliction of approximately 14,560 acres of former lakebed. Nearly 6,000 acres of the relicted lakebed (playa) exists as unvegetated alkali flats of very low wildlife value. However, the playa is potential habitat for the snowy plover, a candidate species for listing as threatened or endangered under the federal Endangered Species Act. Snowy plovers are discussed in Section 6.3.6. Current lakeshore areas are dominated by alkali flats, dry and alkali meadows, and tall and short emergent marshes. (SWRCB 7, Vol. 2, p. 3F-32.)

Alkali and dry meadows currently occupy nearly 4,000 acres of Mono Lake shoreline. This represents a significant increase over prediversion acreages. These habitats provide some cover and foraging opportunities, but have little general wildlife value and use. (SWRCB 7, Vol. 2, p. 3F-33; RT VI, 134:10-134:13.) DFG Biologist Ron Thomas testified that the habitat quality of these "new" wetlands is very much diminished from what used to exist. (RT XXI, p. 53:2-53:11.) The lake fringing wetlands existing today lack freshwater and brackish water open-ponded areas. (RT VI, 208:5-208:24.) The existing alkali flats and alkali meadow have very little habitat value for migratory waterfowl. (RT VI, 135:3-135:22.)

Wet meadows (brackish and freshwater) currently occupy about 50 acres around the existing shoreline. These habitats receive limited wildlife use due to their limited extent and lack of open water. The habitat value and use of almost 1,000 acres of emergent marsh by marsh-nesting birds is reduced by the lack of open water. (SWRCB 7, Vol. 2, p. 3F-33.) The present marshlands are no longer adjacent to the lake and are not associated with the near-shore hypopycnal phenomena discussed above. (RT XXI, 29:10-29:15.) Instead of freshwater traveling a short distance before flowing into Mono Lake as a concentrated stream, the freshwater now diffuses over a large area of the shore and flows into Mono Lake in many areas. (RT XXI, 28:11-28:23.)

When the lake level dropped below the tributaries' delta plains, stream incision caused the draining of the delta lagoons which were important open-water habitats. These small ephemeral lagoons were created by berms of stream cobbles, gravels and sands deposited by the streams and shaped by shoreline currents and waves. The delta lagoons were lost when lake elevations dropped below 6,400 feet. (SWRCB 13u, pp. 20-21.) At lake levels less than 6,400 feet, the steeper gradient of the shoreline limits the formation of lagoon features to areas around the mouth of the streams. Lagoons are relatively rare elsewhere along the lake shore. (SWRCB 13u, pp. 15-16.)

Large persistent lakeshore lagoons were an historic feature of the northern shore of Mono Lake. Lakeshore lagoons cease ponding water when the lake elevation drops below 6,400 to 6,412 feet, depending on the lagoon floor elevation. (SWRCB 13u, pp. 17-20). The large shoreline lagoons are depicted in a photomosaic of Mono Lake from 1929 or 1930. (NAS&MLC 159.) These brackish lagoons are present until the lake drops below 6,400 feet. (RT XXI, 18:2-18:17.)

<u>Changes in Mono Lake Islands and Islets</u>: The decrease in the water level of Mono Lake has resulted in several important changes in island area and configuration, some of which have biological implications. Negit and Paoha Islands have increased

in size with the fall of Mono Lake. Negit Island increased from approximately 162 acres in 1940 to 263 acres when the water level of Mono Lake reached its historical low of 6,372 feet in October 1982. Paoha Island increased from approximately 1,236 acres in 1940 to 2,130 acres in October 1982. The lower lake levels also increased the size of the pre-existing Negit islets and caused new islets to emerge. The Paoha islets did not emerge until the water level declined to approximately 6,395 feet in 1961. (SWRCB 13v, Appendix.)

At a lake elevation of 6,375 feet, Negit Island becomes connected to the mainland by a land bridge. (SWRCB 13v, p. 6.) The landbridge begins as an island that emerges from the strait between Negit Island and the lake shore at approximately 6,390 feet. (NAS&MLC 198.) As the lake level falls, the island grows to form the land bridge at 6,375 feet. (RT XXIII, 135:13-136:13; NAS&MLC 21 and 142A, photographs of land bridge.) The land bridge provides access for coyotes and other terrestrial predators to California gulls nesting on Negit Island.

A rise in the future lake level would affect the Paoha islets. Unlike the hard rock of the Negit Archipelago, the mudstone of the Paoha islets is easily eroded by waves and longshore currents. Auxiliary Report 22 to the Draft EIR describes a recent example of how the islets were modified by changes in lake level. (SWRCB 13v, pp. 13-15.) When Mono Lake fell to 6,381 feet in 1974, there were 12 Paoha islets with a total area of 24 acres. The lake continued to fall reaching its historic low level of 6,372 feet in 1982. By August 1986, the water level rose to 6,380.9 feet, but erosion caused by the rising lake reduced the number of islets by half with a combined area of 11 acres.

<u>Changes in Mono Lake Habitats</u>: The reduction in lake elevation has reduced the surface area of Mono Lake by over 25 percent and caused lake water salinity to increase by approximately 100 percent. The open and near shore waters of Mono Lake are used as feeding zones for several species of birds such as gulls, eared

grebes, red-necked phalaropes, Wilson's phalaropes and several species of waterfowl. Habitat quantity and quality are critical to the algae, alkali flies and brine shrimp that form the foodweb that supports overall productivity of the Mono Lake ecosystem. The relationship between salinity and the aquatic productivity of Mono Lake is addressed in Section 6.1. The loss of the linkage of hypopycnal lenses (i.e., fresh water overlying saline lake waters) with fresh water marshes and lagoons has resulted in reduced wildlife habitat, particularly for waterfowl. (NAS&MLC 180, 181, and 182, photographs.)

<u>Tributary Habitats</u>: As discussed in Section 6.2.4, the diversion of the tributary streams and the fall of Mono Lake resulted in stream incision, erosion, and other geomorphic changes. (NAS&MLC 1W, pp. 6-9.) The direct impacts to terrestrial wildlife habitats were the loss of complex multi-storied riparian forest, fragmentation of the riparian corridors, and draining of wetlands, overflow channels, delta marshes, ponds and lagoons. (NAS&MLC 1U, pp. 5-7.) The result has been a reduction in habitat diversity and complexity, and an increase in lower valued wildlife habitats such as willow scrub, unvegetated floodplain, and Great Basin scrub.

6.3.3 *California Gulls*

California gulls (*Larus californicus*) typically nest in open areas on islands, if possible next to some kind of object such as a rock, log or shrub. (RT XII, 81:7-81:9). The Mono Lake colony is the second largest concentration of California gulls in the world. The Great Salt Lake in Utah is the largest. DFG has listed the California gull as a species of special concern. (RT XXIII, 145:13-145:22.)

The current California gull population at Mono Lake is between 60,000 and 65,000 breeding adults. (RT XXIII, 145:23-145:24.) The next largest colony in the state is located at Clear Lake in Modoc County with a population between 5,000 and 10,000 adults. (RT XXIII, 146:1-146:6.) In 1992, the Mono Lake colony represented about 85 percent of the total population of

California gulls breeding in California. The Mono Lake colony and the Great Salt Lake colony have supported a large number of gulls throughout most of their history and during the extensive drought periods. Other small California gull colonies were either abandoned or reduced during the recent six-year drought. (RT XXIII, 146:7-147:1.)

The documented history of the nesting gull population at Mono Lake is limited. There is a debate by gull researchers on the reliability and interpretation of historical population estimates, particularly regarding changes in the size and distribution of the gull colony during this century. (SWRCB 7, Appendix C, p. C-1.) Dr. David W. Winkler attributes the low gull population in the early part of this century to large scale harvesting of gull eggs to supply food to the mining towns. He believes that the gull population recently has been engaged in a slow population recovery. (RT XXIII, 166:2-166:19.) Dr. Winkler suggests that a pristine Mono Lake probably would have supported many more gulls than were nesting there in 1940. (RT XXIII, 167:1-167:4.)

Dr. Jehl stated that the historical record indicates that gulls have nested extensively on Paoha Island at various times. In 1863, the entire Mono Lake gull population (of unknown size) was on Paoha Island. In 1916, all of the estimated 2,000 gulls at Mono Lake nested on Paoha Island. (LADWP 34, Section 2, p. 37.) Dr. Jehl testified that this would indicate that conditions on Paoha Island are suitable for gull nesting. (RT XII, 82:8-82:17.) Dr. Jehl also testified, however, that most of the increase in gull populations from 1940 to 1979 was on Negit Island. Dr. Jehl stated that, in 1976, Negit Island held approximately 75 percent of the Mono Lake gull population and more than half nested in the shrub habitat on top of the island. (RT XII, 149:3-149:22.) Mr. Kerry Kellogg, a long-time Lee Vining resident, recalled boating to Negit Island in the 1950s to watch the nesting gulls. (NAS&MLC 1J, p. 3.)

Dr. Winkler testified that from 1919 to 1979 the majority of the breeding gulls at Mono Lake nested on Negit Island. (NAS&MLC AE, point #4.) The expansion of the Mono Lake gull colonies in the 20th century happened on Negit Island rather than Paoha Island even though Paoha Island was available for nesting in essentially its present state for a large part of that time. (RT XXIII, 300:9-300:19.) Paoha Island has been avoided throughout the large expansion of the gull populations on the islets during the 1980s, probably due to a resident coyote population. (RT XXIII, 179:18-179:25.) Mr. Shuford of the Point Reyes Bird Observatory testified that the resident coyote population on Paoha Island is a major deterrent to nesting. (RT XXIII, 158:18-159:7.)

The experts disagree regarding the value of Negit Island's greasewood scrub habitat for gull nesting. Dr. Jehl testified there is no evidence in the scientific literature or his field experience that brushy habitats are preferred. (RT XII, 82:1-82:7.) Dr. Winkler referred to 1928 photographs of gulls in greasewood scrub habitat on Negit Island. (NAS&MLC 233 and 234.) Mr. Shuford acknowledged the difference of opinion and explained that there have been no studies at Mono Lake that directly compare reproductive success and gull habitat preference. (RT XXII, 149:15-149:20.) In any event, the evidentiary record establishes that Negit Island and its islets historically have provided important gull nesting habitat. Dr. Jehl expressed concern that concentration of the bulk of the colony on a single island has risks because of predators, spread of infectious diseases or parasites. He believes the risk is reduced if the population is dispersed over several islands. (RT XII, 83:10-83:18.)

As Mono Lake fell below 6,395 feet, the Paoha islets emerged and became important nesting sites for gulls during the recent landbridging of Negit Island. In 1992 and 1993, the Paoha islets held more than 25 percent of the entire Mono Lake gull population. (RT XII, 82:25-83:2.) Dr. Jehl testified that, in 1990, these islets had higher productivity than any other colony. (RT XII, 83:4-83:5.) Dr. Beedy testified, that it was his understanding, that under the 6,383.5 lake level alternative addressed in the Draft EIR, the Paoha islets would be planed down (due to wave erosion) causing a permanent loss of habitat even if the lake level were to decline again at a later time. (RT VI, 96:6-96:18.) This problem was addressed in Auxiliary Report 22 to the Draft EIR. (SWRCB 13v, pp. 13-15.) At the higher range of the 6,377 alternative described in the Draft EIR (6,373 feet to 6,383 feet), most or all of the current nesting area on the Paoha islets would be eliminated. (LADWP 34, Section 2, p. 31.) The water level fluctuations expected under the LADWP Mono Lake Mangaement Plan would lead to the same problem.

Since 1979, there have been five major instances where coyotes have crossed over the landbridge to nesting islands. In 1979, coyotes crossed to Negit Island and displaced 33,000 gulls causing total reproductive failure. Twain islet, the largest of the Negit islets, becomes land bridged at 6,372 feet. (NAS&MLC 199.) In 1982, when the lake level was 6,372 feet, Twain Island and the Java islets were visited by coyotes and at least 30 percent of the gull population was displaced. (RT XXIII, 151:10-151:24.) Mr. Shuford testified that new data documents coyotes reaching Java islet in 1992 at 6,374 feet causing reductions in reproductive success and, again, in 1993 at 6,375 feet causing total reproductive failure of the colony. (RT XXIII, 153:4-153:11 and 161:10-161:15.) Based on the 1982 information, Mr. Shuford and Dr. Beedy expressed concern that Twain islet is susceptible to access by coyotes at roughly the same elevation as Java. Currently, Twain islet holds half of the California gulls breeding at Mono Lake. (RT XXIII, 153:16-153:21; RT VI, 161:11-162:20.) Recent data indicates that the lake level may need to be several feet higher than previously estimated to protect the gull nesting habitat on Negit Island, Twain islet and the Java islets.

Subcontractors to the EIR consultant conducted a study of northwest shore coyote populations in 1990 and 1991 which involved the use of radio collars on coyotes captured near Negit Island. (SWRCB 13 v, Auxiliary Report No. 6 to the Draft EIR.)

At least six different adult coyotes visited Negit Island during the course of the study during which time the elevation of the lake ranged from 6,375.2 feet to 6,374.5 feet. Two or three coyotes (one radio collared) were resident on the island from April 23, 1991 to July 15, 1991 which coincides with the gull nesting and chick rearing period. (SWRCB 13f, p. 13.) Large quantities of gull remains were found in the analysis of coyote droppings from Negit Island. In addition, visual observations and track checks indicated that there were likely three coyotes on Paoha Island. (SWRCB 13f, pp. 6-7.)

Of all the factors influencing gull populations at Mono Lake, Mr. Shuford testified that predation by coyotes is the one factor to have demonstrated a clear and major effect on reproductive success. The evidence shows that there has been a consistent relationship between lake level and nesting habitat security from predation. (RT XXIII, 150:23-151:9; and NAS&MLC 166, Exhibit A.)

Mr. Shuford testified that a lake level alternative of 6,390 feet or higher would provide the greatest quantity and security of nesting habitat for California gulls at Mono Lake. (RT XXIII, 160:18-160:23.) Dr. Winkler stressed the importance of preserving gull habitat on Negit Island and recommends a lake level of 6,383.5 feet or higher in order to maintain a sufficient water barrier around the island. (RT XXIII, 184:16-184:24.) Dr. Jehl believes, however, that the nesting colony of California gulls at Mono Lake has been very successful since the start of diversions and would continue to be successful at the range of water elevations proposed by LADWP. (LADWP 34, Section 2, p. 38.) Dr. Jehl acknowledged that, at lake elevations of 6,390 feet or 6,410 feet, Negit Island could again support high numbers of California gulls. (RT XII, 150:8-150:16.)

Mono Lake fluctuates naturally on an annual basis, typically reaching the yearly maximum level in late spring or early summer and falling to the minimum level in late fall. Under the revised LADWP Mono Lake Management Plan, the Mono Lake target elevation on April 1 of each year would be 6,377 feet. If the lake were below 6,377 feet, exports from the Mono Basin would not be allowed. (LADWP 154, p. 7.) Modeling of the LADWP Mono Lake Management Plan using the Los Angeles Aqueduct Simulation Model (LAASM) and past hydologic data projects that Mono Lake would fluctuate around the 6,377 feet target elevation with a low water level of 6,374.6 feet during dry hydrologic periods, and a high water level of 6,385.8 feet during wet hydrological periods. (LADWP 154, Table 8.) Due to the uncertainty of future hydrology, the water level of Mono Lake may fluctuate over a wider range than the LAASM output suggests.

Based on the evidence presented, we conclude that the LADWP Mono Lake Management Plan would not provide satisfactory long-term California gull habitat. At the lower water levels projected to occur under the LADWP Plan, Negit Island, Java islet and Twain islet would be accessible to predation by coyotes. The higher water elevations projected to occur under the plan are likely to erode the Paoha islets due to wave action. The result would be that when lower water levels again appear due to periodic fluctuations, there would be increasingly less habitat available on the Pahoa islets, and there would be no secure habitat available at Negit Island, Java islet or Twain islet due to accessibility to coyotes.

The evidence in the record establishes the following points should be considered in determining lake level management criteria which are consistent with long-term protection of nesting habitat for California gulls:

1. Coyote predation has been demonstrated to have a major adverse effect on gull reproduction success at Mono Lake when island nesting areas become accessible to coyotes.

2. Java and Twain islets provide good gull nesting habitat if not accessible to coyotes. Twain islet currently supports 50 percent of the nesting gull population at Mono Lake. Recent data show that Java and Twain islets are likely to be

accessible to coyotes ("functionally landbridged") at lake elevations between 6374 and 6375 feet.

3. Negit Island has historically been a significant nesting site for California gulls and is physically landbridged at a lake elevation of 6,375 feet.

4. The water level of Mono Lake fluctuates in response to hydrologic conditions. During prolonged droughts, this fluctuation may be several feet or more.

5. The Paoha islets presently provide important nesting habitat for gulls. During the rise in lake elevation which would occur under the 6,383.5 feet alternative evaluated in the Draft EIR, and which is projected to occur under the LADWP Management Plan, however, the Paoha islets will be eroded by wave action. As a result of the erosion expected during future increases in lake level, it is unlikely that all of the remaining Paoha islets would continue to be available for future nesting habitat during periods when lower water levels occur.

Based on the evidence in the record, the SWRCB concludes that a lake level of 6,384 feet would protect the gulls from coyote access to Negit Island and nearby islets, and would maintain a buffer for continued protection during periods of extended drought. A water level of 6,390 would completely inundate the landbridge between Negit Island and the shore, and would provide additional deterrence to potential terrestrial predators. The SWRCB recognizes that, as the lake rises, the Paoha islets will be eroded and probably lost as future nesting habitat. In view of the smaller size and ephemeral nature of the Paoha islets, however, the SWRCB does not believe that their protection justifies the loss of the much larger gull nesting habitat available on Negit Island at lake levels above 6,384 feet. At a lake level of 6,384 or higher, gulls will have abundant nesting habitat on Negit Island and several of the islets.

6.3.4 *Caspian Terns*

Caspian terns (*Sterna caspia*) are found throughout the world. They breed at scattered locations throughout North America, including the Pacific and Atlantic Coasts and interior regions as far north as Canada. Along the Pacific Coast, they nest primarily in large colonies on human-created habitats. In interior California, Caspian terns breed at isolated lakes. They are common on bays, beaches near river mouths and salt ponds from April to early October and uncommon or rare the rest of the year. (SWRCB 7, Vol. 2, p. 3F-20.) The Caspian tern often nests in association with gulls on open, barren islands. (RT XII, 74:13-74:16.) It is not a species of special concern, or a candidate species for listing at the State or Federal level. (RT VI, 101:1-101:11.) The range and population of the species is increasing in the Pacific states. (RT VI, 101:24-102:1.)

Caspian terns may have been nesting in the Mono Basin as early as 1963. (RT XII, 74:21-74:25.) Nesting birds were discovered on Twain islet in 1976. (RT XXIII, 322:22-323:13.) The terns nested on Twain islet through 1981. In 1982, the water level of Mono Lake reached the historic low of approximately 6,372 feet and coyotes gained access to the islet. (RT XXIII, 305:18-306:7.) The birds shifted to the Paoha islets where they have nested with varying success. (RT VI, 101:20-101:23.) After the lake rose in 1986, the terns returned to Twain islet and nested along with the gulls. (RT XII, 146:6-146:15.) Between 1976 and 1993, the number of breeding pairs varied from one to approximately 13. (RT XII, 142:5-142:7.) LADWP Exhibit 34 provides a summary prepared by Dr. Jehl of the population and nesting success of Caspian terns at Mono Lake. (LADWP 34, Section 2, p. 32.) Based on that data, the Draft EIR characterizes the Mono Lake population as highly variable and probably sustained by immigration rather than local reproduction. (SWRCB 7, Vol. 2, p. 3F-21.)

Dr. Jehl testified that at the higher range of the 6,377 feet alternative and at the higher alternatives, most or all of the current nesting area on the Paoha islets will be eliminated.

(LADWP 34, Section 2, p. 31.) Loss of tern habitat would also be expected to occur under the range of water levels projected to occur under the LADWP Management Plan. (RT XXIII, 310:10-310:25.) Caspian terns nest about two to three feet apart. Dr. Jehl estimated that a maximum of 250 square feet of nesting area would be required for the existing population. (RT XII, 175:9-175:19.)

Dr. Beedy testified that the Draft EIR did not analyze the impact to Caspian terns of rising lake levels because there is no clear impact to the species, they are not a listed species or species of concern, and there is no reason to believe that the terns would not shift back to the Negit islets if the Paoha islets were inundated. (RT VI, 100:2-102:16.) Dr. Jehl agreed that Caspian terns are not rare, and the loss of Mono Lake as a nesting area would have no effect on the species as a whole, but suggested that potential effects on Caspian terns should be considered. (RT XII, 76:10-76:16.)

Dr. Winkler testified that at the water elevations the SWRCB was considering, terns will not be impacted. As long as there is gull nesting habitat on Twain islet, there will also be nesting habitat for terns. The area that Dr. Winkler identified as the former nesting site for terns on Twain islet (NAS&MLC 236) is at an elevation of about 6,415 feet. (RT XXIII, 323:14-324:2.)

6.3.5 *Eared Grebes, Red-necked Phalaropes and Wilson's Phalaropes*

Eared grebes (*Podiceps nigricollis*), Wilson's phalarope (*Phalaropus tricolor*), and the red-necked phalarope (*Phalaropus lobatus*) are birds that use the open water of Mono Lake.

Eared grebes are widespread in North America, Eurasia and Africa. In California, eared grebes breed in marshy habitats in the Central Valley, northeastern plateau, and the Great Basin including Crowley Lake, but not at Mono Lake. Most eared grebes migrating through the state winter at the Salton Sea or in the Gulf of California. (SWRCB 7, Vol. 2, p. 3F-22.) The nearly one million eared grebes at Mono Lake comprise the majority of the Western Hemisphere population. The eared grebe is the most abundant bird species at Mono Lake. Grebes are totally reliant on the aquatic productivity of the lake and may remain continuously at the lake for up to eight months. (RT XII, 77:1-77:13.)

Dr. Jehl testified that even at the historic low water level of 6,372 feet, the available food supplies were more than adequate to support the population. (RT XII, 77:21-77:25.) Dr. Jehl states that when shrimp density gets down to approximately 3,000 per square meter, the birds leave the lake. This may occur as early as November or as late as February. In Dr. Jehl's opinion, food resources for grebes are not a matter of concern at any of the lake levels under consideration. (RT XII, 79:5-79:19.)

The red-necked phalarope breeds in arctic regions worldwide. During migration through California, red-necked phalaropes are common to very abundant depending upon the season. This species is especially abundant in interior lakes such as Mono Lake during the fall. Female migrating red-necked phalaropes arrive at Mono Lake by mid-July and are followed in succession by the males and juveniles. The numbers in the Mono Basin reach a peak by mid-August. Individual red-necked phalaropes are believed to stay from one week to several weeks at Mono Lake. Dr. Jehl estimated total populations at Mono Lake ranged between 52,000 and 65,000 from 1981 to 1984. (SWRCB 7, Vol. 2, p. 3F-26.) Daily census data collected by teams of observers estimated the peak daily count at 17,536 on September 16, 1990. The peak count was approximately 18,000 on August 11, 1991. Dr. Margaret Rubega's analysis of the available population data suggests that the total number of red-necked phalaropes using Mono lake as a migratory stopover probably has changed little since the early 1980s. (SWRCB 13k, pp. 22-23.)

Red-necked phalaropes feed primarily on alkali fly larvae and to a lesser degree on pupa and adults. Dr. Jehl testified that he has not been able to determine any long-term effects on red-necked phalaropes that can be attributed to changes in lake level or salinity. (RT XII, 89:11-89:25.) Recent work by Dr. Rubega suggests there may be a relationship between alkali fly densities at Mono Lake and success of red-necked phalaropes. Dr. Rubega concludes that lake levels which maximize alkali fly production are likely to benefit red-necked phalaropes. (SWRCB 13k, pp. 1-2.)

The report prepared by Dr. Rubega expresses concern that the distribution of red-necked phalaropes at Mono Lake in recent years has shifted toward the northeast sector of the lake which is not as accessible to viewing by the general public. (SWRCB 13k, p. 2.) Dr. Jehl testified that there is no simple pattern of phalarope distribution as a function of lake level, and there is no obvious pattern under conditions that have already been studied. Therefore, it is impossible to predict distribution of the birds at lake levels that have not yet been observed. (RT XII, 84:22-86:4.) There was no substantial long-term evidence presented that linked phalarope use of particular areas of the lake to the water level present at a particular time. In any event, the SWRCB does not consider the relative ease of viewing the phalaropes present at different locations on Mono Lake to be a significant factor to be considered in determining an appropriate lake level.

The breeding range of the Wilson's phalarope is from British Columbia east to Manitoba and south to California. Females compose approximately 70 percent of the Wilson's phalaropes at Mono Lake. The females arrive at Mono Lake in mid-June, followed by smaller numbers of males (28 percent) in early July and juveniles (2 percent) in late July and early August. Adult Wilson's phalaropes remain at Mono Lake continuously for 30 to 40 days to molt and accumulate fat reserves. (SWRCB 7, Vol. 2, pp. 3F-30 to 3F-31.) Wilson's phalaropes differ from red-necked phalaropes in their food habits. The females tend to concentrate in open water where they forage for brine shrimp and smaller amounts of alkali pupae. Males forage closer to shore and consume a greater proportion of flies. Alkali flies also predominate in the juvenile's diet. (SWRCB 7, Vol. 2, p. 3F-31.) After refueling at Mono Lake, Wilson's phalaropes fly 3,000 miles nonstop to wintering grounds in southern Bolivia, northern Chile, and Argentina. (SWRCB 7, Vol. 2, p. 3F-29.) Between 1980 and 1986, the annual flock was estimated at between 50,000 and 60,000 individuals. Recent estimates have reported lower populations. (SWRCB 7, Vol. 2, p. 3F-29 to 3F-30.)

The same general concerns expressed about lake level and aquatic productivity relative to red-necked phalarope populations at Mono Lake would pertain to Wilson's phalaropes, but are of greater concern for Wilson's phalaropes. (See Section 6.1.) Mono Lake is one of the world's most important migratory staging areas for Wilson's phalarope. No similar habitats exist in the vicinity of Mono Lake which provide dependable food supplies and staging areas for birds migrating through the western Great Basin. (SWRCB 7, Vol. 2, p. 3F-32.) Because of Mono Lake's importance to migrating shorebirds, it was designated as one of 18 reserves in the Western Hemisphere Shorebird Reserve Network. The testimony of Dr. Jehl indicates that a rising lake, up to historic levels, probably would not have a long-term adverse effect on the populations of phalaropes at Mono Lake. (RT XII, 124:3-124:16.)

6.3.6 *Snowy Plovers*

Western snowy plovers (*Charadrius alexandrinus*) are a federal candidate for listing as threatened or endangered. The population at Mono Lake has regional significance as one of the state's most important breeding concentrations. (SWRCB 7, Vol. 2, p. 3F-36.) The species' breeding range extends across much of North America, Eurasia, and portions of South America. In North America, snowy plovers breed along the Gulf Coast and Pacific Coast from Washington to California. In California, snowy plovers nest along the coast and in interior locations such as Owens Lake, the Salton Sea and Mono Lake.

Recent surveys of western North America estimate 7,800 breeding adults at interior locations and about 1,900 adults along the coast. (SWRCB 7, Vol. 2, p. 3F-33.) Dr. Winkler first recorded nesting snowy plovers at Mono Lake in 1977, and estimated at least 10 nesting pairs and more than 100 total birds during fall migration. In 1978, statewide censuses estimated the Mono Lake population represented approximately 11 percent of California's breeding population. (SWRCB 7, Vol. 2, p. 3F-34.) Snowy plovers nest in alkali flat and sand dune habitats around the eastern half of the Mono Lake and a small population exists along the northwestern shore near County Park. Their nesting season extends from mid-April to mid-July. (SWRCB 7, Vol. 2, p. 3F-35.)

The Draft EIR reports that declining lake levels have expanded the area of potential breeding habitat to more than 10,000 acres. Lake levels expected at the 6,377 feet alternative and higher elevations would inundate increasingly greater proportions of that habitat raising the concern that snowy plovers could be adversely impacted. In 1989, however, approximately 75 percent of the available habitat was not occupied and thousands of acres could be inundated without causing adverse impacts on snowy plovers. (SWRCB 7, Vol. 2, p. 3F-87.) Testimony from several expert witnesses supports the conclusion that a rise in the lake level to 6,390 feet or higher would leave ample habitat available for snowy plovers. (RT XII, 206:3-206:21; RT XIII 318:18-320:1; RT XIII 320:2-320:22.)

6.3.7 *Waterfowl*

Detailed and colorful testimony from long-time residents of the Mono Basin shows that Mono Lake once supported tens of thousands of ducks (possibly hundreds of thousands) and hundreds of geese during the fall migration period. The most abundant species was the northern shoveler (spoonbill) that used the lake to forage on brine shrimp. Mallards were also numerous and were generally associated with freshwater sites along the streams, springs, and fresh and brackish marshes. Sites which received heavy waterfowl use were the meadows area of Rush Creek, Rush Creek near its mouth, the Dumbrowski Ponds on Rush Creek, the Lee Vining Creek delta, the marshes at Simons and Warm Springs, the northshore lagoons, and wetlands near Wilson Creek and Dechambeau Ranch.[10] There were also many ducks in Rush Creek above Grant Lake. (RT XVII, 185:21-186:10.)

The hearing testimony is consistent with interviews of several other long-time residents of the Mono Basin which are reported in the Draft EIR discussion of Mono Basin waterfowl. (SWRCB 7, Vol. 2, p. 3-7.)[11] Historic waterfowl abundance at Mono Lake is also supported by a 1940 waterfowl harvest map of Mono Lake (DFG 95) and the Pacific Waterfowl Flyway Report, #7, 1949. (DFG 96; RT XXI, 40:23-41:20.)

NAS&MLC Exhibit 103 is composed of Pacific Flyway Waterfowl Investigation population data sheets from September through November of 1948 for Mono Lake. The data were collected by Walter Dumbrowski who owned the commercial waterfowl hunting club referred to in the testimony of long-time residents. His counts on several September days estimated 175,000 to 200,000 ducks. His October counts ranged from approximately 175,000 to approximately 400,000 ducks. His November counts estimated over a million ducks of which 80 percent were shovelers and ruddy ducks. Attached to NAS&MLC Exhibit 103 is a map of the Rush Creek delta depicting the location and size of the Dumbrowski ponds. The largest of these ponds (22 acres) is identified (shaded) as the area of eye count observation reported on the September 20, 1948 data sheet where Mr. Dumbrowski estimated there were between 175,000 and 200,000 ducks. On October 11, 1948, he estimated there were about 60,000 ducks in the pond.

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[10] *Long-time residents testifying about waterfowl included Mrs. Elma Blaver, Mr. August Hess, and Mr. Kerry Kellogg.*

[11] *In preparing the analysis of Mono Basin waterfowl for the Draft EIR, Jones and Stokes Associates interviewed several long-time Mono Basin residents including Ms. Katherine Clover, Ms. Jessie Durant, Mr. Jack Preston, Mr. Kent DeChambeau, and Mr. Don Banta. All of those individuals recalled large numbers of ducks in the Mono Basin in the period before out-of-basin exports began. Species reported to Jones and Stokes include northern shovelers, mallards, green-winged teal, American wigeon, northern pintails and gadwalls. (SWRCB 7, Vol. 2, p. 3F-8.)*

Retired DFG Biologist Eldon Vestal testified that migratory waterfowl were present in large numbers at Mono Lake from October through December. Although he did not participate in formal waterfowl counts at Mono Lake, Mr. Vestal observed hundreds of thousands of waterfowl on Mono Lake on numerous occasions. Shovelers and ruddy ducks were the predominant species but he also observed mallards, pintails, redheads, gadwalls, baldpates (American widgeon), scaups, coots, three species of teal and Canadian geese. Mr. Vestal confirms that there was extensive duck hunting around Mono Lake in the 1930s and 1940s. (NAS&MLC 1AB, pp. 2-5.)

Dr. Stine testified that a drawing prepared by Walter Dumbrowski in the mid-1940s which identifies sites of waterfowl distribution on Mono Lake coincides with areas where freshwater enters Mono Lake. (RT XXI, 13:15-15:3; and NAS&MLC 176.) Dr. Stine attributed waterfowl abundance at these areas to the previously discussed phenomenon of hypopycnal stratification which occurs where freshwater enters Mono Lake. (RT XXI, 20:4-20:16.) In addition to Mono Lake and immediately adjacent areas, Dr. Stine testified that the North shore lagoons and the Rush Creek bottomlands were areas of duck abundance. (RT XXI, 9:15-10:7.) The declining water elevation of Mono Lake affected all three areas identified by Dr. Stine. The lagoons dried up as the declining water level approached 6,400 feet. (RT XXI, 27:4-27:22.) The marshlands of the Rush Creek and Lee Vining Creek deltas were lost due to incision. (RT XXI, 28:11-29:9.) Although there has been a net increase in marshland, most of the presently existing marshland is not adjacent to the lake. (RT XXI, 29:10-29:15.)

DFG biologist Ron Thomas testified that he has flown over the lake many times and hunted there on several occasions. He believes that Warm Springs and Simons Springs are probably the major waterfowl concentration areas today due to their location near to the lake. (RT XXI, 39:24-40:13.) Mr. Thomas testified that the habitat value of the new wetland areas is very much diminished from the previous habitats. (RT XXI, 53:2-53:11.)

Dr. Beedy testified that the lake fringing alkali meadows supported very few ducks. (RT VI, 135:17-135:22.) Dry meadow areas provide little waterfowl value in the absence of a source of fresh water. (RT VI, 137:20-138:18.) Botanist James Jokerst testified that not all habitats classified as wetlands or riparian necessarily have the same values and functions. (RT VI, 113:12-113:19.) Mr. Jokerst testified that not all of the lake fringing "wetlands" may meet regulatory definitions of wetlands. The U.S. Army Corps of Engineers requires that jurisdictional wetlands have three indicators: prevalence of hydrophytic vegetation, wetland hydrology, and hydric soils. In contrast, Mr. Jokerst explained that the USFWS requires presence of only one of the positive indicators to be classified as a wetland. Large portions of the alkali flat qualify under the USFWS definition because the water table is at or near the surface for a substantial portion of the year. Only small areas of alkali flat, with very sparse vegetation, meet the Corps of Engineers wetlands criteria. The relicted areas that are vegetated today were submerged in 1940. (RT VI, 217:14-219:2.)

Dr. Frederic Reid (Biological Supervisor for Ducks Unlimited) testified that the Mono Basin, like most of the wetlands in the Great Basin, is an important migrational habitat. (RT XXI, 60:6-60:8.) He stated that the Klamath, Mono and Owens Valley waterfowl habitats have been impacted by human activity including agriculture drains, water diversions and water quality degradation. (RT XXI, 62:13-62:16.) Dr. Reid believes that the pre-diversion conditions of Mono Lake supported orders of magnitude more waterfowl than exist today. (RT XXI, 69:1-69:3.)

The Draft EIR discusses the decline of migratory duck populations across North America during the 1970s and 1980s. Populations at Mono Lake reflected this trend. Censuses conducted at the lake during the 1970s and 1980s suggest that no more than a few thousand ducks were present at Mono Lake at one time. (SWRCB 7, Vol. 2, p. 3F-39.) Current estimates of duck populations at Mono Lake range from 11,000 to 15,000 individuals per year. Recent operation of Grant Lake for water supply and recreation has reduced its waterfowl habitat value. (SWRCB 7, Vol. 2, p. 3F-43.)

Dr. Stine testified regarding what he believes would be required to restore waterfowl habitat in several areas including the following: (1) Restoration of waterfowl habitat at Warm Springs and Simon Springs would require a lake level of 6,390 feet; (2) Restoration of waterfowl habitat along Rush Creek would require rewatering of abandoned channels and raising the water table of the Rush Creek bottomlands; (3) Restoration of the marshland and waterfowl habitat areas at the Rush, Lee Vining, and Mill Creek deltas and the Dechambeau Ranch embayment would require a water level of 6,400 feet; and (4) Restoration of the north shore lagoon would require a water level of 6,405 feet. (NAS&MLC 1U, p. 7.)

Dr. Reid testified that, at the current lake level or below, waterfowl habitat restoration will be expensive and marginal in impact. Substantial improvements can only be achieved by increasing the water level. (RT XXI, 72:11-72:22.) Dr. Reid's testimony regarding the lake levels required for restoration of waterfowl habitat in specific areas is consistent with Dr. Stine's analysis. Dr. Reid also testified regarding the benefits of riparian restoration work to improve waterfowl habitat in the area of Mono Basin streams, springs and deltas. (RT XXI, 73:14-73:21.) Mr. Thomas testified that naturally fluctuating lake levels around 6,405 feet or higher would restore the waterfowl populations that have been seen in the past. (RT XXI, 54:22-54:24.)

Dr. Reid described the North American Waterfowl Plan which arranges partnerships between governmental agencies and private conservation organizations to restore wetland habitats to support the waterfowl population levels of the 1970s. Ducks Unlimited was involved in several projects in the Great Basin. (RT XXI, 74:2-74:21.) Dr. Reid identified measures that could be implemented at Warm Springs and Simons Springs to hold water through the summer periods and into the fall. (RT XXI, 154:1-

154:12.) Dr. Reid also testified that Ducks Unlimited is cooperating on a 30-acre wetland restoration project at DeChambeau Pond, but stated that such projects can be very costly. (RT XXII, 25:7-25:19.) Dr. Reid described the potential use of "scrapes" to collect water and emulate slough-like depressions or swales to hold water for the summer and sometimes into the fall. (RT XXII, 35:15-36:2.) He believes the areas of greatest potential to create or restore habitat are at Warm Springs, Simons Springs and the stream corridors and floodplains of Rush Creek and Lee Vining Creek. (RT XXI, 154:1-154:25.) Dr. Reid testified that the substantial planning process for wetlands restoration can typically run about 18 months. (RT XXII, 47:16-49:5.) Ducks Unlimited would be willing to participate as a technical advisor on waterfowl habitat restoration. (RT XXI, 155:7-155:9.)

Based on the evidence discussed above, the SWRCB concludes that Mono Lake and nearby areas provided important habitat and a major concentration area for migratory waterfowl prior to out-of-basin diversions by LADWP and up to the early 1960s. The loss of open water habitats and fresh water sites around the lake due to water diversions by LADWP coincided with the decline in migratory waterfowl populations at Mono Lake. Historically, Mono Lake probably supported several hundred thousand ducks during the fall migration. The current habitat supports a small fraction of the historic numbers.

Restoration of pre-diversion waterfowl habitat would permit substantial increases in migratory waterfowl use at Mono Lake. The actual number of waterfowl which would use these restored habitats, however, is unknown and is dependent in part upon the restoration of other similarly degraded habitats in the interior portion of the Pacific Flyway and annual fluctuations in waterfowl reproduction and populations. Maximum restoration of waterfowl habitat in the Mono Basin would require maintaining a water level of 6,405 feet.

In view of the City of Los Angeles' need for water for municipal use (Sections 7.1 through 7.1.7 below), and in view of the competing public trust uses which would not be best served by a water level of 6,405 feet, this decision does not regulate LADWP's water diversions in a manner which would restore the maximum amount of waterfowl habitat. Increasing the water level to an average of 6,392 feet as called for in this decision, however, would allow for restoration of some of the lost waterfowl habitat. Additional waterfowl habitat could be restored through other restoration measures identified in the record.

Permanent termination of all or virtually all water exports from the Mono Basin would be needed to restore the maximum amount of waterfowl habitat in the Mono Basin, but would preclude use of any water for municipal use by Los Angeles. In accordance with the "physical solution doctrine" discussed in Section 2.5 above, a water diverter can be compelled to employ a physical solution through which competing water demands can be met and the constitutional goal of promoting maximum beneficial use of the State's waters will be served. Thus, as part of a physical solution allowing for diversion of water for municipal use, LADWP can be required to undertake waterfowl habitat restoration measures. Waterfowl habitat restoration can serve to restore public trust uses while requiring a smaller commitment of water.

With the exception of the natural restoration that gradually will occur due to the instream flows and lake level required by this decision, the record is insufficient to specify at this time the waterfowl habitat restoration measures which should be undertaken. The record is sufficient, however, to require that as part of the restoration plan required by this decision, LADWP consider various waterfowl habitat restoration measures identified in the Draft EIR and the hearing record. The SWRCB concludes that LADWP should be required to consult with DFG and other interested parties and analyze potential feasible waterfowl restoration projects which are consistent with the lake level criteria established in the decision, consistent with the regulations governing the Mono Basin National Scenic Area, and which could avoid or properly mitigate any disturbance of archeological resources in the Mono Basin. LADWP's evaluation of potential waterfowl restoration projects should focus on lake-fringing wetland areas.

6.3.8 *Special-Status Species*

Special-status species are animals and plants that are legally protected under the State or Federal Endangered Species Acts or other regulations, species that are considered sufficiently rare by the scientific community to be candidates for such listing, and species of special concern to either state or federal agencies. (SWRCB 7, Vol. 2, pp. 3F-12 to 3F-13.) The Draft EIR identified 39 special-status animal species that occur or may occur in the Mono Basin or along the upper Owens River to Lake Crowley. Appendix E of the Draft EIR provides an analysis of the pre-diversion and point-of-reference status of the 39 species. The California gull, the snowy plover, and the Mono Lake brine shrimp have been discussed previously. Of the remaining 36 special-status species, the Draft EIR concludes:

1. Ospreys and bald eagles would probably benefit from restoration of fisheries on Rush and Lee Vining Creeks;

2. Reductions of spring flows, grazing in the Mono Basin and construction of Lake Crowley probably reduced habitat availability for yellow rails, which prefer to nest in shallow, freshwater marshes with sparse emergent vegetation; and

3. Long-eared owls, yellow warblers, yellow-breasted chats, and willow flycatchers probably declined in the project area during the diversion period due to a loss of riparian broadleaf and willow scrub vegetation along the diverted tributaries. (SWRCB 7, Vol. 2, p. 3F-49.)

The Draft EIR identified six special-status plants that are known to occur below the 7,000-foot elevation in the Mono Basin. The

Draft EIR concludes that no state listed or federally listed or proposed threatened or endangered plants would be affected by any of the alternatives. In addition, no special-status plants in the Mono Basin or Long Valley occur in riparian zones affected by the project. Two plants listed in the California Native Plant Society inventory of rare and endangered plants could be affected by an increase in lake level above 6,400 feet. All special-status plants in the Mono Basin and Long Valley were probably more abundant in 1940 than today, but they have not been adversely affected by changes in streamflow or lake levels. (SWRCB 7, Vol. 1, pp. 3C-48 to 3C-49.)

In summary, the minimum streamflow and lake level criteria established in this decision will benefit Mono Lake brine shrimp and California gulls, may have some beneficial effect on ospreys and bald eagles, and are not expected to have a significant adverse impact on any special status species of animals or plants.

6.4 Mono Basin Air Quality

As noted earlier in this decision, the California Supreme Court ruled that the scenic views of Mono Lake and its shore, and the purity of the air in the Mono Basin are among the values protected by the public trust doctrine. (National Audubon Society v. Superior Court, 33 Cal.3d at 435, 189 Cal.Rptr. at 356.) The declining water level of Mono Lake attributable to LADWP diversions has led to severe periodic dust storms, a deterioration of air quality in the Mono Basin and violation of standards set pursuant to the federal Clean Air Act. As discussed below, the evidence in the record establishes that resolution of the air quality problem will require reduced water diversions from pre-1989 levels in order to allow the water level of Mono Lake to rise and cover much of the exposed lakebed area.

LADWP argues that the Legislature "has not granted the SWRCB authority to enforce state or federal statutes involving air quality." (LADWP Rebuttal Brief, p. 65.) The fact that the Legislature has charged other agencies with primary regulatory authority over air quality, however, does not mean that the SWRCB should ignore existing or potential air quality impacts of water diversions. As noted above, the Audubon decision establishes that air quality is among the values protected by the public trust doctrine. Moreover, all water diversions in California are subject to the constitutional prohibition of unreasonable use or method of diversion of water. (California Constitution, Article X, Section 2.) It should be beyond dispute that, in a situation where diversion of water can lead to violation of a public health based air quality standard, the protection of air quality should be considered in determining the conditions under which the water appropriation is allowed. Statutory restrictions upon the Great Basin Air Pollution Control District's jurisdiction to regulate water diversions cannot logically be interpreted as limiting the SWRCB's established statutory authority over diversion and use of water. (Water Code Sections 174, 1200, et seq.)

6.4.1 *Effect of Reduced Lake Levels on Air Quality*

No ambient air quality monitoring was conducted in the Mono Basin before 1979. Therefore, no quantitative data exist to describe the pre-1941 conditions. The Draft EIR (SWRCB 7, Vol. 2, pp. 3H-8 to 3H-11 and Appendix N, p. N5-7) reviewed the historical accounts of the Mono Basin including an 1889 report titled "*Quaternary History of the Mono Valley, California*" by Israel C. Russell (reprinted from the Eighth Annual Report of the United States Geological Survey, 1889, pp. 267-394). Russell noted that on windy days Mono Lake was streaked with alkaline froth, but his report makes no mention of windblown dust, sand or salt. (SWRCB 7, Vol. 2, pp. 3H10-3H11.)

Aerial photographs from 1930 (lake elevation approximately 6,420) and 1940 (lake elevation approximately 6,417) show very narrow fringes of efflorescent salts along the edges of lagoons near the lakeshore; scattered small patches of salt among some sand dunes; and no efflorescent salt visible on the narrow strip of barren sand bordering the north or east shores of the lake. (SWRCB 7, Vol. 2, p. 3H-9.) The Draft EIR states that the best available evidence suggests that major dust storm events were probably rare under pre-diversion conditions and that any dust storms that did occur would have been dominated by silt, clay, and sand particles with only small quantities of salt particles from interstitial salts and water spray from off the lake. (SWRCB 7, Vol. 2, p. 3H-11.)

As the surface elevation of Mono Lake has fallen from 6,417 feet at the start of LADWP diversions in 1941 to 6,375 feet in spring of 1994, increasingly greater areas of former lakebed and lakebed sediments have been exposed ("relicted") forming a white ring around Mono Lake known as the playa. Under present conditions with large areas of exposed playa, strong winds produce dust storms of varying size and duration that degrade the ambient air quality and scenic views of the Mono Basin. The three most frequent dust emission source areas are the landbridge (the exposed playa between the shoreline and Negit Island), the North Shore and the East Shore. (GBUAPCD A, p. 7.) An additional emission source area is the emerged western portion of Paoha Island. (SWRCB 7, Vol. 2, pp. 3H-20 and 21.)

The Draft EIR describes the term "dust storm" and "sand storm" as episodes of windblown particulate matter that significantly restrict visibility. Dust storms are dominated by particles with diameters smaller than 100 microns; sand storms are dominated by particles with diameters larger than 100 microns. (SWRCB 7, Appendix N, p. N-10.)

The major emission sources of suspended particulate matter in the Mono Basin are produced by wind erosion of efflorescent salt deposits and some exposed soils, and sediments. (RT VI, 201:4-201:12.) Efflorescent salts form as shallow saline ground water rises to the surface of permeable sediments through capillary action and evaporates at the soil surface leaving a highly erodible salt crust. (GBUAPCD 30, pp. 1, 2, 16, and 17, photographs). Efflorescent salt deposits are seldom found on soil-air interfaces where the ground water table is more than ten feet below the ground surface. (GBUAPCD 30, pp. 1 and 11;

SWRCB 7, Vol. 2, p. 3H-21.) The major emission sources at Mono Lake are considered "anthropogenic", a classification which includes emissions influenced directly or indirectly by human activity. (SWRCB 7, Vol. 2, p. 3H-6.)

6.4.2 *The PM-10 Standard and Human Health*

The term "ambient air quality" refers to the atmospheric concentration of a specific compound or material present at a location that may be some distance from the source of the pollutant emissions. (SWRCB 7, Vol. 2, pp. H-1 and H-2.) During the 1980s, air quality standards for particulate matter were revised to apply only to "inhalable" particles with a size distribution weighted toward particles having aerodynamic diameters of 10 microns or less ("PM-10"). (SWRCB 7, Appendix, p. N-3.) The PM-10 standard is set to control concentrations of inhalable sized fine particles less than 10 microns in size, or about one tenth the diameter of human hair. (GBUAPCD A, III, p. 17.) Health risk studies were used to establish the PM-10 standard based on potential impacts to human health. (RT XII, 9:8-9:22 and 52:6-52:13.)

PM-10 sized particles are small enough to be inhaled deep into the lower respiratory tract. When breathing through the nose, few particles with an aerodynamic diameter larger than 10 microns reach the lower respiratory tract. (SWRCB 7, Appendix, p. N-3.) People who live in or visit areas exposed to the dust events at Mono Lake are at risk.

Federal standards for suspended particulate matter (PM-10) have been set for two time periods: a 24-hour average and an annual average of 24-hour values. The federal "National Ambient Air Quality Standards" (NAAQS) for PM-10 are:

> 150 micrograms/cubic meter as a 24-hour average; and
> 50 micrograms/cubic meter as an annual arithmetic mean
> (SWRCB 7, Vol. 2, p. 3H-4; RT XII, 9:23-10:3.)

Dr. M. Joseph Fedoruk, M.D., testified on behalf of LADWP that there was no evidence that, at the existing lake levels, the occasional dust storms will have a significant public health impact in the affected areas. (LADWP 47, Section 6, p. 87.) Dr. Fedoruk suggested it is likely that individuals in the affected area will limit their exposure to PM-10 by taking avertive action, such as going indoors during the occasional dust storms. (LADWP 47, Section 6, p. 88.) After hearing the description of dust problems experienced by a resident on the north shore of Mono Lake (NAS&MLC 1F), however, Dr. Fedoruk agreed that experiences of the type described would constitute a public health problem. (RT XXIII, 41:10-41:20.)

Mr. Duane Ono of the Great Basin Unified Air Pollution Control District (GBAPCD), testified that exposure to PM-10 levels above the federal standard may cause sensitive individuals to experience varying degrees of breathing difficulties, some of which may linger beyond the exposure period. In some cases, breathing difficulties due to PM-10 exposure may cause asthma attacks or even contribute to an individual's death. Other health effects such as eye and nasal irritation may also occur. The most sensitive population includes children, the elderly, and people with respiratory problems, heart disease or influenza. (GBUAPCD A, III, p. 16; RT XXIX, 27:20-27:24.) The U.S. Forest Service is concerned that exposure to dust events poses a potential health risk to visitors to the Mono Basin. (RT XXIX, 20:20-20:25.)

6.4.3 *Existing Air Quality Conditions*

Efflorescent salt deposits at Mono Lake are found along the northern and eastern shores of the lake, generally below the 6,390 foot contour. (SWRCB 7, Vol. 2, Figure 3H-20.) Efflorescent salts which were virtually nonexistent before 1941 cover 4,975 acres or approximately 65 percent of the relicted lands at lake elevation 6,376 feet. Some of the salts are noncrystalline powdery deposits highly susceptible to wind erosion. More often, the salts are crusted but subject to disturbance by windblown sand. (SWRCB 7, Vol. 2, p. 3H-21; GBUAPCD 7, 17, 18, and 19 (photographs).)

Windblown emissions at Mono Lake vary with season due to snow cover, precipitation, and crust formation. Generally the dust episodes occur during the months of April, May, June, November and December when the surface crust of the playa is thin. (GBUAPCD 10, pp. 3 and 5; RT XXIX, 20:9-20:11.) U.S. Forest Service Exhibit 3 is a video of dust events as seen from the Mono Lake Visitor Center in the spring of 1993.

Documented dust events have caused short-term air quality degradation in the Scenic Area which has resulted in exceedences of the Federal standard for PM-10. However, sampling data suggest that in Lee Vining (which is normally upwind of the dust storms), PM-10 concentrations over a 5 year period were extremely low during all the dust storms. (RT XXIX, 103:1-103:12.) Dust events have occurred at a frequency and concentration in violation of the Federal Clean Air Act. (GBUAPCD A, p. 1.) Mr. Ono testified that GBUAPCD monitoring data at the Simis Ranch show a statistical average of about 3.2 exceedences per year for the period 1988 to 1992. (RT XXIX, 53:12-53:19.) The national ambient air quality standard for PM-10 allows one exceedence or less per year without regard to how much the level is above the measured numerical standard of 150 micrograms per cubic meter. (RT XXIX, 29:2-29:15.) While the air quality of the Mono Basin is normally within the standard, there are enough days over the standard during the three-year period to be in violation. (RT XII, 14:3-14:8.)

6.4.4 *Compliance with Federal Clean Air Act Requirements*

Designation as a Nonattainment Area: On July 16, 1993, the U.S. Environmental Protection Agency (U.S. EPA) published a notice of proposed rulemaking revising the PM-10 designation for the Mono Basin in the Federal Register. (Vol. 58, No. 135, pp. 38331-38333.) The U.S. EPA proposed to revise the PM-10 designation for the Mono Basin from "unclassifiable" to "nonattainment" based upon recorded violations of the PM-10 NAAQS which occurred on or after January 1, 1989. (USEPA 1, p. 1.) The Mono Basin was designated as a nonattainment area for PM-10 on December 29, 1993. (RT XXIX, 28:11-28:19.)

The Regulatory Framework: The federal Clean Air Act amendments of 1990 require each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. These plans must be submitted to and approved by the U.S. EPA. The NAAQS for PM-10 sets forth regulations for implementing the regulatory standards by requiring the development of a SIP to develop strategies necessary to assure attainment and maintenance of the PM-10 standard. (USEPA 1, p. 1.) Designation as a nonattainment area sets up a series of planning and regulatory deadline requirements for the state and local air pollution control agencies. By operation of law, the Mono Basin is initially classified as a moderate nonattainment area. The State must submit a SIP to U.S. EPA within 18 months that either demonstrates attainment will occur no later than the end of the sixth calendar year following the effective date of redesignation or shows that a demonstration of attainment within that period is impracticable. (RT XII, 5:11-5:22; USEPA 1, p. 3.) Demonstration of practicable attainment may include the use of air quality models. (USEPA 1, p. 3.)

If the State does not demonstrate attainment or demonstrates that attainment is impracticable within six years from the designation date (December 29, 1993), the Mono Basin will be upgraded to the serious nonattainment classification by U.S. EPA. This redesignation provides additional time to attain the standard, while also triggering additional legal and planning requirements. A new SIP is required within 18 months that demonstrates attainment as expeditiously as practicable, but in no case later than ten years after the designation to serious nonattainment area. In a December 16, 1993 letter to GBUAPCD (NAS&MLC 246), U.S. EPA outlined its understanding of the general timelines for the longest period possible for compliance with planning deadlines and attainment deadlines. The letter states that if the Mono Basin fails to attain PM-10 standards by December 31, 2008, a new SIP would be required that provides for a 5 percent reduction of PM-10 emissions per year until the NAAQS is attained. (NAS&MLC 246, p. 2.) If the State fails to provide an adequate SIP, U.S. EPA is required to promulgate its own federal implementation plan to achieve the attainment of the PM-10 standard in the Mono Basin. (RT XII, 6:10-7:7.)

The State has designated the GBUAPCD as the lead agency to develop the SIP for the Mono Basin. Once the plan is completed and approved by the GBUAPCD, it will be forwarded to the California Air Resources Board (ARB) for adoption. Once adopted by ARB, the plan is considered as a SIP which is then forwarded to the U.S. EPA in accordance with Clean Air Act requirements. (RT XXIX, 71:11-71:22.)

The GBUAPCD is currently in the process of developing a SIP to bring the Mono Basin into compliance with the Federal Clean Air Act. (GBUAPCD A, p. 1.) Mr. Ono testified that the SIP being developed by his agency must provide reasonable assurance that the standard would be met with the strategy that is included in the plan. (RT XXIX, 30:1-30:5.)

Air Quality Modeling: In 1991, the GBAPCD contracted with TRC Environmental Corporation (TRC) to perform an air quality model evaluation to assess dispersion modeling techniques for prediction of PM-10 emissions in the Mono Basin. (GBUAPCD 3, p. 1.) TRC evaluated the Industrial Source Complex Short Term (ISCST) model and the Fugitive Dust Model (FDM). The results of the evaluation were that the FDM outperformed the ISCST overall and was found to be technically superior for the prediction of PM-10 concentrations downwind of eroding source areas. In most instances, however, the predictions of the two models were similar. (GBUAPCD 3, p. 18; RT XXIX, 34:5-34:25.) Under GBUAPCD direction, TRC used the Industrial Source Complex-2 model (ISC-2), which was the U.S. EPA approved dispersion model, to model PM-10 emissions. The ISC-2 model is routinely used for regulatory purposes. (GBUAPCD A, II, p. 5) A Mono Lake Air

Quality Modeling Study was conducted to assess the impacts of windblown PM-10 emissions from the Mono Lake playa at different levels of the lake. (GBUAPCD 10, p. 1.)

As part of their work on the Draft EIR, Jones and Stokes Associates also evaluated air quality impacts in the Mono Basin using a computer model as the most practical method for developing quantitative air quality assessments of future conditions. Jones and Stokes Associates selected the Fugitive Dust Model (FDM). Modeling procedures and results are presented in Mono Basin EIR Auxiliary Report No. 28. (SWRCB 13z.)

Based on the investigations done by the GBUAPCD and Jones and Stokes Associates, Mr. Ono testified that an average Mono Lake elevation of 6,392 feet would provide an appropriate level of protection of air quality. Mr. Ono also testified that he believes the 6,390 feet alternative identified in the Draft EIR, will provide the necessary level of assurance to protect air quality. (RT XXIX, 26:2-26:13.) The 6,390 alternative had a projected median lake elevation of 6,391.6 feet. Mr. Ono stated that the lake elevation alternatives 6,383.5 feet and lower (as identified in the Draft EIR) would not satisfy the NAAQS for PM-10 and would not bring the Mono Basin into attainment. (RT XXIX, 26:21-26:25.)

Mr. John Pinsonnault, an air quality consultant to LADWP, acknowledged that during some windstorms there will be exceedence of the Federal standards at Simis Ranch and Warm Springs, as well as other areas to the north and northeast of the lake. (RT XII, 257:2-257:10.) Mr. Pinsonnault also testified that the GBUAPCD monitoring data provide an excellent picture of the air quality at the suggested lake elevations of the LADWP plan. (RT XII, 257:14-257:20.) Mr. Pinsonnault discussed his general concern with the models used by GBUAPCD and JSA (RT XII, 258:1-261:25), but acknowledged that use of models is necessary to estimate concentrations of dust that could exist under certain conditions. (RT XII, 257:21-257:25.) Mr. Pinsonnault provided no data or studies to refute the findings of the GBUAPCD or the Draft EIR.

Mr. Pinsonnault also proposed a theory that as the lake elevation rises there could be increases in the ground water level that could cause even greater quantities of efflorescent salt crust to form at elevations that at the present time do not have salt crust. (RT XII, 264:23-265:7.) Although he was a member of the Technical Advisory Group on air quality issues and modeling for the Draft EIR, Mr. Pinsonnault testified that he had not provided the EIR contractor with any data or examples from the literature relating to issues he raised at the hearing. (RT XXIII, 21:7-21:13 and 22:16-22:19.) Mr. Ono testified that there was no foundation or data to support Mr. Pinsonnault's theory about increased efflorescent salt problems at higher water levels. (RT XXIX, 112:2-112:9.)

Other Potential Air Quality Mitigation Measures: GBUAPCD Exhibit 23 is a memo dated July 8, 1993 titled "Potential Mitigations For Mono Lake And Their Engineering Implications." The memo evaluates various alternatives to reduce or eliminate emission source areas found on the relicted playa at Mono Lake. The options evaluated were vegetation plantings, sand fences, volcanic cinders or other coverings, and chemical applications.

Dr. David P. Groeneveld, a plant ecologist and principal investigator for testing vegetation establishment on the saline Owens Drylake playa, conducted several investigations at Mono Lake for the GBUAPCD including a study titled, "Mono Lakeshore Environments: Vegetation Establishment to Control Airborne Dust." The conclusions of Dr. Groeneveld's vegetation study were:

1. Zones of poor or absent vegetation establishment on the eastern shore are constrained by poor ground water quality and quantity. Without artificial leaching, there will be no way to establish a vegetation cover that is meaningful for dust suppression on these zones;

2. Where vegetation is becoming established naturally due to proximity to seepage zones and springs (e.g., Simon Springs),

artificial planting is not a viable means of accelerating the process; and

3. Artificial plant establishment was successful in an extended fetch zone to the east of Simon Springs and has the potential to significantly reduce blowing dust in this limited area. This zone lies above the 6,393 foot contour. (GBUAPCD 26, pp. 1-2.)

Another study by Dr. Groeneveld, "Seeps and Springs Around Mono Lake That Influence Plant Establishment and Growth," reports that zones which lacked vegetation establishment around the lake (particularly the northeast area) coincided with waters of low calcium content, high salinity and potentially phytotoxic concentrations of boron and arsenic. (GBUAPCD 27, Abstract.) Dr. Groeneveld testified that, without extensive irrigation using pumped freshwater to leach those unvegetated saline zones, there would be no way to enhance vegetation growth to reduce blowing dust. He believes that condition will probably last tens to hundreds of years. (RT XXIX, 41:3-41:7.) There was no evidence provided as to the potential impact to ground water resources of such an intensive irrigation program.

Mr. Theodore Schade, GBUAPCD Project Manager for fugitive dust mitigation studies at Owens and Mono Lake, testified that the GBUAPCD has tested a number of fugitive dust mitigation measures at Owens Lake. The measures tested at Owens Lake included sprinkler irrigation, gravel blankets, artificial sand dunes and chemical sprays. With the exception of the gravel blanket, none of the measures reduced fugitive dust levels enough to be considered successful and appropriate for large scale implementation. (RT XXIX, 42:1-42:25.)

GBUAPCD Exhibit 23 addresses the quantity of material that would be needed to implement a volcanic cinder or gravel cover program on the Mono Lake playa. (GBUAPCD 23, pp. 1-2.) The area between lake elevation 6,383.5 feet and 6,390 feet encompasses a noncontinuous strip approximately 75,000 feet long between 675 and 2,000 feet wide, covering approximately 1,600 acres or 2.5 square miles. An estimated six inches of material (1.3 million cubic yards) would have to be laid over the mitigation area. This equates to approximately 162,000 dump truck loads (200 per day for three years) which would be required to move the material to the site.

Mr. Schade testified that if a successful engineering mitigation measure were identified, there would need to be a significant amount of land disturbance in the construction of the supporting infrastructure. This infrastructure would likely include new roads, pipelines, wells, powerlines, fences, sand fences and barrow sites. The GBUAPCD has not specifically identified any engineering measures that have a reasonable chance of succeeding at Mono Lake. (RT XXIX, 44:2-44:18.)

6.4.5 *Compliance with the Mono Basin National Forest Scenic Area Comprehensive Management Plan (CMP)*

Section 304 of the 1984 California Wilderness Act (PL 98-425) established the Mono Basin National Forest Scenic Area (Scenic Area). The Act required preparation of the Comprehensive Management Plan for the Scenic Area which was approved on March 16, 1990. (USFS 2, p. 1; RT XXVIII, 15:1-25:4.) The plan recommends a lake elevation range of 6,377 feet to 6,390 feet with management near the midpoint of 6,383.5 feet. The plan is intended to provide management direction for a 10 to 15 year period, but recognizes there may be a need for modification based on new information. (RT XXVIII, 15:8-25:25.) Forest Supervisor Dennis Martin testified that the management direction in the CMP needs to be reevaluated due to reclassification of the Mono Basin as a nonattainment area pursuant to the Clean Air Act. (RT XXVIII, 16:5-16:15.) Mr. Martin further testified that the USFS was not aware of any proven or feasible methods of physical mitigation that could be applied to the relicted lands that would be consistent with the intent of the federal legislation which is to preserve the natural scenic beauty of the area. The USFS recommended that the SWRCB should adopt the 6,390 feet alternative to bring the Mono Basin into compliance with the Clean Air Act. (RT XXVIII, 17:9-17:19.)

6.4.6 *Conclusions Regarding Mono Basin Air Quality*

The evidence establishes that the Mono Basin is in violation of the national ambient air quality standard for PM-10 that was established for protection of human health. The major source areas of PM-10 emissions are relicted lakebed sediments encrusted with efflorescent salts. Most of the major source areas were exposed due to the declining water level in Mono Lake caused by LADWP's diversion of water from the tributary streams. The only feasible method of reducing the PM-10 emissions sufficiently to come into compliance with the national ambient air quality standards is to increase the water elevation of Mono Lake and submerge much of the exposed emission source area. The SWRCB recognizes that there is a degree of uncertainty inherent in predicting future air quality conditions based on the type of computer modeling results presented at the hearing. Nonetheless, the computer modeling results presented are the best evidence currently available of what is needed to come into compliance with applicable air quality standards. Increasing the water elevation of Mono Lake to an average level of 6,392 feet would provide a reasonable assurance of establishing compliance with the national ambient air quality standard for PM-10. Improving air quality at Mono Lake by reducing the severity of periodic dust storms in the Mono Basin would also protect the views and scenic resources for which the Mono Basin is widely known.

6.5 Visual and Recreational Resources

6.5.1 *Visual Characteristics of the Mono Basin*

Historical Overview: Many early visitors to the Mono Basin have described their impressions of the lake and the landscape. (SWRCB 13x, pp. 3-5; SWRCB 7, Vol. 2, pp. 3I-1 to 3I-6.) John Muir described the Mono Basin as "A country of wonderful contrasts, hot deserts bordered by snow-laden mountains, cinders and ashes scattered on glacier-polished pavement, frost and fire working together in the making of beauty." (SWRCB 13x, pp. 2-3.) In contrast, Mark Twain wrote in Roughing It: "Mono Lake lies in a lifeless, treeless, hideous desert 8,000 feet above the level of the sea and is guarded by mountains 2,000 feet higher whose summits are always clothed in clouds. This solemn, silent sailless lake, this lonely tenant of the loneliest spot on earth is little graced with the picturesque." (RT XVII, 164:17-165:12.) Mr. Twain went on to comment on the tufa structures at Mono Lake as follows: "speaking of the peculiarities of Mono Lake, I ought to have mentioned that at intervals all around the shore, stand picturesque turret looking masses and clusters of a whitish, coarse grained rock that resembles inferior mortar dried hard." (RT XVII, 184:7-187:24.) Despite these contrasting descriptions, the increasing numbers of visitors to the Mono Basin, and the many eloquent statements presented during the policy statement sessions, establish that the Mono Basin is a valuable visual and recreational resource.

Prior to the export of water from the Mono Basin beginning in 1941, natural variations in the surface elevation of Mono Lake in historic times ranged from a low of approximately 6,404 feet in 1862 to an historic high of 6,428 feet in 1919. In 1941, the lake level was at 6,417 feet. (SWRCB 13x, p. 4.)

Comprehensive descriptions of the visual elements of the Mono Basin are found in the Draft EIR, Auxiliary Report No. 24 to the Draft EIR and USFS Exhibit 1. (SWRCB 7, Vol. 2, Chapter I, pp. 3I-8 thru 3I-24; SWRCB 13x, pp.8-18; and USFS 1, pp. 85-98.) The Mono Basin has been described as a major scenic attraction in the Eastern Sierra with considerable visual diversity due to surrounding peaks such as Mt. Dana, Mt. Gibbs, and Lee Vining Peak; glaciated valleys and morraines; dominating volcanic features; Mono Lake and its islands, tufa structures, playa, and wetlands; and the tributary streams which feed the lake. (SWRCB 13x, pp. 10-11.) The many birds and local concentrations of alkali flies also are visual elements of the landscape. (NAS&MLC 36 and 41; SWRCB 13x, pp. 27-28.)

<u>Mono Lake Tufa State Reserve</u>: The State established the Mono Lake Tufa State Reserve on January 1, 1982. The reserve consists

of the state owned portion of the relicted lands and the Mono Lake bed lying at or below elevation 6,417 feet. The legislation establishing the reserve recognized that the tufa and associated sand structures at Mono Lake are a valuable geologic and scientific resource which should be protected for the enjoyment and education of the public. (Public Resources Code Section 5046.) These lands are managed primarily for the protection of tufa and associated sand structures and providing for their interpretation. (RT XXV, 142:15-142:21.) Public Resources Code Section 5019.65 provides in relevant part:

> "The purpose of a State Reserve is to preserve the native ecological associations, unique fauna and flora characteristics, geological features, and scenic qualities in a condition of undisturbed integrity. Resource manipulations should be restricted to the minimum required to negate the deleterious influence of man."

Public Resources Code Section 5049 provides that natural or artificially caused accretion or reliction of the waters of Mono Lake shall not be deemed contrary to the purposes of the statute which established the reserve. The California Department of Parks and Recreation (DPR) is responsible for managing the Mono Lake Tufa State Reserve.

Mono Basin National Forest Scenic Area: The Mono Basin National Forest Scenic Area (Scenic Area) was established in 1984. The Scenic Area includes some 76,703 acres of land and 41,600 acres of Mono Lake within the Inyo National Forest. The legislative direction and overall goal of the Scenic Area is to protect its geologic, cultural, scenic, and other natural resources, while allowing recreational, scientific, and other activities consistent with that goal. (USFS 2, p. 16.) After completion and public review of the Final Environmental Impact Statement (EIS) and Comprehensive Mangement Plan (CMP) for the Scenic Area, the Forest Service adopted a management alternative for the Scenic Area which emphasizes ecological, interpretive and visual values.

Effects of LADWP Diversions on Visual Resources: The effects of LADWP water diversions on various resources have been addressed in detail in previous sections of this decision. In general terms, LADWP diversions have impacted visual resources as described below.

1. Lake surface and shoreline: Mono Lake is the single most important feature affecting the recreational and visual resources of the Scenic Area. (SWRCB 13x, p. 14.) The lake attracts the public and provides for the many recreation and interpretive opportunities within the Scenic Area. (RT XXV, 161:16-161:20.) Recreation user surveys at Mono Lake in 1992 reported that the most common visitor responses were they had come to "see what the lake is like" or for "sightseeing." (SWRCB 7, Appendix W, p. W-4.)

   The USFS used the Visual Resource Management System (VRMS) to inventory and describe the scenic landscapes, the landscape variety, key viewing points, viewing zones, and the sensitivity of the landscape to modification. The USFS found that the scenic quality of the Scenic Area for most visitors is related to the broad views and landscapes of the entire Mono Basin that are visible from key view points. The most important single feature of all of the views is Mono Lake. The most important single element in those views is water. Since the primary viewing context is of the whole basin, it takes changes and variations to the landscape that are broad in scope to create changes that would impair those views. (USFS A-4, pp. 4-5.) When diversions began, the lake surface covered approximately 86 square miles. By 1989, the coverage was reduced to about 66 square miles. (SWRCB 7, Vol. 2, p. 3I-10.)

2. Islands: The two major islands (Negit and Paoha) in Mono Lake are considered to be visually positive elements, especially when perceived to be true islands surrounded on all sides by water. (SWRCB 13x, p. 20.) Each island has clusters of smaller islets nearby which change in number and

size depending upon the elevation of the lake. Some Negit islets existed prior to diversions by LADWP. The Paoha islets emerged from Mono Lake as it regressed below 6,395 feet in 1961. Negit Island becomes landbridged to the mainland at a lake elevation of 6,375 feet. (SWRCB 13v, p. 6.) In recommending that Negit Island should remain an island, State Park Ranger David Carle relied in part upon its improved value as a visual resource when it is not connected to the lakeshore. (DPR 4, p. 4.)

3. Playa: As the surface elevation of Mono Lake fell, increasingly greater areas of former lakebed have become exposed "playa" forming a distinctive white area along the southern, northern and eastern shores, which can be visually dominant in elevated views and photographs. (SWRCB 13x, p. 13; GBUAPC 14; and NAS&MLC 142.) The playa is almost a mile wide in places. It consists of a relatively flat surface encrusted with a salt efflorescence and sparsely covered in some areas with vegetation. The air quality impacts of dust storms caused by strong winds across the exposed playa have been discussed previously. The dust storms also reduce regional visibility and clarity of scenic views. (SWRCB 13x, p. 30, and Figure 17; USFS 3, video of dust storms.)

4. Tufa: Although tufa is found in other alkaline bodies of water, the variety and quantity of Mono Lake's towers are unique and distinctive. (SWRCB 7, Vol. 2, pp. 3I-11 and 3I-12.) Lithoid tufa is formed when upwellings from calcium-bearing freshwater springs in the lake bottom chemically mix with the alkaline carbonate-rich waters of the lake. The calcium and carbonates bond, precipitating out as a form of limestone (calcite). The tufa forming process occurs only under the water surface. Auxiliary Report No. 9 to the Draft EIR describes the process of tufa formation in detail. (SWRCB 13i, pp. 3-5.)

Tufa deposits occur as pinnacles, domes, and spires collectively called "lithoid tufa towers." (SWRCB 3, Figure 5.8, p. 171.) Delicately cemented lakebed sands form another kind of tufa structure known as "sand tufa." (SWRCB 13i, p. 1.) Lithoid tufa formations occur at elevations varying from 6,368 feet to 6,432 feet. Sand tufa formations occur at elevations between 6,380 feet and 6,432 feet. (SWRCB 3, Figure 5.9, p. 172.) While tufa formations are scattered throughout the Mono Basin, there are six main "groves" of lithoid tufa: South Tufa, Lee Vining Tufa Area, County Park (aka Dechambeau Grove), Wilson Grove, Old Marina, and Simons Springs. (SWRCB 7, Vol. 2, Figure 3I-9.)

Visible tufa existed in the prediversion period as evidenced by Mark Twain's observation mentioned above and the Israel Russell photographs of the Wilson Grove (ca. 1883). (NAS&MLC 143 and 144.) Contrary to the generally adverse visual consequences of a declining Mono Lake, the declining water level has made large areas of tufa formations accessible to public view. The different lake elevations supported by various parties will have varying degrees of impact on accessibility of tufa to public view at various locations.

6.5.2 *Recreation in the Mono Basin*

Mono Lake was a popular recreation spot during the 1920s and 1930s, and tourism was one of the Basin's most important economic resources. (SC-A, p.1.) A 1938 Mono County sportsman's map titled "Mono County Greets You-Fisherman's Paradise" identifies lodges, camps, lakes, streams, and local businesses of interest to visitors. (CT 5-C.) In 1929, Venita McPherson promoted and staged the first "Mark Twain Day" at the Mono Inn to commemorate the humorist's stay in Mono County in the 1860s. (SC-A, p. 2.) Mark Twain Day became an annual event until the start of World War II. The holiday featured power boat races, swimming events, horse swimming races and a bathing-beauty contest. (SWRCB 7, Vol. 2, p. 3J-2; SC 4 and 5.) During the 1930s, there were boat tours of Mono Lake in which tourists were taken to view the gulls on Negit Island and to swim in the hot springs on Paoha Island.

(SC 2 and 3.) By 1940, the June Lake Loop had developed into a major outdoor recreation area for summer and winter activities. (SWRCB 7, Vol. 2, p. 3J-3.)

Today, recreation is the most significant use of the Inyo National Forest totaling eight million recreation visitor days in 1989.[12] (SWRCB 7, Vol. 2, p. 3J-6.) Recreational demand is projected to increase at approximately two percent per year for the next 50 years. The USFS expects that visitations to the Mono Basin National Forest Scenic Area will increase at a somewhat faster rate until the year 2000. (USFS 1, p. 129.) Visitors to the Scenic Area come from throughout the world. (SLC&DPR 4a and 4b.) In 1986, 64 percent of all visitors came from California, approximately 19 percent came from other states, and the remainder came from other countries. (USFS 1, p. 129.) Interpretive facilities exist at South Tufa, Old Marina, Black Point, Navy Beach, County Park, Panum Crater and the Scenic Area Visitors Center. Ranger David Carle estimated that the Mono Lake Tufa State Reserve would be visited by approximately 250,000 visitors in 1993. (SLC&DPR 4, p. 15.)

As more people become aware of the recovery of the lower reaches of Rush Creek and Lee Vining Creek, recreation in those areas is expected to increase. (SWRCB 7, Vol. 2, p. 3J-11.) The upper reaches of Rush and Lee Vining Creeks are stocked by DFG with catchable-sized trout. Other recreational activities include camping, hiking, wildlife observation, and photography.

The June Lake Loop supports year-round recreation with most activity at the lakes occurring during the summer. June Lake, Gull Lake, and Silver Lake feature campgrounds which received a total of approximately 42,000 visitor nights in 1991. (SWRCB 7, Vol. 2, p. 3J-12 and Figure 3J-1.) Grant Lake features a marina with a 70-unit campground, store, boat ramp, moorage and boat rentals. The spillway elevation at Grant Lake is 7,130 feet.

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[12] *A "recreation visitor day" equals 12 hours or recreation use by any combination of people.*

When the water elevation drops below 7,111 feet (lake volume of approximately 21,000 acre-feet), the boat ramps at the lake are unuseable. Grant Lake recreation use varies with lake level. Since 1986, Grant Lake has averaged 48,000 visitor days, with fishing as the most popular activity. Approximately 20 percent of Grant Lake use typically occurs in April and May; 60 percent occurs in June, July and August, with 20 percent in September and October. (SWRCB 7, Vol. 2, pp. 3J-9 to 3J-10.)

6.5.3 *Effects of Different Lake Levels on Visual Resources*
Several lake level alternatives were evaluated in the Draft EIR and addressed at the water right hearing. Each of the alternatives affects visual resources and existing or potential recreational opportunities in the Mono Basin. Ms. Nancy Upham of the Inyo National Forest testified on public expectations for management of the Scenic Area. Based on her experience as a public affairs official and former manager of the Scenic Area, Ms. Upham believes that the public values wide open spaces, with very little development or signs of human intrusion, where people have opportunities to explore and learn about the environment they are experiencing. The public also has a fascination with tufa and likes to see birds and wildlife which represent proof that the ecosystem is healthy and thriving. (USFS A-7, p. 3.)

USFS Landscape Architect Edward Rickford testified that the dewatering of the streams from which LADWP diverts water and the lowering of the lake level resulted in broad scale effects on visual resources in the Mono Basin. (RT XXV, 163:2-164:8.) The rewatering of the streams and restoration of the riparian corridors has been addressed previously. Mr. Rickford testified that if the lake rises from its current elevation (approximately 6,375 feet) up to approximately 6,390 feet, the focus of interpretation, sightseeing and recreational activities and use patterns around the lake are not expected to change. However, above the 6,390 feet elevation, the South Tufa area begins to lose its recreational carrying capacity as the grove becomes inundated at higher levels. (RT XXV, 161:24-162:8.)

Mr. Rickford testified that, from all key view points, the landscape view will be greatly enhanced by lake levels between the 6,383.5 feet alternative and the 6,390 feet alternative. Raising the lake level to the 6,383.5 feet alternative or above will reduce the exposed white alkali flats to where they are no longer a significant adverse visual impact. Once the lake reaches 6,390 feet, the water will essentially meet existing vegetation lines and the lake will appear as full and in a natural appearing state from all view points. (NAS&MLC 30 and 31, photographs.) Photographs submitted by NAS&MLC depict the lake from several view points at elevations ranging from 6,389 feet to 6,394 feet. (NAS&MLC 18, 22, and 29, photographs.) From these photographs, Negit Island appears as an island and the lake appears full.

6.5.4 *Effects of Different Lake Levels on Recreation and Tufa*

Boating and Swimming: Today almost all boating at Mono Lake is limited to canoes and kayaks. Most boaters launch from the Navy Beach parking area. DPR staff testified that if the lake were to rise above 6,390 feet, the boat launching ramps at Old Marina will be useable again. (SLC&DPR 4, p. 13.) USFS staff testified that if the lake rises, Old Marina would become a much more popular access point to the lake. (USFS A-4, p. 3.) At 6,390 feet or higher, boating access and swimming opportunities could improve significantly. (RT XXV, 162:19-162:21.)

Lithoid Tufa: Lithoid tufa formations (generally referred to simply as "tufa") are one of the greatest scenic attractions that bring visitors to Mono Lake. Visitation to the Mono Lake Tufa State Reserve was expected to be 250,000 visitors in 1993. (RT XXV, 143:6-143:8.) Mr. Rickford testified that tufa are visually enhanced when water based. (RT XXV, 168:16-168:17.) Most of the currently visible portions of the major groves of tufa are land based and have been exposed by the receding lake.

A visual preference survey was conducted for the Draft EIR. Mono Lake visitors were shown a series of photographs, each focusing on one of the landscape elements (e.g., birds, water based tufa, land based tufa, playa or sand tufa). They were asked to rate the importance of the element to overall scenic quality. Water based tufa attained the highest preference rating and birds were second. Viewers had a higher visual preference for water based tufa than for land based tufa. (NAS&MLC 32 and 33, Photographs.) Sand tufa had a higher visual preference than land based tufa but less than water based tufa. (SWRCB 7, Appendix V, Table V-4.)

The SWRCB's evaluation of the relation between tufa resources and lake level is based primarily on the testimony of Dr. Scott Stine (RT XXV), David Carle (SLC&DPR 4 and RT XXV), and Edward Rickford (USFS A-4 and RT XXV), and from the Draft EIR (SWRCB 7, Vol. 2, Chapter 3I), Auxiliary Reports to the Draft EIR (SWRCB 13x and 13i), and a number of photographs in the record. (SLC&DPR 4c, 4d, 4e and 4f; and NAS&MLC 23 through 28 and 30 through 35.) The six major tufa sites are addressed below.

Simons Springs: This tufa group is on the southeast side of the lake, 5 miles east of South Tufa. The tufa is widely scattered and contains relatively few towers. All structures are land based with base elevations ranging from a low of 6,380 feet to a high of 6,430 feet. Access is by hiking or along sandy jeep trails. The remote location of this site makes heavy use very unlikely. (SWRCB 13x, p. 23 and Table 1.)

Wilson Grove: This site, located east of County Park, has towers that would remain exposed above 6,400 feet as evidenced by the previously cited photographs taken by I. C. Russel. (NAS&MLC 143, 144, 25, and 26.) At the current lake elevation, most of the tufa are land based. There are about 100 tufa towers with bases that lie at elevations between 6,375 feet and 6,410 feet. (RT XXV, 127:3-127:6; SWRCB 7, Vol. 2, Figure 3I-7; and SLC&DPR 4h.) At a lake level of 6,377 feet, approximately ten percent of the towers would be water based; at 6,383.5 feet and 6,390 feet, approximately 30 percent of the towers would be water based. (RT XXV, 127:21-128:6.) At 6,407.1 feet, 20 percent would be submerged and approximately 30 percent would be submerged at a lake level of 6,410 feet. (SWRCB 13i, Table 2.) This site (like most of the tufa areas other than South Tufa) is characterized by a wet marsh which makes it difficult to explore. (SLC&DPR 4, p. 9; and NAS&MLC 27 and 28, photographs.)

County Park/Danburg Beach: This grove also has about 100 towers distributed from approximately 6,375 feet to above 6,410 feet. At 6,383.5 feet, 20 percent of the towers would be water based and 80 percent are land based. Most of the tufa would be water based and visible at a lake level of 6,390 feet. (RT XXV, 129:20-130:18.) At 6,407 feet, 90 percent of the tufa would be inundated. (SWRCB 13i, Table 2.) The County Park formations are not subject to toppling. Because the area is so wet, access is limited to a boardwalk trail unless visitors are willing to walk through the marsh. Access to the site is restricted at the east end by private roads and residences. (SLC&DPR 4, p. 9.) The County Park tufa group is more rounded or dome-like than those found at the Lee Vining group or South Tufa. (SWRCB 13x, p. 23 and Figure 12.)

Old Marina: The Old Marina site is heavily visited because of its proximity to U.S. Highway 395. The size and visual impact of the site do not compare with the other tufa areas. There are a few tall structures, but most of the tufa is in the form of craggy boulders. (SWRCB 13x, p. 23 and Figure 12; and NAS&MLC 31, photograph.) The shoreline is muddy at the current lake elevation, making access difficult. A boardwalk constructed by DPR for walking and wheelchair access provides only partial access at the current lake level. (SLC&DPR 4, p. 9.)

Lee Vining Tufa: Lee Vining Tufa is the largest tufa area at Mono Lake. (SLC&DPR 4f and 4g.) The area has both water based and land based tufa. It is similar to the South Tufa site, although wetter and more densely vegetated. There is limited access by foot. (SLC&DPR 4, pp. 8-9.) Lee Vining Tufa towers extend up the shoreline to about 6,407 feet. At 6,377 feet, approximately 10 percent of the tufa would be water based and the remainder would be land based. At 6,383.5 feet, approximately 20 percent would be water based and 80 percent land based. At 6,390 feet, approximately 20 percent of the towers would be submerged and the remaining tufa would be split between water based and land based. (RT XXV, 131:10-131:23.) At 6,407 feet, 95 percent of the grove would be inundated. Total submergence would occur at 6,410.3 feet. (SWRCB 13i, Table 2.)

South Tufa: The South Tufa area is the main visitor site at Mono Lake with 137,000 visitors by fall of 1993 and 173,225 visits in 1992. (RT XXV, 151:14-151:16; USFS A-4, p. 7; and SLC&DPR 4c, 4d and 4e, photographs.) Recreation use is expected to increase. (USFS A-4, p. 7.) South Tufa is different from the other tufa groves in several respects:

1. In contrast to the much older tufa at other locations, the South Tufa area is believed to be less than 100 years old. As a consequence the tufa structures are more shallowly rooted in the sediment. (RT XXV, 132:3-132:10.)

2. At South Tufa, a rise or fall in lake level can undercut the sediment of the shallowly rooted small towers (solitary small towers less than four feet in diameter) causing them to topple. The large agglomerations of tufa called bulwarks and the large domes tufa would not be expected to topple. (RT XXV, 132:11-133:1-25). Toppling is not a problem at other groves.

3. It is possible to walk to the shoreline without encountering mud or marsh. Birds, flies and shrimp are accessible at South Tufa. The area can accomodate up to 200 people at a time and up to 1,200 people per day. The large carrying capacity is partially because of the acreage of the tufa area combined with relative ease of access. (RT XXV, 151:14-152:15.) Daily traffic can easily reach 200 to 300 vehicles. (USFS A-4, p. 7.)

4. Because of the size of the tufa grove and the existing loop pathways, the South Tufa area allows people to get out of sight of each other. (RT XXV, 153:24-154:2.)

The USFS completed a topographic survey of the South Tufa area in May of 1993 to be used in the redesign and rehabilitation of the recreation facilities. (USFS A-4, p. 9.) Maps that graphically display the visible tufa, and existing and potential trail systems at specific lake levels were presented as exhibits. (USFS 9-12.) Mr. Rickford testified as to the visual and recreational characteristics of South Tufa as depicted by the survey maps at different lake levels. Key points from Mr. Rickford's assessment are summarized below.

1. Lake level of 6,377 feet: Basically all of the tufa is land based. Most visitors quickly walk by most of the grove to reach tufa in the water-shore zone. Opportunities for viewing water based tufa close to the South Tufa grove are quite limited at 6,377 feet. (USFS A-4, pp. 9-10; USFS 9.)

2. Lake level of 6,383.5 feet: Approximately 18 acres of land based tufa are available which will accommodate all levels of expected use and provide a viable recreation and interpretive experience. Density of use will increase requiring the trail to be further defined from the existing conditions. Paved trails and boardwalks become a possibility. The shoreline is on average 300 feet closer to the parking area making the grove more accessible for some. More of the tufa is water based. There will be 18 to 20 islands of tufa that will enhance the visual variety and quality of the views. Very little of the tufa will be totally submerged. (USFS A-4, pp. 10-11; and USFS 10.)

3. Lake level of 6,390 feet: Approximately 9 acres and 35 to 40 percent of the tufa stands will be land based. All of the rest of the tufa will be water based or project into the lake. At the 6,390 feet alternative, visitors can still experience tall tufa in dense stands and bulkwarks and a looptrail system can be maintained. Approximately 25 to 30 tufa islands will be visible 100 to 800 feet from shore. Although many of the shorter towers will be submerged, this

does not create a noticeable visual impact. The shoreline will be 500 to 800 feet closer to the parking lot, thus making the water more accessible. Trails will be further defined and visitors will not be free to roam at will through the grove. This alternative will still provide adequate carrying capacity for the expected use and South Tufa will still function as the primary on-site interpretive opportunity along the shoreline of Mono Lake. (USFS A-4, pp. 11-12; USFS 11.)

4. <u>Lake levels of 6,400 feet and 6,410 feet</u>: At 6,400 feet, nearly all significant tufa becomes water based and most of the major tufa islands will be submerged. Approximately 10 percent of the tufa will be visible as water based tufa. The land based carrying capacity of the South Tufa site is eliminated and opportunities to walk among the tufa are gone. Launching of canoes and light boats may increase. Interpretation oriented visitor use will probably decline and will shift to other sites. At the 6,410 feet elevation, all tufa will be essentially submerged thus eliminating the major visual element and focus that attracts visitors to the site. (USFS A-4, pp. 12-13; USFS 12.)

Mr. Rickford's testimony supports the conclusion that a lake level in the range covered by the 6,390 alternative evaluated in the Draft EIR would provide for a good recreation development base and positive visitor experience. At substantially higher water levels, use would have to be shifted to other areas. (USFS A-4, p. 14.)

Mr. Carle testified that at lake levels higher than 6,398 feet, all of the significantly tall towers would be off shore, with many more submerged. At elevations above 6,400 feet, the experience will be significantly diminished. Due to remote locations or surrounding marshland, it is unlikely that some tufa areas will ever be heavily visited. Mr. Carle believes that there needs to be a "major visitor site" like

South Tufa to accomodate large numbers of visitors. (SLC&DPR 1-4, pp. 10-11.)

<u>Sand Tufa</u>: Sand tufa are considered an important visual resource because of their unique formations. (SWRCB 13x, p. 25; SWRCB 7, Vol. 2, Figure 3I-13.) Sand tufa occur along the south shore of Mono Lake most notably at Navy Beach. (SWRCB 13x, Figure 11.) Deposits occur over a wide range of elevations, from 6,435 feet through a band lying between 6,425 and 6,417 feet, and down to the better known formations at 6,380 feet to 6,390 feet. (NAS&MLC 1AF, p. 1.) Sand tufa deposits at the higher elevations are not presently exposed. Sand tufa are cemented lakebed sands that have been exposed due to lake regression and wind erosion. The cemented sands form delicate-looking and intricately connected tubular structures when exposed that range in height from several inches to over six feet. They also can be seen in cross-section along the cliffs of wave-cut terraces such as the terrace immediately below the Navy Beach parking lot. (SWRCB 13i, p. 17.)

DPR staff and Dr. Stine surveyed the sand tufa areas at Mono Lake. Their results indicate that, at the higher water levels of the 6,383.5 alternative, virtually all of the currently exposed sand tufa would be undercut. The lake would have to remain below 6,384 feet to protect all of the major sand tufa sites. (SLC&DPR 1-4, p. 12.) Mr. Carle stated that the Navy Beach sand tufa are the most visited of the sand tufa sites, the most accessible being in the exposed cliff face. (RT XXVIA, 75:25-76:3.) Dr. Stine testified that major low lying sand tufa will be undercut and lost even by lake elevations proposed under the LADWP Management Plan. (RT XXV, 137:12-137:25.) Mr. Carle testified that major tufa sites would likely be undercut between elevations 6,384 and 6,392 feet, but that new exposures of sand tufa in new incised cliff faces seem likely. (RT XXV, 154:23-155:3.) Dr. Stine expects, that in most cases, the cliffs that would form as a result of a rise in lake level would be exposing sand tufa similar to the one cliff at Navy Beach. (RT XXV, 216:7-216:21.) Dr. Stine testified that it was his opinion that more sand tufa would be exposed in cliff faces than exists today, although there would be less free-standing sand tufa at a lake level of 6,390 to 6,400 feet. (RT XXVIA, 128:5-128:14.)

The DPR has closely monitored the sand tufa for the last ten years by maintaining a photo inventory. They have documented very few obvious visual changes in that decade. Based upon review of the condition of the sand tufa over a range of ages, however, Dr. Stine concluded that a substantial reduction of sand tufa occurs over a period of a half century. He considers it likely that, independent of any change in lake elevation, the tall, free-standing sand tufa deposits between 6,380 and 6,390 feet will undergo pronounced reduction and collapse over the next 50 years due to weathering and erosion. (NAS&MLC 1AF, p. 1.)

Mr. Rickford testified that the loss of the sand tufa is not considered a negative visual impact because the scale of sand tufa does not show up in the key viewpoints of the landscape. Sand tufa is visible only to a person who is very close. (RT XXVIA, 36:2-36:25.)

6.5.5 *Agency Recommendations*

The U. S. Forest Service, the California Department of Parks and Recreation and the State Lands Commission have responsibilities for land management and recreation in the immediate vicinity of Mono Lake. The USFS recognizes that there are many different types of resources that must be considered in their Comprehensive Management Plan for the Mono Basin National Forest Scenic Area and that no single lake elevation maximizes all of those resources. (RT XXVIA, 84:3-84:14.) Based on review of all the evidence provided, the USFS recommended adoption of the 6,390 feet alternative described in the Draft EIR. (RT XXV, 180:2-180:8.)

The California Department of Parks and Recreation also recommended adoption of the 6,390 feet alternative based on the conclusion that "it offers the best balance among all the resources used which must be considered, including the natural and geological resources, recreation and visual elements, and air quality concerns." (RT XXV, 144:23-145:3.)

The State Lands Commission is charged with the administration of the public's interest in the beds of navigable lakes and rivers, and the identification and protection of environmentally sensitive lands. (State v. Superior Court (Lyon) (1981) 29 Cal.3d 210, cert. denied 454 U.S. 865; Public Resources Code Sections 6370 and 6378.) The joint recommendation in the SLC&DPR closing brief is that a lake level of at least 6,390 feet is necessary to protect most of the public trust values of Mono Lake. (SLC&DPR, Closing Brief pp. 4 and 5.) SLC&DPR contend that "6,390 feet provides a stable lake ecosystem with some benefit to the public trust values while still allowing exports of water from the basin. It is not a perfect solution, but it is a reasoned one." (SLC&DPR, Closing Brief, p. 54.)

The state and federal land management agencies in the Mono Basin all favor a water elevation that would undercut and submerge most of the exposed sand tufa structures near Mono Lake. In view of the large public interest in viewing these unusual formations, however, it would be appropriate for those agencies to evaluate the feasibility of relocating one or more of the sand tufa structures to a protected location such as the Forest Service Mono Basin Visitor Center.[13]

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[13] *The EIR identifies the collection and display of examples of sand tufa for interpretive purposes as a potential mitigation measure for the loss of sand tufa. This mitigation measure would not reduce impacts to a less than significant level. The EIR does not identify any source of funding for SWRCB implementation of the measure, nor is any such funding available. The SWRCB finds that it would be inappropriate for the SWRCB to require LADWP to collect and display sand tufa samples. The sand tufa would not have appeared if Los Angeles' water diversions had been consistent with the requirements of the Fish and Game Code, and loss of sand tufa due to higher lake levels is the result of controls being imposed on LADWP by this decision, not the result of actions voluntarily undertaken by LADWP. These considerations make it unreasonable, hence infeasible for purposes of CEQA, to impose mitigation requirements on LADWP to collect and display examples of sand tufa for intepretive purposes.*

6.5.6 *Conclusions Regarding Visual and Recreational Resources*
The evidence discussed above establishes that the visual scenery in the Mono Basin is one of the area's most important assets. A lake level of approximately 6,390 feet would have a number of visually beneficial effects including the following: (1) it would give the visual appearance of a full lake; (2) it would submerge the landbridge to Negit Island and restore Negit Island to its former condition as a true island; (3) it would increase the proportion of water based tufa; (4) it would greatly reduce the area of dry, sparsely vegetated playa surrounding Mono Lake; amd (5) it would reduce the severity of dust storms which reduce visibility and interfere with the wide open scenic views.

Fishing and other recreation on the lower portions of the tributary streams to Mono Lake will be benefitted by the restoration of flows and other measures previously addressed in this decision. Recreation at Grant Lake would benefit by maintaining the water elevation at or above 7,111 feet from May 31 through Labor Day when feasible while still maintaining instream flow requirements for fish.

At Mono Lake, an increase in water level to the 6,390 feet range would improve boating access and reduce salinity which would make swimming more enjoyable. The primary recreation at Mono Lake involves visits to the unusual tufa formations. The South Tufa area is the most heavily used interpretive and recreational site at Mono Lake. Maintaining a lake level of approximately 6,390 feet would retain the accessibility of the South Tufa area to visitors and would increase the proportion of visually appealing water based tufa. Maintaining a lake level of approximately 6,405 feet or higher, as advocated by some parties, would submerge or totally eliminate the functional use of the South Tufa area except to those in boats. The other tufa sites are generally smaller and located in wetter or marshy areas. The evidence in the record does not establish that other tufa areas would be able to fully absorb the shift in recreational demand if the South Tufa area were inaccessible.

6.6 Mono Lake Water Quality and Designation as Outstanding National Resource Water

Mono Lake is a sink in a closed hydrologic system having no natural outlet. Inflow from tributaries, ground water and mineral springs contains dissolved salts which enter the lake and slowly accumulate. Because the water quality of the inflow to Mono Lake is very high, the increase in salinity is so slow that the total mass of dissolved salts in Mono Lake is considered a constant. (SWRCB 7, pp. 3B-7 and 3B-8.) The salinity of water in the lake is a function of the volume of water in the lake, which in turn is reflected by the water elevation. (SWRCB 7, p. 3B-7.)

In 1941, when the lake level was 6,417 feet, the estimated total dissolved solids (TDS) in Mono Lake were 48 grams per liter (g/l), as compared to a TDS of approximately 35 g/l for seawater. (SWRCB 7, pp. 3B-7 and 3B-8.) As the volume of water in the Mono Lake has decreased through evaporation and reduced inflow, the TDS of the lake has increased. (SWRCB 7, p. 3B-1.) At the point of reference condition evaluated in the Draft EIR, the water elevation of Mono Lake was 6,376.3 feet, and the TDS was 90 g/l, or nearly 90 percent greater than the prediversion condition and more than 2.5 times as salty as seawater. (SWRCB 7, p. 3B-27.)

As discussed in Section 6.1, laboratory experiments show a direct relationship between salinity and production of the Mono Lake brine shrimp and the Mono Lake alkali fly which serve as the main food source for many migratory birds. At a lake level of approximately 6,390 feet, the salinity of Mono Lake would be approximately 71 g/l. (SWRCB 7, Table A-1.) Previously discussed testimony establishes that a salinity of 75 g/l or less would maintain the aquatic productivity of the brine shrimp and brine fly in good condition, but that a substantially higher salinity would have negative effects. (See Section 6.1.)

Water quality at Mono Lake is subject to the federal antidegradation policy which was enacted pursuant to the Clean Water Act. (40 CFR, § 131.12.) The antidegradation policy establishes general narrative water quality standards which apply where other water quality standards do not address a particular pollutant. The antidegradation policy establishes a three-part test for determining when reductions in water quality may be permitted.

The first tier of protection under the antidegradation policy requires that "existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained." (40 CFR § 131.12(a)(1).)

The second tier applies to situations where water quality exceeds the level necessary to support fish, shellfish, wildlife and recreation. In that situation, the federal antidegradation policy requires that existing water quality be maintained unless it finds that:

> "...allowing lower water quality is necessary to accomodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully...." (40 CFR § 131.12(a)(2).)

Finally, the third tier provides that:

> "Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and <u>waters of exceptional recreational or ecological significance</u>, that water quality shall be maintained and protected." (40 CFR § 131.12(a)(3), emphasis added.)

In addition to waters of exceptionally high water quality, Outstanding National Resource Waters may also include:

> "Water bodies which are important, unique or sensitive ecologically, but whose water quality as measured by traditional parameters (dissolved oxygen, pH, etc.) may not be particularly high or whose character cannot be adequately described by these parameters." (48 Fed. Reg. 51402, Nov. 8, 1983.)

The federal antidegradation policy applies to reductions in water quality which occurred or threatened to occur after the policy was adopted. When the antidegradation policy was adopted in November 1975, the salinity of Mono Lake was approximately 85 g/l at a lake level of 6,379.3 feet.

SWRCB Resolution No. 68-16 establishes requirements similar to the federal antidegradation policy. In all cases where the federal antidegradation policy is applicable, SWRCB Resolution No. 68-16 requires that, at a minimum, the three-part test established by the federal antidegradation policy must be satisfied. (SWRCB Order No. WQ 86-17 at pp. 17-18.)

Due to the evidence indicating an inverse relationship between salinity and aquatic productivity of the brine shrimp and brine fly (Section 6.1 above), allowing water diversions resulting in a salinity higher than 85 g/l would be contrary to the first tier of the antidegradation policy and contrary to SWRCB Resolution No. 68-16 because the productivity of the brine shrimp and brine fly would decline as salinity increased.

Moreover, in view of the substantial evidence in the record about the unique nature of the Mono Basin ecosystem, the key role of Mono Lake in providing habitat for many species of birds dependent upon the brine shrimp and brine fly, and the tremendous public interest in protection of Mono Basin wildlife, the SWRCB finds that Mono Lake constitutes an Outstanding National Resource Water having exceptional ecological significance. As such, the water quality which existed in November 1975 when the federal antidegradation regulation was enacted must be maintained and protected. To maintain the salinity of Mono Lake at 85 g/l or lower would require that the water level of the lake be raised and maintained at 6,379.3 feet or higher.

The SWRCB is aware that it may take a number of years to reach the target lake level and that the water elevation of Mono Lake can fluctuate substantially in response to hydrologic changes. However, LADWP's water right licenses should be amended to include conditions which provide a reasonable assurance of maintaining an average water elevation above 6,379.3 feet in order to maintain the water quality which existed when the antidegradation policy was established.

The federal antidegradation policy sets requirements for when the water quality which existed in November 1975, must be maintained. Water quality objectives must, at a minimum, be consistent with the federal antidegradation policy, but other considerations may call for setting objectives which provide a higher level of water quality. Water quality objectives must also protect the beneficial uses designated for protection, even if 1975 water quality was not adequate to protect those uses. (40 C.F.R. § 131.11(a); Cal. Water Code § 13241(a).)

The Water Quality Control Plan for the South Lahontan Basin was adopted by the California Regional Water Quality Control Board, Lahontan Region, and approved by the SWRCB in 1975. The beneficial uses for Mono Lake designated for protection by the plan include saline water habitat, wildlife habitat, and water contact recreation. 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 U.S. EPA as the 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.

The reasonableness and public trust doctrines provide the SWRCB with continuing authority to reopen previous water allocation decisions to consider impacts on water quality and enforce water quality standards. (<u>United States</u> v. <u>State Water Resources Control Board</u> (1986) 182 Cal.App.3d 82, 129-30, 149-51, [227 Cal.Rptr. 161, 187-88, 201-202].) As discussed above, salinities substantially above 75 g/l would have negative effects on the aquatic productivity of the brine shrimp and brine fly. The adopted water quality objective of 76 g/l is reasonably necessary to protect the designated beneficial uses of Mono Lake. Enforcement of the objective under the SWRCB's water right authority is the only feasible means of attaining that objective.

Consistent with the reasonableness and public trust doctrines, LADWP's water right licenses should be amended to provide a reasonable assurance of maintaining an average water elevation at or above 6,386 feet in order to comply with the water quality standards for Mono Lake.

In reaching a decision on the criteria governing water diversions under LADWP's licenses, the SWRCB has considered the salinity standard for Mono Lake established in the basin plan, the federal antidegradation policy, and the antidegradation policy established in SWRCB Resolution No. 68-16. The water diversion criteria discussed in Section 6.8 of this decision will result in reducing the salinity of Mono Lake to a level consistent with those standards and policies.

6.7 Conclusions Regarding Desired Lake Level for Protection of Public Trust Resources

The instream flow requirements for restoration and maintenance of fish in the four diverted streams are discussed in Sections 5.0 through 5.5 above. Computer modeling results using the LAAMP model (Version 3.31, SWRCB 49) suggest that establishing the specified instream flows (without any additional water that may be needed to raise the water level of Mono Lake) would: (1) cause the water level of Mono Lake to reach 6,390 feet in roughly 29 to 44 years depending on the assumptions which are made regarding future hydrology; and (2) result in total inflow to Mono Lake sufficient to maintain an eventual lake level of approximately 6,388 feet to 6,390 feet for the 50-year period after a lake level of 6,391 feet is reached, depending upon future hydrology.

As discussed in Sections 6.4 through 6.4.6, the record indicates that compliance with federal air quality standards will require an average water level of approximately 6,392 feet in order to submerge a sufficient portion of the playa to reduce the blowing of PM-10 particles to within applicable limits. In addition, the evidence discussed in Section 6.3.7, indicates that restoration of all or nearly all of the waterfowl habitat which has been lost since 1941 would require a lake level over 6,405 feet. However, some waterfowl habitat would be restored at 6,390 feet and there are opportunities for restoration of additional waterfowl habitat through various mitigation measures identified in the Draft EIR and hearing record.

A lake level of 6,405 feet would not be consistent with the objectives of preserving public access to the most frequently visited tufa sites and continuing to make tufa structures at Mono Lake widely and conveniently accessible to public view. In addition, restricting diversions by LADWP to the extent necessary to reach and maintain a water level above 6,405 feet as recommended by the NAS&MLC would result in even greater restrictions upon the diversion and use of water for municipal and power needs.

In determining the most appropriate water level for protection of public trust resources at Mono Lake, the SWRCB recognizes that there is no single lake elevation that will maximize protection and accessibility to all public trust resources. In addition, variations in hydrology are such that there will continue to be fluctuations in the water level of Mono Lake regardless of what target lake level is selected.

Based on the evidence discussed in previous sections, the SWRCB concludes that maintaining an average water elevation sufficient to result in compliance with federal air quality standards will also provide appropriate protection to public trust resources at Mono Lake. The record indicates that an average water elevation of 6,392 feet would be consistent with protection of a number of important public trust resources including: air quality in the Mono Basin; water quality in Mono Lake; the Mono Lake brine shrimp and brine fly which provide food for migratory birds; secure, long-term nesting habitat for California gulls and other migratory birds; easily accessible recreational opportunities for the large number of visitors to the Mono Lake Tufa State Reserve; and the panoramic and scenic views which attract many people to the Mono Basin.

6.8 <u>Criteria for Regulating Water Diversions in Order to Reach and Maintain Desired Lake Level</u>

<u>Transition Period</u>: To reach and maintain a water elevation sufficient to protect the public trust resources discussed above while allowing water diversions to the City of Los Angeles under appropriate conditions, LADWP's water right licenses should be amended to limit diversions in the following respects until the water level of Mono Lake reaches 6,391 feet:

1. <u>No diversions of water unless fish flow requirements are met</u>: The minimum flows needed to restore and maintain the pre-1941 fisheries to the four affected streams are specified in Sections 5.0 through 5.4.4 above. Diversion of water under LADWP's licenses should be allowed only when the required flows for fishery protection are met. The licenses should also require LADWP to release water for channel maintenance and flushing purposes in accordance with previously addressed requirements.

2. <u>No diversions until a lake level of 6,377 feet is reached</u>: No diversions of water should be allowed under LADWP's water right licenses any time that the water level in Mono Lake is below or is projected to be below 6,377 feet during the runoff year of April 1 through March 31.[14]

3. <u>Diversions allowed at lake levels above 6,377 feet and below 6,380</u>: If the water level of Mono Lake is expected to remain at or above 6,377 feet throughout the runoff year of April 1 through March 31 (based on the May 1 runoff projections and any subsequent projections that LADWP makes), then LADWP would be allowed to divert up to 4,500 acre-feet per year for the purposes of use specified in its licenses.

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[14] *This level is the bare minimum elevation necessary to provide protection to gull habitat on Negit Island, Twain islet, and Java islet. Prohibiting all diversions at lake levels below 6,377 feet also will provide approximately a nine-foot buffer above the lake level of 6,368 feet at which significant additional incision and permanent damage to stream channels near Mono Lake would occur. (NAS&MLC 1 AF, pp. 3-4.)*

4. Diversions allowed between lake levels at or above 6,380 feet and below 6,391 feet: At water levels in Mono Lake at or above 6,380 feet and less than 6,391 feet, LADWP would be allowed to divert up to 16,000 acre-feet per year under its licenses.

5. Reconsideration of water diversion criteria if lake level does not reach 6,391 feet in 20 years: In the event that the water level of Mono Lake has not reached 6,391 feet by September 28, 2014, the SWRCB will hold a hearing to consider the condition of Mono Lake and the surrounding area and will determine if further revisions to the licenses are appropriate.

After Transition Period: Once a lake level of 6,391 feet is reached, diversions under LADWP's licenses should be allowed in accordance with the following criteria:

1. No diversions allowed at lake levels below 6,388 feet: Once the water level of Mono Lake has reached an elevation of 6,391 feet, no diversions would be allowed at any time the water level falls below 6,388 feet.

2. Diversions allowed at lake levels between 6,388 feet and 6,391 feet: Once a water level of 6,391 feet has been reached, diversions by LADWP would be limited to 10,000 acre-feet per year any time that the water level is at or above 6,388 feet and below 6,391 feet, provided that fishery protection flows and channel maintenance and flushing flow requirements are met.

3. Diversions allowed at lake levels at or above 6,391 feet: At lake levels at or above 6,391 feet on April 1, LADWP may divert all available water in excess of the amount needed to maintain the required fishery protection flows and the channel maintenance and flushing flows up to the amounts otherwise authorized under LADWP's licenses.

For purposes of the water diversion criteria specified above, the water level of Mono Lake would be measured on April 1 of each year, and the limitations on water diversions would apply for the one year period of April 1 through March 31 of the succeeding year.

The water diversion criteria specified above are based on: (1) the legal requirement to provide fishery protection flows; (2) the need to reach a lake level that is consistent with protection of public trust resources in the Mono Basin in a reasonable amount of time; and (3) the constitutional mandate to maximize the reasonable and beneficial use of water and avoid unnecessary or unreasonable restrictions upon the water diversions serving the municipal needs of Los Angeles. The feasibility of the specified water diversion criteria in view of the effects on Los Angeles' water and power supply is discussed later in this decision.

Computer modeling using Version 3.31 of the LAAMP model indicates that, assuming a repeat of 1940 through 1989 hydrology, the above criteria would result in Mono Lake reaching an elevation of 6,390 feet in approximately 28 years.[15] The water level would be expected to reach 6,392 feet in approximately two more years. Using an assumed future hydrology based on a "rolling average" of the hydrologic years 1940 through 1989 would result in reaching a lake level of 6,390 feet in approximately 18 years. Computer modeling (using 1940 through 1989 hydrology) indicates that the above diversion criteria would result in maintaining an average lake level of approximately 6,392.6 feet during the next fifty year period after an elevation of 6,391 feet is reached. The water level should remain above 6,390 feet approximately 90 percent of the time.

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[15] *This conclusion does not take into account the additional provision under the previously specified criteria that if an elevation of 6,391 feet is not reached in 20 years, the SWRCB will hold a hearing to consider the condition of the lake and the surrounding area, and will determine if any further revisions to LADWP's licenses are appropriate.*

In projecting the expected effects of the diversion criteria specified above on the future water level in Mono Lake, the SWRCB is keenly aware of the limitations of computer modeling hydrologic systems and the probability that future hydrologic conditions may differ significantly from historical conditions. If there were a series of extremely wet years, for example, Mono Lake could reach an elevation of 6,391 feet in much less than 20 years. Similarly, an extended series of very dry years could lengthen the period before 6,391 feet is reached. Under the circumstances, there is limited value in attempting to fine tune computer model projections of inherently uncertain conditions many years in the future. If future conditions vary substantially from the conditions assumed in reaching this decision, the SWRCB could adjust the water diversion criteria in an appropriate manner under the exercise of its continuing authority over water rights.

7.0 BENEFICIAL USES SERVED BY WATER DIVERSIONS

7.1 Use of Mono Basin Water for Municipal Purposes

As discussed previously, the Court of Appeal decisions in the Cal Trout cases establish that water needed to protect fish in the four diverted streams is not available for diversion by LADWP. In determining the extent to which additional restrictions should be placed on LADWP's water right licenses for protection of other public trust resources, the SWRCB is compelled to consider the feasibility of those restrictions in view of the other beneficial uses made of the water diverted. The primary beneficial use of water exported from the Mono Basin is to serve the municipal needs of the City of Los Angeles. Sections 7.1.1 through 7.1.4 address present water use and water supplies for Los Angeles, the expected water supply impacts of this decision, and the expected impacts of this decision on the water quality in Los Angeles.

7.1.1 *Present Water Use and Water Supplies for the City of Los Angeles*

Water use in Los Angeles varies on a seasonal and yearly basis in response to climatological conditions. Demand is higher in summer and hot, dry years, and lower in winter and during cooler, wetter years. Indoor water use remains fairly constant and outdoor use accounts for most of the variation. (SWRCB 7, p. 31-4.) At the time the Draft EIR was prepared, daily water use was about 179 gallons per person which is moderately low in comparision to other cities in California and elsewhere in the country. (SWRCB 7, p. 3L-4; LADWP 104 B, p. 162.)

Local ground water has provided a relatively stable source of supply over the past 50 years. Water supplies from the Los Angeles Aqueduct and the Metropolitan Water District of Southern California (MWD) have been more variable. During dry years, reductions in Los Angeles Aqueduct deliveries from the Owens and Mono Basins have usually been replaced by water from MWD. During wet years, LADWP generally has limited purchases from MWD because historically that has been LADWP's most expensive source of supply. (SWRCB 7, p. 3L-9.)

LADWP obtains an average of about 112 thousand acre-feet per year from local ground water basins, with ground water consumption being highest during drought years when other supplies are more limited. (SWRCB 7, p. 3L-9.) The expansion of the Los Angeles Aqueduct in 1970 allowed Los Angeles to export an average of about 450 thousand acre-feet per year from the Owens and Mono Basins, with the Owens Basin supplying about four fifths of aqueduct deliveries. (SWRCB 7, p. 3L-9.) Since June of 1989, however, LADWP has been prohibited from exporting any Mono Basin water, except for about three thousand acre-feet used for a fishery study on the upper Owens River. (NAS&MLC 5, p. 10; LADWP 149, Table 3.)

Los Angeles also purchases water from MWD, which presently serves 27 member agencies. From 1970 to 1990, LADWP purchased an average of 78.6 thousand acre-feet per year from MWD, amounting to about 13 percent of its total supply. LADWP has purchased more water from MWD during drought periods than in other years. In fiscal 1989-1990, for example, much of the State was in the fourth consecutive year of drought and the previously mentioned preliminary injunction prohibited water exports from the Mono Basin. As a result, LADWP purchased approximately 385 thousand acre-feet from MWD, or about 55 percent of its total needs. LADWP has a current entitlement to about 26 percent of MWD water. (SWRCB 7, p. 3L-10.)

MWD receives water from the Colorado River and the State Water Project. MWD's firm apportionment of Colorado River water is about 550 thousand acre-feet per year. For several years, however, MWD has been receiving approximately 1.2 million acre-feet per year from the Colorado River, including surplus water, unused California agricultutral water, and unused water allocated to other states. (SWRCB 7, p. 3L-10; MWD 1, p. 8.)

The SWP transports water from the Delta via the California Aqueduct to MWD. Under existing water right permit conditions, the present "average annual yield" of the SWP is about 2.4 million acre-feet per year. (SWRCB 7, p. 3L-10.) Average annual yield is the dependable supply available during a prolonged dry period, such as a repeat of the 1928-1934 drought. (NAS&MLC 58, pp. 4-20.) In most years, the SWP has been able to deliver about 3 to 3.5 million acre-feet. Entitlement requests are more than 3.7 million acre-feet per year. (SWRCB 7, p. 3L-10.) Between 1971 and 1990, the SWP delivered an average of 467 thousand acre-feet per year to MWD, or about 31.3 percent of MWD's water supply, with the balance coming from the Colorado River. In the 1989-1990 water year, however, the SWP supplied MWD 1.3 million acre-feet or about 52 percent of MWD's supply. (SWRCB 7, pp. L-10 and 3L-11.)

In recent years, Endangered Species Act limitations have significantly reduced the amount of SWP water that can be delivered. In 1991, DWR established the California Drought Emergency Water Bank to make water available to water short areas through water transfers. The 1991 Water Bank acquired nearly 860 thousand acre-feet which was sufficient to meet the critical needs of purchasers with additional water remaining available for sale. MWD purchased 215 thousand acre-feet from the Water Bank at a cost of $175 per acre-foot, or approximately $37.7 million, with pumping costs estimated to be $142 per acre-foot, or $30.4 million.

The record indicates that LADWP does an effective job of managing the water it obtains from various sources. The City of Los Angeles began citywide water metering in 1902, it has had a conjunctive use[16] program of surface and ground water since 1920, it has pursued water recycling since 1970, and it has had a vigorous water conservation program since 1976. (RT XV, 93:3-93:16; LADWP 65, pp. 2, 3, 84 and 88.) Dr. Timothy Quinn of MWD testified that Los Angeles has done an extraordinary job of implementing those water management measures designated as "best management practices" by the California Urban Water Conservation Council. (RT XXV, 42:22-43:14.)

During past drought years, LADWP's water customers have saved up to 30 percent of normal water use. (LADWP 65, p. 87.) Los Angeles has 22 water conservation programs in place including public education, an ultra low flush toilet retrofit program, and a tiered water pricing system. (LADWP 65, pp. 87-96; RT XV, 80:23-81:2; SWRCB 7, pp. 3L-6 to 3L-7.)

7.1.2 *Impacts of this Decision on Water Supplies Available to Los Angeles*

The reduction in Mono Basin water exports from the levels in effect prior to the 1989 preliminary injunction has had, and will continue to have, a direct effect upon water supplies available to the City of Los Angeles. The effects of this decision upon Los Angeles will be greatest in the early years when Mono Basin diversions are most severely restricted and will decrease after the level of Mono Lake reaches 6,391 feet.

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[16] *Conjunctive use is the coordinated management of ground water and surface water supplies. The amount of water stored underground is increased in wet years so that it can be drawn upon for use in dry years. Conjunctive use can enhance the ability to capture excess surface water from the SWP and the Colorado River in wet years. (NAS&MLC 223, p. 32.)*

Using Version 3.31 of the LAAMP model, the 1989 "point of reference conditions," and 1941 through 1989 hydrology, the average annual Mono Basin water exports over a 50-year period would be approximately 74.5 thousand acre-feet.[17] As described in the discussion of fishery protection flows, the SWRCB is required to amend LADWP's licenses to establish instream flow conditions for protection of fish. Amendment of the licenses to include only the instream flow and channel maintenance flows established in this decision would result in projected average annual exports from the Mono Basin of approximately 39.3 thousand acre-feet.[18] Thus, over a 50-year period, fishery protection flows result in approximately a 35.2 thousand acre-feet reduction in Los Angeles' water supply from the Mono Basin from the point of reference condition.[19] During the approximate 20-year transition period to the target lake level, the impact on water exports due to fishery protection flow would be approximately 35.7 thousand acre-feet, assuming a repeat of 1940-1959 hydrology.

In addition, this decision establishes conditions for protection of other public trust resources which will further reduce Mono

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[17] *Under the point of reference conditions described in the Draft EIR, Version 2.0 of the LAAMP model estimated average water exports of approximately 72.7 thousand acre-feet per year from the Mono Basin. (SWRCB 7, p. 3A-20.) The difference is due to modifications in the model and input assumptions utilized in Version 3.31 of the LAAMP model.*

[18] *Based on computer model projections using the LAAMP 3.31 model and 1940 through 1989 hydrology.*

[19] *During the period 1974 through 1989, LADWP exported an average of 83 thousand acre-feet per year from the Mono Basin. If that number were used as a reference point for evaluating the impacts of this decision, then the relative reduction in LADWP's water would be somewhat greater. Under the Court of Appeal rulings in the Cal Trout cases, however, the reduction in LADWP water diversions due to fishery protection flows is non-discretionary. The quantity of water over which the SWRCB has discretion to consider the feasibility of limiting Mono Basin diversions in view of other competing demands is the amount needed for protection of public trust resources above and beyond water needed for fishery protection purposes. Regardless of what level of water exports is considered as the baseline for determining the total effect of this decision on LADWP's water supply, the difference between the quantity of water needed for protection of public trust resources and that needed for protection of fishery resources remains the same. In evaluating the feasibility of limiting Mono Basin diversions in order to protect public trust resources, the focus of the SWRCB's inquiry is on: (1) the overall supplies expected to be available to meet LADWP's needs; and (2) the quantity of additional water which is needed for protection of public trust resources in the Mono Basin after fishery flows are provided.*

Basin water exports. Computer modeling results project that during the first 50-year period of applying the water diversion criteria established in this decision, LADWP will be able to export an average annual amount of approximately 21.1 thousand acre-feet. Under the specified water diversion criteria, however, it is expected that less water will be available for export during the estimated 20-year period in which the lake is projected to rise to approximately 6,391 feet, and more water available for diversion in later years. Computer modeling indicates that LADWP will be able to divert an average of approximately 12.3 thousand acre-feet per year during the first 20 years.[20]

Once the lake reaches 6,391 feet, LADWP's average annual Mono Basin exports are projected to increase to 30.8 thousand acre-feet. Thus, in comparison to the point of reference, the net effect of this decision will be to reduce average annual Mono Basin exports to Los Angeles by 43.7 thousand acre-feet.

Over the first 20 years, the additional reduction in water exports due to protection of non-fishery public trust resources in the Mono Basin is projected to be approximately 32.3 thousand acre-feet per year. After a lake level of 6,391 is reached, the reduction in exports due to protection of non-fishery public trust resources is approximately 8.5 thousand acre-feet per year.

Beginning in 1989, a preliminary injunction has prevented Los Angeles from diverting water from the Mono Basin. As a result, Los Angeles already has experienced five years of dealing with the loss of previously available water from the Mono Basin. Los Angeles' future water supply and demand situation is discussed below.

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[20] *For purposes of comparison, the LAAMP 3.31 model projects that, using 1940 through 1959 hydrologic data and 1989 point of reference conditions, average annual Mono Basin exports over a 20-year period would be 80.3 thousand acre-feet per year.*

7.1.3 *Future Water Supply and Demand Conditions in Los Angeles*
LADWP projects that the city will use approximately 700 thousand acre-feet per year by 1995, increasing to 756.5 thousand acre-feet by 2010 due to population growth. LADWP cautions, however, that large uncertainties exist regarding future projections. (LADWP 65, p. 82; Figure 1, p. 83.) Although Los Angeles water use exceeded 700 thousand acre-feet during 1987, the City's vigorous water conservation programs during successive drought years reduced water use by more than 20 percent between March 1991 and April 1992. Reduction in water use due to water conservation remained above 15 percent after drought conditions ended, which suggests that a permanent change in water use patterns has been achieved. (LADWP 65, p. 86.) A number of alternatives are available to LADWP to help offset water losses from the reduction of Mono Basin exports. These include increased use of local ground water, continued water conservation programs, reclamation and recycling, and obtaining additional water supplies from MWD. Each of these alternatives is addressed below.

<u>Local Ground Water</u>: LADWP pumps ground water from the San Fernando Basin and three other local ground water basins that are regulated by a watermaster in accordance with ground water adjudication decrees. LADWP estimates that it can increase average annual yield from ground water by 20 thousand acre-feet up to a total of 132 thousand acre-feet. The increase is due to credit that LADWP will receive for water that it imports into the San Fernando Valley which percolates to the ground water basin. (SWRCB 7, p. 3L-12.)

<u>Water Conservation</u>: The record establishes that the City of Los Angeles and its residents have an excellent record of water conservation. Some of the water conservation measures used to date, such as drought tolerant landscaping and retrofitting with ultra-low flush toilets, will continue to have long-term benefits. Other measures such as rationing would not be expected to be employed except during critical water shortages.

Reclamation and Recycling: Considerable evidence was introduced regarding the potential for increased reclamation and recycling of water in the LADWP and MWD service areas. LADWP projects that reclaimed water could replace 160 thousand acre-feet of water from other sources in the MWD service area, approximately 80 thousand acre-feet of which will be available for use in LADWP's service area. The remainder of the reclaimed water will serve to release other MWD water for use elsewhere. (LADWP 65, p. 88; RT XV, 90:15-91:9.) LADWP intends to recycle 40 percent of its wastewater and to use recycled water to displace 10 percent of its potable supply by 2010. (LADWP 65, p. 89.)

LADWP's Water Procurement Adjustment Fund may provide funding of up to $45 million per year for additional recycling projects. (RT XV, 133:25-134:12.) To date, LADWP has decided to limit water reclamation projects to those costing less than $600 per acre-foot, based on assumed costs of water from MWD in the near-term future. (RT XL, 75:10-76:4.)

Dr. Quinn of MWD testified that water reclamation in Southern California will reach as high as 670 thousand acre-feet in the next 20 years. (RT XXV, 58:17-58:19.) MWD supports water reclamation through its Local Projects Program which offers a rebate of $154 for each acre-foot of water generated by a local agency. (RT XXV, 56:14-57:2; RT XV, 163:3-163:19.) Additional funding for water reclamation programs is also available to Los Angeles from the federal government under the provisions of Section 1613 of the Reclamation Projects Authorization and Adjustment Act of 1992 (HR 429) and from the State under the provisions of the Environmental Water Act of 1989 (California Water Code Section 12929, et seq. [AB 444]). The sources of financing available for replacement water are dependent upon the type of projects that LADWP chooses to pursue.

Supplies From Metropolitan Water District: The portion of LADWP's water demand that cannot be met from local ground water supplies, Los Angeles Aquifer deliveries, and water reclamation will very likely be met by MWD. In 1990, LADWP requested 197 thousand acre-feet of water from MWD, but it was entitled to receive 639 thousand acre-feet. LADWP expects to request 212 thousand acre-feet per year by 2010, by which time its contractual entitlement will have declined to about 602 thousand acre-feet. (SWRCB 7, p. 3L-13.) In view of LADWP's large contractual entitlements from MWD under a first priority right, the issue is whether MWD will have sufficient water available to meet an increase in LADWP's demand. Although MWD currently represents one of LADWP's least expensive sources of additional water, LADWP has decided to develop its own more expensive resources because of its perception of uncertainty concerning MWD supplies. (SWRCB 7, p. 3L-14.)

MWD's objective is to meet 100 percent of "full-service" demand at least 90 percent of the time. Full-service demand is defined as wholesale demand for imported water after accounting for implementation of water management programs and best management practices within the service area. Another MWD objective is to require extraordinary demand reduction only infrequently, with moderate demand reduction programs occurring in about eight percent of all years. Serious rationing with economic consequences comparable to those occurring during drought year 1991 would occur only two percent of the time. (MWD 1, p. 5.)

MWD's primary sources of supply are the SWP and the Colorado River. The availability of water to MWD from the SWP will depend in part upon future restrictions that are placed on water diversions from the Sacramento-San Joaquin Delta area. Dr. Quinn testified that "flexibility" is central to the issue of water available for diversion by the SWP in the Delta. (RT XXV, 48:4-48:12.) With sufficient flexibility in the Delta, Dr. Quinn believes that there is a potential for more SWP deliveries, increased use of ground water storage during wet periods, and expanded water transfers. (RT XXV, 16:14-16:22.) Testimony was also presented concerning a recent water transfer to MWD involving water that is currently exported for irrigation south of the Delta. (MWD 1, pp. 9 and 10.) Transfers to MWD or LADWP of water that is presently used south of the Delta would avoid issues raised by an increase in Delta exports.

LADWP's analysis of water available to MWD assumes that MWD will obtain only 626 thousand acre-feet from the Colorado River Aqueduct. (CT 25, Appendix 1.) MWD presented testimony, however, that it expects to maintain a full Colorado River Aqueduct receiving 1.2 million acre-feet per year. (RT XV, 19:1-19:3.) This difference of nearly 600 thousand acre-feet is several times greater than the total amount of water that LADWP has ever diverted from the Mono Basin. In view of MWD's testimony and its success in obtaining Colorado River water in recent years, it is reasonable to conclude that MWD's average water deliveries from the Colorado River Aqueduct will continue to substantially exceed the 626 thousand acre-feet estimate used in the LADWP analysis.

7.1.4 *Impacts of this Decision on Water Quality in Los Angeles*

Water exported from the Mono Basin is low in dissolved minerals and easily meets all state and federal drinking water standards. (RT XV, 5:11-6:15.) Mono Basin water can be used to dilute naturally occurring minerals in the Owens River such as arsenic. (RT XV, 5:16-5:17.)

Although the City of Los Angeles water supply meets the current arsenic standard of 50 $\mu g/l$, testimony was presented that the U.S. EPA will soon propose a more stringent arsenic standard which would go into effect in 1998. (RT XV, 5:16-6:12, 29:1-29:3.) If the new arsenic standard is very stringent, it may be necessary to use blending, a new treatment plant at Hot Creek, and/ or additional treatment facilities at the Los Angeles Aqueduct filtration plant. (RT XV, 6:15-6:21.) Testimony from LADWP indicates that it may be necessary to construct the water treatment plant for arsenic, with or without the continued diversion of water from the Mono Basin. LADWP is currently performing preliminary studies to assess the feasibility of different options for complying with the anticipated new arsenic standard. (RT XV, 29:4-29:14.)

Water from the Mono Basin is of very high quality and, in sufficient quantities, it would serve a valuable dilution function with respect to other water delivered through the Los Angeles Aqueduct. After accounting for the quantity of water needed for fishery protection in the Mono Basin, however, the amount of water remaining in dispute is considerably reduced. Computer modeling indicates that, on average, long-term protection of public trust uses in the Mono Basin will require an additional 8.5 thousand acre-feet of water per year. The dilution function served by restoring this relatively small amount of water to a water system serving over 600 thousand acre-feet of water per year would be relatively small.

7.1.5 *Economic Costs of Reduced Mono Basin Water Supply for Municipal Use*

Under the point of reference conditions described in the Draft EIR, Version 3.31 of the LAAMP model estimates average annual exports over a 50-year period of 74.5 thousand acre-feet per year. Amendment of the licenses to include the instream flows and channel maintenance flows established in this decision would result in average annual exports from the Mono Lake Basin of approximately 39.3 thousand acre-feet. Protection of public trust resources would reduce Mono Basin water exports by an additional 8.5 thousand acre-feet per year once a lake level of 6,391 feet has been reached. During the approximately 20-year period that it will take to reach 6,391 feet, restoration and protection of public trust resources will reduce Mono Basin water exports by approximately 32.3 thousand acre-feet, in addition to the reduction in water exports due to fish flows.

Reduced water exports from the Mono Basin which are necessary to correct the damage caused by past diversions will result in additional water supply and power costs to LADWP and its customers. The amount of these costs depend upon the following:

(1) The cost of water conservation programs to reduce demand in the LADWP service area.

(2) The cost of procuring replacement water needed to meet demand when it is not economical to reduce demand further by conservation programs.

(3) A cost assigned to the expense and inconvenience imposed on customers as a result of water shortages in years when LADWP is unable to procure sufficient water to meet demand in its service area (i.e., "water shortage costs").

(4) Cost of replacement power as discussed in Section 7.2.

As discussed in Sections 7.1.1 through 7.1.3, there is strong evidence that replacement water will be available to Los Angeles from a variety of sources. Although the cost of the replacement water will exceed the cost of water from the Mono Basin, reduced Mono Basin diversions resulting from this decision should not result in shortage costs due to unavailability of replacement water.

The cost of replacing water by water conservation programs, water recycling, and procurement from MWD would vary from $300 per acre-foot for water conservation programs to about $700 per acre-foot for the most expensive reclamation project under consideration by LADWP. (LADWP 160, p. A-15.) The current cost of water purchased from MWD is $230 per acre-foot. (SWRCB 7, Table 3N-12.) According to testimony of MWD, the full incremental cost in the near term of delivering new supplies of water to the MWD service area is expected to be $350 to $400 per acre-foot. (RT XXV 54:11-54:20.)

The total cost of replacing water lost as a result of this decision will vary from year to year depending on the proportion of replacement water from each source. Replacement water will be more expensive in dry years than in normal and wet years.

LADWP and the Natural Heritage Institute (on behalf of Cal Trout) both used computer models to estimate the cost of reducing deliveries from the Mono Basin. Neither of the analyses that were presented provides a satisfactory estimate of the cost of replacement water over a series of wet, normal, and dry years, because the computer models' cost projections include a variety of other costs with the water replacement costs, and because the computer models include some assumptions that are unrealistic or could not be verified. For example, the LADWP analysis assumes that insufficient replacement water will be available thereby causing high water shortage costs to be imposed on water users in Los Angeles. This assumption does not appear realistic in light of the evidence discussed in Section 7.1.3. On the other hand, the analysis by the Natural Heritage Institute contained a variety of assumptions concerning how water use in LADWP service area will be affected by pricing and water conservation measures. The SWRCB was unable to verify whether the assumptions used in the Natural Heritage Institute's analysis were realistic.

Due to the limitations of the analyses presented by LADWP and the Natural Heritage Institute, the SWRCB developed a separate estimate of the cost of replacement water based on evidence in the record. The method by which the cost estimate presented in this decision was developed is described below in Section 7.1.6. For the reasons explained in that section, the actual costs may be significantly lower than the costs assumed for purposes of this decision.

The SWRCB's estimates for replacement water are based upon comparison of LADWP's projected Mono Basin water exports under the terms of this decision with the exports that would have been expected if the 1989 point of reference conditions had continued. It should be recognized that LADWP has been obtaining replacement water for former Mono Basin supplies since 1989, primarily through increased deliveries from MWD. The primary water supply and financial effect of this decision will be a continuing requirement for LADWP to obtain replacement water for a large portion of the water formerly exported from the Mono Basin.

As described in Section 7.1.6 below, the SWRCB's cost estimates indicate that the average annual cost of requiring instream flows and channel maintenance flows for fishery protection purposes would be about $14.5 million. Under the previously discussed Court of Appeal decision in Cal Trout II, however, the flows required for fishery protection purposes in this instance are mandatory. Flows needed to reestablish and maintain the fishery are not subject to reduction due to economic cost. The additional cost of protecting public trust values by reducing diversions further to allow the lake level to rise to 6,391 feet in a reasonable period of time would be approximately $13.3 million per year over the next 20 years.

The cost after the transition period would be significantly lower because LADWP will be able to increase diversions once public trust resources are restored to the level of protection provided by maintaining the elevation of Mono Lake above 6,391 feet. The actual costs will depend on water replacement costs in the mid-twenty-first century. An analysis based on near-term water replacement costs indicates that, after the transition period, the water supply cost of protecting public trust resources will average about $3.4 million annually. This cost is in addition to the $14.5 million annual cost of providing replacement water for the reduction in Mono Basin exports attributable to fishery protection flows. The method of determining the estimated cost of providing the fishery protection flows and the additional water needed for protection of public trust resources is described below.

7.1.6 *Estimation of Average Cost of Replacement Water*

The SWRCB's estimate of the average costs of replacement water is based on a base replacement cost of $400 per acre-foot. This cost is at the upper end of the range stated as the cost of new water supplies from MWD. Replacement water is likely to be more expensive in dry years and less expensive in wet years. Consequently, the base cost was adjusted by a factor giving the relative cost of MWD water in dry, normal, and wet years to provide an estimate of the average replacement cost of water in dry, normal, and wet years. (LADWP 160, p. 8.) This adjustment gives the following water replacement costs:

Dry year average	$430/acre-foot
Normal year average	$400/acre-foot
Wet year average	$370/acre-foot

To provide a conservative estimate of costs, an additional 20 percent was added to the replacement cost in dry years. Thus, the water replacement costs used in the calculations were as follows:

Dry year average	$520/acre-foot
Normal year average	$400/acre-foot
Wet year average	$370/acre-foot

The average amount of replacement water needed in each type of year during the transition to the protected lake level was estimated in the following way. The LAAMP model (Version 3.31) was used to estimate exports from the Mono Basin over a 20-year period under each of three scenarios:

(1) The point of reference scenario described in the EIR;

(2) A scenario based on limiting diversions in order to provide instream flow for protection of fish (referred to as the "Fish Flow Scenario"); and

(3) A scenario where diversions are reduced further in order to provide fishery protection flows <u>and</u> to protect public trust resources in accordance with the transition period diversion criteria specified in Section 6.8 above (referred to as "Fish Flow plus Public Trust Scenario").

The amount of replacement water needed to offset reduced exports from the Mono Basin is conservatively estimated as the difference in Mono Basin exports under the point of reference conditions and under each of the other scenarios. In reality, less replacement water may be needed because it may be possible to partially offset the reductions in exports from the Mono Basin by taking more water from other sources along the Los Angeles Aqueduct. In addition, some of the water exported from the Mono Basin is lost in transit to Los Angeles. For purposes of estimating the cost of complying with this decision, however, it was assumed that reductions in Mono Basin exports would require obtaining an equal amount of replacement water from other sources.

Table 15 below shows the estimated quantities of replacement water needed to satisfy the fishery protection flows, the additional quantity of replacement water needed to restore the lake level to protect other public trust uses, and the estimated total quantity of water needed to meet fishery protection flows and to protect other public trust uses. The figures in Table 15 are for the estimated 20-year transition period which will be needed for the water level of Mono Lake to reach 6,391 feet.[21]

TABLE 15: REPLACEMENT WATER NEEDED DURING TRANSITION PERIOD (ACRE-FEET)

SCENARIO	DRY YEAR AVERAGE (20% of years)	NORMAL YEAR AVERAGE (60% of years)	WET YEAR AVERAGE (20% of years)	AVERAGE OVER 20 YEARS
REPLACEMENT WATER TO MEET "FISH FLOW SCENARIO"	25,700	37,400	37,800	35,700
ADDITIONAL REPLACEMENT WATER TO MEET PUBLIC TRUST REQUIREMENT	19,600	31,000	51,200	32,300
TOTAL REPLACEMENT WATER TO MEET "FISH FLOW PLUS PUBLIC TRUST SCENARIO"	45,300	68,400	89,000	68,000

The average water replacement costs in the three hydrologic year types were estimated by applying the replacement costs for each year type to the average amount of water needed in that year type. The average annual water replacement cost over all year types was estimated by weighing these amounts over the relative frequencies of the three year types, assuming 20 percent dry years, 60 percent normal years, and 20 percent wet years.

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[21] *Because of limitations in the hydrologic model, the average amount of replacement water in column 4 of the table is not exactly equal to the averages in each year-type weighted over the relative frequencies of these year-types.*

The resulting costs during the estimated 20-year transition period are as follows: (1) the estimated average annual water replacement cost of meeting the fish flow requirement is approximately $14.5 million; and (2) the additional estimated average annual cost of protecting public trust resources is approximately $13.3 million. In the first several years, actual costs are likely to be less than these figures because the actual replacement cost of water is likely to be closer to the current cost of water from MWD than to the costs used in this analysis.

An additional analysis of replacement water cost was conducted for the period after the lake has reached 6,391 feet. The LAAMP model (Version 3.31) was used to estimate exports from the Mono Basin over a 50-year period under each of three scenarios:

(1) The point of reference scenario described in the Draft EIR;

(2) A scenario based on limiting diversions in order to provide instream flow for protection of fish (referred to as the "Fish Flow Scenario"); and

(3) A scenario where diversions are reduced further in order to provide fishery protection flows <u>and</u> to protect public trust values in accordance with the post-transition period diversion criteria specified in Section 6.8 above (referred to as "Fish Flow plus Public Trust Scenario").

This analysis indicated that the additional replacement water, over and above that needed to meet the fish flow requirement, necessary to maintain the lake near a protected level of 6,391 feet would average 4,100 acre-feet in dry years, 10,900 acre-feet in normal years, 5,000 acre-feet in wet years. Over the 50-year period an average of 8,500 acre-feet per year would be required. The resulting water replacement costs would average $3.4 million over the 50-year period. This cost is in addition to the approximately $14.5 million annual cost of providing replacement water for the reduction in Mono Basin exports attributable to fishery protection flows.

7.1.7 *Conclusions Regarding Water Supply for Municipal Use*
The quantity of water available to Los Angeles in the future depends to a large extent upon water availability to MWD and LADWP's success in implementing proposed water reclamation projects. MWD has been able to meet LADWP's increased demands over the last several years and the evidence in the record indicates it is very likely that MWD will continue to have sufficient water available to meet LADWP's needs in the future. In addition, if LADWP vigorously pursues the water reclamation projects that it presently is developing, then reclaimed water will provide a substantial augmentation to Los Angeles' supplies within the next decade. Thus, the SWRCB concludes that there will continue to be sufficient water available to meet the municipal needs of Los Angeles when diversions from the Mono Basin are restricted in accordance with the water diversion criteria discussed in Section 6.8.

Due to uncertainty about future hydrology and future water availability throughout the state, it is difficult to develop an accurate estimate of the cost of securing replacement water supplies for water formerly diverted from the Mono Basin. For purposes of determining the feasibility of the water right license amendments set forth in this decision, the SWRCB believes that the cost estimates presented in Sections 7.1.5 and 7.1.6 above provide a reasonable approximation of the expense involved in securing replacement water. The availability of funding from the sources discussed in Section 7.1.3 makes it likely that the cost to LADWP ratepayers of securing replacement supplies will be less than estimated above.

The SWRCB recognizes that a complete economic analysis of the effects of this decision would also examine the economic benefits of protecting fishery and public trust resources in the Mono Basin. Considerable information regarding these economic benefits was provided in the Draft EIR and other evidence presented at the water right hearing. Rather than delve further into the speculative area of projecting future economic costs and benefits, the SWRCB chooses to focus on examining whether the economic costs of this decision make its adoption infeasible. Based on the evidence in the record, the SWRCB concludes that neither the water supply costs nor the power supply costs (see Section 7.2) make it infeasible to protect public trust resources in the Mono Basin in accordance with the terms of this decision.

The EIR concludes that the 6,390-feet alternative would have significant water supply impacts upon Los Angeles but that those impacts can be mitigated by securing funding for replacement water from various sources. The lower lake level alternatives identified in the EIR would have less impact on Los Angeles' water supplies, but also would provide less protection for public trust resources in the Mono Basin. Specifically, these alternatives would provide less protection for fish and wildlife, and would not attain air and water quality standards. The SWRCB concludes that the appropriate balance between protection of public trust resources in the Mono Basin and the adverse impacts of reducing Mono Basin water exports calls for a target lake level above 6,390 feet. Therefore, alternatives which would result in a significantly lower lake level are not a feasible means of reducing adverse impacts on Los Angeles' water supply.

The EIR identifies as potential mitigation measures a number of avenues Los Angeles may pursue to obtain or develop replacement water supplies. These include water reclamation projects, using funds available under AB 444, participating in water transfers under the Central Valley Project Improvement Act (Title XXXIV of HR 429), participating in MWD's water reclamation and groundwater recovery rebate program, and implementing and monitoring compliance with urban water conservation best management practices.

The record establishes that Los Angeles has been pursuing new water supplies from various sources. The record also indicates that Los Angeles (or, in the case of water transfers under HR 429, MWD) is pursuing the measures identified in the EIR as means of obtaining replacement supplies. These actions are the primary responsibility of Los Angeles, which has a strong incentive to continue pursuing development of the water supplies it needs. Therefore, the SWRCB concludes that to amend Los Angeles' water rights to require specific actions to pursue additional water supplies: (1) would not be an appropriate means of mitigating adverse water supply impacts of this decision; and (2) should be deemed infeasible for purposes of CEQA, because it would unnecessarily interfere with the management of Los Angeles' operations. Overall, the adverse water supply impacts of this decision are overridden by the legal requirement to provide flows to reestablish and maintain the pre-1941 fishery in the four tributary streams, and by the benefits of this decision to fishery and other public trust resources in the Mono Basin.

Although the SWRCB concludes that Los Angeles' need for water for municipal use does not make it infeasible to protect public trust resources in the Mono Basin, the SWRCB also recognizes that there is, and there will continue to be, a long-term water supply problem in Southern California and other areas of the State. Therefore, water diversions from the Mono Basin should not be unnecessarily restricted beyond what is necessary to provide reasonable protection for public trust resources in the Mono Basin as addressed in this decision.

7.2 Hydroelectric Power Production

Water exported from the Mono Basin is used to generate hydroelectric power as the water passes through power plants on the Los Angeles Aqueduct. A reduction in the amount of water exported from the Mono Basin will result in reduced power generation and increased cost to Los Angeles to obtain power from other sources. In addition, the reduction in hydroelectric power production could have an adverse impact on air quality. (See Section 8.4.)

As shown in Table 15 above, amendment of Los Angeles' licenses to include the instream flows and channel maintenance flows established in this decision would reduce annual exports from the Mono Lake Basin by an average of approximately 35.7 thousand acre-feet during the 20-year transition period. Reducing diversions in order to reach and maintain a lake level near 6,391 feet in accordance with the previously specified water diversion criteria would result in reducing deliveries by approximately 32.3 thousand acre-feet more. After the transition to the protected lake level, diversions could be increased again to a level which would result in annual average exports to Los Angeles of approximately 8.5 thousand acre-feet less than would be the case if only the fishery flow requirements were added to LADWP's licenses.

The City of Los Angeles, the Mono Lake Committee, and the National Audubon Society concur that the cost of replacing energy generated by power plants on the Los Angeles Aqueduct will be approximately $125 per acre-foot. (CT 47, Table 1.) The average annual cost of reduced power production due to the fishery protection flows would be approximately $4.5 million. Until the water level of Mono Lake reaches 6,391 feet, protection of public trust resources will result in annual energy costs approximately $4.0 million greater than the energy costs that would be incurred if only the fish flow requirements were met. After the transition period, the annual energy costs would be approximately $1.1 million greater than the costs that would be incurred if only the fish flow requirements were met.

The cost of power supplied by Southern California Edison to much of the area adjacent to LADWP's service area is approximately 20 percent higher than LADWP's cost. (RT XXIII, 179:18.) Therefore, the increase in power costs to LADWP ratepayers due to loss of Mono Basin water is not considered to impose a significant hardship on LADWP electricity customers. As with the water supply costs, it should be recognized that LADWP customers have been paying the cost of obtaining replacement power from other sources since 1989.

7.3 Summary of Costs of Obtaining Replacement Water and Power Due to Reduced Mono Basin Diversions

Los Angeles will incur economic costs due to reduction of water exports from the Mono Basin. Based on the information presented in Sections 7.1.5 and 7.2 above, water supply replacement costs during the approximate 20 year transition period are estimated to be approximately $27.8 million per year and power replacement costs are estimated to be approximately $8.5 million per year. The total estimated costs for replacement of water and power during the transition period are approximately $36.3 million per year. Slightly over half of the estimated costs are due to the fishery protection flows, and the remainder are due to the need for additional water to raise the water level of Mono Lake to protect public trust uses.

Once the water level of Mono Lake has reached 6,391 feet above sea level, water exports are expected to increase, and water and power replacement costs are expected to decrease. Water supply replacement costs after the transition period are estimated to be approximately $17.9 million per year, and power supply replacement costs are estimated to be approximately $5.6 million per year. The total estimated costs for replacement of water and power after the transition period are approximately $23.5 million per year. Approximately 80 percent of the estimated long-term costs are due to the fishery protection flows, and the remainder are due to the need for additional water to maintain Mono Lake at a water level sufficient to protect public trust uses.

8.0 POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS OF REDUCED MONO BASIN WATER DIVERSIONS

8.1 Effects of Rising Lake Level on Sand Tufa

As explained in the discussion of visual and recreational resources, many of the sand tufa formations at Mono Lake will be lost at lake levels above 6,384 feet. LADWP's rebuttal brief argues that the LADWP Mono Lake Management Plan is the only proposal which is consistent with Public Resources Code Section 5046 which calls for protection of the sand tufa. (LADWP Rebuttal Brief, p. 56.) Public Resources Code Section 5049, however, expressly provides that natural or artificially caused accretion or reliction of the waters of Mono Lake shall not be deemed contrary to the purposes of the law establishing the Mono Lake Tufa State Reserve. In addition, the evidence establishes that the higher water levels expected to occur under the LADWP plan would also adversely impact the sand tufa.

The sand tufa structures which are in question were not visible prior to 1941 because they were formed under the lake bottom. Dr. Stine's research indicates that, even if the lake level did not increase, the sand tufa would be expected to undergo pronounced weathering and erosion over the next 50 years. (NAS&MLC 1AF, p. 1.) The primary agencies with land management responsibility in the Mono Basin, including the Department of Parks and Recreation which manages the Mono Lake Tufa State Reserve, all recommend adoption of the 6,390 feet alternative described in the Draft EIR.

The SWRCB considers loss of sand tufa structures at Mono Lake to be a significant adverse impact. The only measure which would mitigate adverse impacts on sand tufa to less than a level of significance would be to maintain the level of Mono Lake at 6,384 feet or less. (See Section 6.5.4.) However, establishment of the mandatory fishery protection flows in the four streams from which LADWP diverts water is expected to result in an average long-term lake level over 6,388 feet. The legal requirement to establish fishery protection flows makes it infeasible to preserve a long-term lake level of less than approximately 6,388 feet. Therefore, the legally required fishery protection flows are an overriding consideration justifying amendment of LADWP's water right licenses despite the impacts on sand tufa. The SWRCB also finds that, even in the absence of a legal mandate to establish fishery protection flows, the benefits of protecting other public trust resources at Mono Lake constitute a separate basis for our conclusion that overriding considerations justify a higher lake level despite adverse impacts to sand tufa. (14, CCR, § 15093.)

8.2 Lake Fringing Vegetation

The term "wetlands," as used in the Draft EIR, is based on the USFWS definition which encompasses areas that do not meet the U.S. EPA or the Corps of Engineers definition of wetlands for implementation of Section 404 of the Clean Water Act. Applying the USFWS definition, one result of the declining water elevation at Mono Lake is that the area of lake fringing wetlands (excluding dry meadow area) increased from about 360 acres to 2,800 acres on the relicted lakeshore. As discussed in Section 6.3.3, however, the habitat value of the new wetland areas in the relicted lakebed is much less than the habitat value of the wetlands which existed prior to 1941. In the absence of LADWP's diversions, the water level of Mono Lake today would have been much higher and the wetlands which developed in the relicted lakebed area would not exist. (SWRCB 7, Vol. 1, Figure 3A-8.)

A rise in the water level of Mono Lake to approximately 6,392 feet will result in the loss of over 1,600 acres of wetland in the area of the relicted lakebed. (SWRCB 7, Table 3C-6.) A portion of the lost acreage will be mitigated for by the increase in high value wetland habitat expected to occur at various locations at a lake elevation above 6,390 feet. (See Section 6.3.7) Mitigation for the total loss of low value wetlands would not be feasible due to the large acreage involved. The U.S. Forest Service considers the loss of the wetlands which would occur due to a rise in lake level to be insignificant. (RT XXV, 183:17-184:7.) As noted in Section 8.3 above, the primary land management agencies in the Mono Basin all recommend a substantial increase in the water level of Mono Lake.

In view of the relatively low habitat value of the wetlands in the relicted lake bed, reduction of that wetland area is less significant than would be the case with other wetland areas. Even so, the EIR identifies submergence of wetlands in the relicted lakebed area as a significant adverse environmental effect. The SWRCB finds that submergence of those wetlands is an unavoidable result of restoring the water level of Mono Lake to an elevation sufficient to protect public trust resources. The SWRCB further finds that the balanced protection of public trust resources which will be provided by the water diversion criteria established in this decision is an overriding consideration which justifies submergence of wetlands in the relicted lakebed. The legal mandate to establish fishery protection flows provides a separate basis for the SWRCB's findings that: (1) overriding considerations justify the requirements of this decision despite the submergence of wetlands which will occur as a result; and (2) that alternatives which would avoid the loss of wetlands in the relicted lake bed are infeasible.

8.3 Flows in the Upper Owens River

The export of water from the Mono Basin since 1941 has had various effects on channel structure and flows of the upper Owens River between East Portal and Lake Crowley. Prior to Mono Basin exports, the flow in the upper Owens River was primarily from natural springs in the Big Springs area which provide a relatively steady rate of flow. The natural flow above East Portal fluctuated between a monthly average of 51 cfs and 85 cfs with an average of approximately 58.5 cfs. (DFG 62, p. 16.) Between 1941 and 1989, water exports from the Mono Basin greatly increased the flow in the upper Owens River below East Portal, but the rate of flow was more variable, depending upon the quantity and timing of diversions from the Mono Basin.

The major study of the upper Owens River fishery presented at the hearing was Owens River Stream Evaluation Report 93-1 prepared by a consultant to DFG. (DFG 62.) The study was designed to develop instream flow recommendations and habitat development and management plans for the upper Owens River between East Portal and Lake Crowley. Based on flow recommendations using the IFIM methodology described previously, the DFG study estimated that flows of 120 to 250 cfs just downstream of East Portal would provide habitat within 80 percent of the maximum values for all life stages of brown trout and rainbow trout. (DFG 62, pp. 213 and 214.)

Because adult brown trout and rainbow trout are thought to inhabit the upper Owens River on a year round basis, optimizing adult habitat conditions would require a year-round flow regime of approximately 250 cfs. (DFG 62, p. 214.) Maximum habitat for adult trout was estimated to be provided at 250 cfs, but flows of that rate would exceed the "minimum bank-full flow capacity at several locations" and were not recommended by DFG. (DFG 62, p. i.) To minimize exceedence of bank-full flow capacity, DFG recommended that flows not exceed 200 cfs directly below East Portal. (DFG 3, p. 7.) DFG's recommendations were summarized as follows:

> "If additional water is diverted from the Mono Lake Basin to the upper Owens River, it should be diverted in a stable manner on a year round basis. Futhermore, streamflow, just downstream of East Portal on the upper Owens River should not exceed 200 cfs nor should streamflow exceed 270 cfs at the confluence of Hot Creek." (DFG 3, p. 7.)

Under present conditions, the DFG study indicates that flows between 120 cfs to 250 cfs just below East Portal would provide the best fishery habitat. Based on information presented in the study, a DFG fisheries biologist concluded that the fishery in the upper Owens River was in good condition at the lower flow levels present at the time of the hearing. (RT XXII, 305:9-306:23; DFG 62, pp. 168 and 177.)

LADWP presented testimony by Dr. William Platts recommending that the upper Owens River receive bank-full flows at least once every three years for channel and bank maintenance, and that "riparian maintenance flows" should occur once every ten years. Over time, these flows are thought to produce the vegetation and soils needed to maintain and develop a stream and surrounding riparian habitat which are in good condition. (LADWP 136, p. 1.) Dr. Platts disagreed with DFG's recommendation for a limit of 200 cfs below East Portal because it was based solely on fishery needs and did not account for flows needed for bank formation and channel maintenance. (LADWP 136, p. 2.)

Prior to 1941, flows in the upper Owens River were relatively steady through the year without the wide variability characteristic of streams which are primarily dependent upon widely fluctuating runoff. Although the character of the stream may have changed over the years, there is insufficient evidence to conclude that the present upper Owens River needs the large channel maintenance and riparian maintenance flows recommended by Dr. Platts. In view of the conflicting evidence regarding the effects of high flows on the stream channel, the SWRCB does not adopt either DFG's or Dr. Platt's recommendations regarding flow levels for channel protection and/or maintenance in the upper Owens River just downstream of East Portal.

Reductions in water diversions to the Owens Basin from the Mono Basin will reduce the fishery habitat available from what was present at times under the point of reference conditions. Reduced Mono Basin diversions will also reduce the amount of imported water available to mitigate periodic water temperature and water quality problems in the upper Owens River which, at certain times of the year, can be significant. (SWRCB 7, p. 3D-82 and 3D-83.)

On the positive side, amendments to LADWP's water right licenses in order to reduce large, rapid flow fluctuations should have a beneficial effect upon conditions in the upper Owens River. Increases in discharge to the upper Owens River at East Portal should be limited to 20 percent of the previous day's flow and decreases in discharge should be limited to 10 percent of the previous day's flow. (LADWP 136, p. 2.) In addition, LADWP should be required to make a good faith effort to schedule any releases into the upper Owens River at a relatively stable rate, consistent with operational limitations and water availability. Finally, in order to avoid adverse impacts of extremely high flows due to Mono Basin water diversions, the SWRCB concludes that LADWP's licenses should be amended to limit water diversions from the Mono Basin so that the combined natural flow at East Portal and the discharge from East Portal do not exceed 250 cfs as measured directly below the East Portal discharge.

This decision is not expected to have a significant effect on channel conditions in the upper Owens River. Adverse impacts on upper Owens River fishery habitat caused by reducing water exports from the Mono Basin can be partially mitigated through requirements which prevent rapid fluctuations in the exports which do occur. In addition, once the water level of Mono Lake increases above 6,377 feet, the water diversion criteria established in this decision allow for a resumption of water exports from the Mono Basin. The resultant increase in flows in the upper Owens River will increase the amount of fishery habitat in that stream. To mitigate adverse impacts on upper Owens River fishery habitat to less than a level of significance, however, would require diversion of large quantities of water from the Mono Basin in order to maintain the approximate quantity of fishery habitat in the upper Owens River which occurred prior to the 1989 preliminary injunctions.

The legal requirement to provide fishery flows in the Mono Basin streams, and the need to further limit Mono Basin water diversions to protect public trust resources, makes it infeasible to export sufficient water from the Mono Basin to mitigate below a level of significance the adverse impacts on fishery habitat, water quality and water temperature in the Owens River. Therefore, the SWRCB concludes that protection of fisheries and public trust resources in the Mono Basin is an overriding consideration which justifies the adverse impacts that reduced Mono Basin water diversions will have in the upper Owens River Basin.[22]

8.4 <u>Air Quality Impacts Due to Alternative Methods of Electrical Power Production</u>

The limitations on Mono Basin water exports under the terms of this decision correspond to limitations on hydroelectric power production as discussed in Section 7.2. Depending upon how Los Angeles compensates for the continuing loss of hydroelectric power production, there could be adverse air quality impacts. The Draft EIR established criteria for determining the

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[22] *A fishery study of the middle Owens River was also prepared as an auxiliary report for the Draft EIR. (SWRCB 13W; SWRCB 7.) The primary objectives of the study were to characterize fishery habitat on the middle Owens River, between Pleasant Valley Reservoir and Tinemaha Reservoir, and to facilitate comparisons of fishery habitat gains and losses attributable to each project alternative analyzed in the Draft EIR. The Draft EIR did not identify any significant adverse impacts to the middle Owens River fishery from adopting the 6,390 feet alternative. (SWRCB 7, pp. 3D-65, 3D-66, and 3D-86.)*

significance of expected air quality impacts based on the quantity of emissions from LADWP's power generation facilities in the Los Angeles Basin and the overall quantity of additional out-of-basin emissions. (SWRCB 7, pp. 3M-12 and 3M-13.) The power supply impacts of this decision are in between the impacts evaluated in the Draft EIR for the 6,390 feet alternative and the 6,410 feet alternative. The Draft EIR projected that the lost power production under both alternatives would be compensated for primarily by an increase in energy generation in the Los Angeles Basin. (SWRCB 7, pp. 3M-19 and 3M-20.) Applying the criteria established in the Draft EIR, the additional emissions due to compensating for lost power production would not be considered significant. (SWRCB 7, pp. 3M-19 and 3M-20.)

The actual air quality impacts of reduced Mono Basin water exports depend upon how Los Angeles chooses to respond to the loss of reduced hydroelectric power production. In addition to replacement of lost power through generation at LADWP facilities or purchase from out-of-basin sources, increased energy conservation could offset a portion of the loss with no adverse impact on air quality. The point of reference conditions, against which environmental impacts are evaluated for purposes of the EIR, existed prior to the temporary cessation of Mono Basin water exports under the preliminary injunction in 1989. It is important to recognize that this decision will not result in an additional reduction in the level of hydroelectric power generation beyond that which has already occurred. Rather, as the water level of Mono Lake rises, LADWP will be able to increase Mono Basin water exports and recover a portion of the water previously available for export and hydroelectric power production.

8.5 <u>Cultural Resources</u>

The term cultural resources encompasses sites, features, and locations of archeological, historical, architectural and ethnohistorical origins. These can date from an estimated 10,000 years ago to historic and architectural resources as recent as 50 years ago. Cultural resources can even be contemporary, as in ceremonial locations and traditional food gathering areas used by present Native Americans. Most cultural resources consist of areas defined by the presence of physical remains such as artifacts or structural debris, but they may also consist of a location with no defining physical characteristics where a significant historical event occurred, or where on-going Native American religious activities are held.

The limited cultural resource investigations done for the environmental impact report consisted of an archeological records check and literature search, contacts with several archeologists who have done research in the Mono Lake area, and a field assessment of 15 previous recorded cultural resources. (SWRCB 7, pp. 3K-1 to 3K-2.) That work was designed to gauge the cultural resource sensitivity of the Mono Basin rather than to provide a comprehensive inventory of cultural resources within the potential impact zone.

The archeological field reconnaissance on Mono Basin streams, in conjunction with pre-field research, indicates a high level of archeologic sensitivity. Settlement patterns projected from other archeological surveys and ethnographical studies in the Mono Basin area indicate an extensive prehistoric/ethnographic use of the riparian corridor areas such as those existing along the Mono Lake tributaries.

8.5.1 *Applicable Legal Requirements*

The principal State policy for the protection of cultural resources is provided by the California Environmental Quality Act and the CEQA Guidelines. The procedures for protection, preservation, and/or mitigation of cultural resources are set forth in Appendix K of the CEQA Guidelines. If a project may cause damage to an "important archeological resource," as defined in Appendix K of the CEQA Guidelines, the project may have a significant effect on the environment.

Additional laws provide for the protection of Native American remains and outline the procedures to be followed if remains are found (e.g., Health and Safety Code Section 7052 and Public Resources Code Section 5097.) Projects which will have impacts on federal lands, which will require a federal permit, or which are federally funded, are subject to Section 106 of the National Historic Preservation Act of 1966 (as amended) and its implementing regulations. (Title 36, Code of Fed. Regs (CFR), Part 800.) Appendix K to the CEQA Guidelines states that a public agency may use the documentation prepared under federal guidelines in place of other documentation needed for CEQA . Cultural resources assessed as significant in the federal process would also be considered "important" in the CEQA process.

8.5.2 *Potential Effects of This Decision on Cultural Resources*
The main channels of the four diverted streams have been receiving almost all available flow since 1989, so any additional effects of the flows required under this decision on the main channels should be limited. Due to extensive cultural resources in the riparian corridors of the Mono Basin streams, it is very likely that reopening of historic stream channels and other stream restoration work would have impacts to cultural resources. In addition to the actual restoration work, related activities such as vehicular access, the quarrying of gravels and boulders used as restoration materials, and the disposal of spoils could all have potential adverse impacts on cultural resources. The increased recreational use along the riparian corridors of Lee Vining, Walker, Parker, and Rush Creeks, which would be expected to occur with the restoration of continuous flow and the fisheries, is a secondary source of potential adverse impacts. Impacts could be either inadvertent (e.g., increased vehicular use) or deliberate (e.g., vandalism and unauthorized collection).

The photo documentation of the restoration work done in 1991 and 1992 shows major streambed and bank modifications, including excavations of silted pools, backwater areas and overflow channels. (NAS&MLC 126 and 174.) Much of this work appears to have been done with a large treaded backhoe that would produce extensive subsurface disturbance. If any similar work is done in the future, it should be conducted in accordance with the procedures established in this decision.

8.5.3 *Mitigation for Potential Adverse Impacts to Cultural Resources*

The nature and extent of potential impacts to cultural resources in the Mono Basin due to amendment of Los Angeles' water right licenses will depend upon the type of work proposed under the restoration plans to be developed under the terms of this decision. As the party responsible for preparation of the restoration plans, and implementation of those plans once they have been approved by the SWRCB, LADWP also will be responsible for evaluating potential effects on cultural resources in accordance with CEQA and other applicable legal requirements.

In preparing the restoration plans required under this decision, LADWP should consider the mitigation measures for potentially significant impacts to cultural resources identified in the Draft EIR. (SWRCB 7, p. 3K-16.) The mitigation measures include a literature search, completion of a cultural resources reconnaissance, recording and evaluation of all cultural resources in accordance with the CEQA guidelines, and contacts with Native Americans and people familiar with local history. The information developed during the field reconnaissance work should be compiled in a written report which can be used to identify sensitive cultural resource areas and to develop restoration plans accordingly.

Based on the results of the survey, the significance evaluation of the identified cultural resources and Native American consultation, a Cultural Resources Treatment Plan (CRTP) should then be developed. CEQA Guidelines (Appendix K) provide that the preferred manner of treatment is the in situ preservation of cultural resources. This can be accomplished through project redesign (i.e., avoidance), through active intervention such as capping with soil or rip-rapping with stones, or through limiting access. The CRTP should identify and elaborate on other treatment options as noted in the Draft EIR in the event that preservation is not feasible. (SWRCB 7, p. 3K-16.)

The CRTP should include provisions for the protection of any resources of importance to the Mono Basin Native American community and, if requested, provide for access to resources and areas for traditional uses. The CRTP must also include provisions for unanticipated discoveries, such as human remains and other archeological materials that could be discovered during project required activities initiated after the initial cultural resource reconnaissance. The CRTP must delineate the requirements for archeological excavations and require the preparation of research designs to guide any required excavations or other types of data recovery mitigation.

The CRTP must also include a monitoring program to ensure the effectiveness of the treatment plans that are implemented. This monitoring program should provide for observation, at periodic intervals, of the effectiveness of preservation/protection measures and for guaging the status of impacts such as increased recreational use of the Mono Basin area.

If federal lands (e.g., Inyo National Forest) are included in the projected impact zone, any cultural resource investigations conducted there would have to satisfy federal laws and regulations in addition to state statutes.

8.5.4 *Conclusions Regarding Effects on Cultural Resources*
The limited cultural resources work which has been conducted indicates that there has been a high level of prehistoric and ethnographic use of riparian corridors along streams in the Mono Basin. The legal requirement to amend the LADWP licenses to require sufficient releases to restore and maintain the pre-1941 fishery makes infeasible any alternatives which do not risk possible impacts to cultural resources from increased recreational activity due to restored streamflows. Projects developed as part of the restoration plans called for in this decision have the potential to adversely impact cultural

resources. The specific types of impacts, alternatives and mitigation measures associated with restoration projects cannot be identified at this time. As part of the restoration planning process, LADWP should be required to take appropriate actions to protect cultural resources in accordance with the provisions of the order at the end of this decision. The SWRCB's determination of what specific restoration measures will be required will depend in part upon the effects of the proposed activities on cultural resources.

8.6 Indirect Environmental Impacts of Reduced Mono Basin Water Diversions

The record establishes that there will be sufficient replacement water available to Los Angeles from other sources to offset the reductions in water diversions from the Mono Basin. (See Section 7.1.3.) The reduction in Mono Basin water diversions will be offset by some combination of increased use of local groundwater due to a credit for water LADWP imports into the San Fernando Valley, expanded water conservation measures, increased water reclamation projects in Los Angeles, increased purchases from Metropolitan Water District of Southern California and, possibly, increased water provided from other sources such as water transfers.

Obtaining additional water from some of the alternative sources of supply may have indirect adverse environmental impacts. The nature and extent of those impacts will depend in large part upon which sources of replacement water LADWP chooses to pursue. Under present circumstances, it is too speculative for the SWRCB to evaluate indirect impacts of LADWP obtaining replacement water from other sources.

8.7 Other Environmental Impacts of Amendment of LADWP Water Right Licenses

The EIR identified stream channel erosion due to high flows in the four diverted streams as a potentially significant impact of selecting the 6,390 feet alternative (which is similar to the requirements established in this decision). Limitations on high flows which were proposed as mitigation measures can be considered as part of the stream restoration plan. In the absence of additional operational information, it is not feasible for the SWRCB to specify precisely how high flows should be handled at this time. The establishment of water diversion criteria which will result in increasing the water level at Mono Lake in order to protect public trust resources is an overriding consideration justifying adoption of this decision despite potential stream erosion impacts of high flows.

The potentially harmful effect of high flows on the fisheries in Rush Creek and Lee Vining Creek will be partially mitigated by the ramping rates and channel maintenance flows established in this decision. It is not feasible to implement other potential mitigation measures identified in the EIR pending availability of additional information which will be developed as part of the stream restoration plans. The need to establish water diversion criteria which will increase the water level at Mono Lake is an overriding consideration justifying adoption of this decision despite potential adverse impacts of high flows on fish in the four diverted streams.

The increased instream flows and the restrictions on Mono Basin water exports under this decision could adversely impact recreation at Crowley Lake and Grant Lake. The EIR suggests construction of a substitute waterskiing course at Lake Crowley as a mitigation measure. The EIR does not identify available funding for a substitute waterskiing course, nor does the record contain sufficient evidence regarding construction of a substitute waterskiing course. Whatever benefits may be associated with a waterskiing course, it is infeasible for the SWRCB to require LADWP to construct a waterskiing course as a condition of its water right licenses, and the SWRCB itself has no funding for such projects. Recreation at Grant Lake could be protected by maintaining a water elevation at or above 7,111 feet during the recreation season. This decision requires LADWP to prepare a Grant Lake operations and management plan which will consider recreational and other aspects of Grant Lake operations.

Pending completion of that plan, it is not feasible for the SWRCB to establish operations criteria for Grant Lake. The need to establish the fishery protection flows and water diversion criteria to protect other public trust resources are overriding considerations which justify adoption of this decision despite potential adverse impacts on recreation at Crowley Lake and Grant Lake.

9.0 SUMMARY AND CONCLUSIONS

The City of Los Angeles' water diversions from the Mono Basin were authorized over fifty years ago when protection of environmental and public trust resources was viewed very differently than today. Los Angeles' export of water from the Mono Basin has provided a large amount of high quality water for municipal uses, but it has also caused extensive environmental damage. In 1983, the California Supreme Court ruled that the State Water Resources Control Board has the authority to reexamine past water allocation decisions and the responsibility to protect public trust resources where feasible.[23] Later decisions by the California Court of Appeal emphasized the legal priority attached to providing instream flows for fishery protection.

Based on examination of the public trust resources of the Mono Basin, consideration of the flows needed for protection of fish, and consideration of the impacts of this decision on the water available for municipal use and power production, the SWRCB concludes that the water right licenses of the City of Los Angeles should be amended in several respects as discussed in detail in previous sections of this decision. The necessary license amendments include establishment of minimum instream flows for protection of fish in the streams from which LADWP diverts water, as well as periodic higher flows for channel

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[23] *The order which follows amends LADWP's water right licenses to include the SWRCB's standard permit and license term regarding continuing authority.*

maintenance and flushing purposes similar to what occurred under natural conditions.

This decision also amends Los Angeles' water right licenses to include specified water diversion criteria which are intended to gradually restore the average water elevation of Mono Lake to approximately 6,392 feet above mean sea level in order to protect public trust resources at Mono Lake. Among other things, the increased water level will protect nesting habitat for California gulls and other migratory birds, maintain the long-term productivity of Mono Lake brine shrimp and brine fly populations, maintain public accessibility to the most widely visited tufa sites in the Mono Lake Tufa State Reserve, enhance the scenic aspects of the Mono Basin, lead to compliance with water quality standards, and reduce blowing dust in order to comply with federal air quality standards.

The water diversion criteria will significantly reduce the quantity of water which Los Angeles can divert from the Mono Basin as compared to pre-1989 conditions. Since 1989, however, a preliminary injunction has prevented Los Angeles from diverting water from the Mono Basin any time that the water level of Mono Lake is below 6,377 feet. This decision continues the prohibition on diversion at lake levels below 6,377 feet, and specifies criteria under which Los Angeles can divert water as the lake level rises. The rate at which the water level of Mono Lake rises will depend in large part upon future hydrology. Although the license amendments restrict diversions from the Mono Basin, the evidence shows that there are other sources of water reasonably available to Los Angeles and that the amendments to Los Angeles' licenses are feasible.

Finally, this decision requires specified actions aimed at expediting the recovery of resources which were degraded due to many years of little or no flow in the four diverted streams. The decision requires Los Angeles to consult with the Department of Fish and Game and other designated parties, and to develop plans for stream and waterfowl habitat restoration. The specific restoration work that will be required will be determined following the State Water Resources Control Board's review of the restoration plans.

In summary, we believe that this decision and the process by which it has been reached satisfy the California Supreme Court's objective of taking "a new and objective look at the water resources of the Mono Basin." (National Audubon Society v. Superior Court, 33 Cal.3d at 452, 189 Cal.Rptr. at 369.) The requirements set forth in the order which follows are in accord with the Court's mandate to protect public trust resources where feasible and the mandate of the California Constitution to maximize the reasonable and beneficial use of California's limited water resources.

ORDER

IT IS HEREBY ORDERED that Water Right Licenses 10191 and 10192 are amended to include the following conditions:

1. For protection of fish in the specified streams, Licensee shall bypass flows below Licensee's points of diversion equal to the flows specified below or the streamflow at the point of diversion, whichever is less. However, if necessary to meet the dry year flow requirements on Rush Creek, Licensee shall release water from storage at Grant Lake Reservoir under the conditions specified below. The flows provided under this requirement shall remain in the stream channel and shall not be diverted for any other use.

    a. Lee Vining Creek

Dry Year Flow Requirements	
April 1 through September 30	37 cfs
October 1 through March 31	25 cfs

Normal Year Flow Requirements

April 1 through September 30	54 cfs
October 1 through March 31	40 cfs

Wet Year Flow Requirements

April 1 through September 30	54 cfs
October 1 through March 31	40 cfs

b. Walker Creek

Flow Requirements for All Types of Water Years

April 1 through September 30	6.0 cfs
October 1 through March 31	4.5 cfs

c. Parker Creek

Flow Requirements for All Types of Water Years

April 1 through September 30	9.0 cfs
October 1 through March 31	6.0 cfs

d. Rush Creek

Dry Year Flow Requirements

April 1 through September 30	31 cfs
October 1 through March 31	36 cfs

Normal Year Flow Requirements

April 1 through September 30	47 cfs
October 1 through March 31	44 cfs

Wet year Flow Requirements

April 1 through September 30	68 cfs
October 1 through March 31	52 cfs

The dry year flow requirements in Rush Creek shall be maintained, if necessary, by release of stored water from Grant Lake until Grant Lake reaches a volume of 11,500 acre-feet. If Grant Lake storage falls below 11,500 acre-feet, the instream flow requirement shall be the lesser of the inflow to Grant Lake from Rush Creek or the specified dry year flow requirement.

For normal and wet hydrologic years, the instream flow requirements shall be the requirements specified above or the inflow to Grant Lake from Rush Creek, whichever is less. If during normal and wet hydrologic years the inflow to Grant Lake from Rush Creek is less than the dry year flow requirements, then Licensee shall release stored water to maintain the dry year flow requirements until Grant Lake storage falls to 11,500 acre-feet or less.

2. Licensee shall provide channel maintenance and flushing flows for each stream from which water is diverted in accordance with the flows specified below. In the event that the flows at the Licensee's points of diversion on Lee Vining Creek, Walker Creek and Parker Creek are insufficient to provide the channel maintenance and flushing flow requirements, Licensee shall bypass the highest flows which are expected to be present at its points of diversion for the length of time specified in the tables below, and shall notify as soon as reasonably possible the Chief of the Division of Water Rights of the reason that the normally applicable channel maintenance and flushing flow requirements could not be met. In addition, at times when Licensee is responsible for the change in flow in any of the streams from which water is diverted, Licensee shall adjust the rate of change of flow so as not to exceed the "ramping rate" specified below for each stream. Licensee is not required to compensate for fluctuations in the flow reaching Licensee's point of diversion. The specified ramping rates shall be determined based on the percentage of change in flow from the average flow over the preceding 24 hours.

a. Lee Vining Creek

CHANNEL MAINTENANCE & FLUSHING FLOW REQUIREMENTS LEE VINING CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	160 CFS FOR A MINIMUM OF 3 CONSECUTIVE DAYS DURING MAY, JUNE OR JULY
WET YEAR	160 CFS FOR 30 CONSECUTIVE DAYS DURING MAY, JUNE OR JULY
RAMPING RATE - NOT TO EXCEED 20% CHANGE DURING ASCENDING FLOW AND 15% DURING DESCENDING FLOWS PER 24 HOURS	

b. Walker Creek

CHANNEL MAINTENANCE AND FLUSHING FLOWS FOR LOWER WALKER CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	15 TO 30 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
WET YEAR	15 TO 30 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
RAMPING RATE - NOT TO EXCEED 10% CHANGE IN STREAMFLOW PER 24 HOURS	

c. Parker Creek

CHANNEL MAINTENANCE & FLUSHING FLOWS FOR LOWER PARKER CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	25 TO 40 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
WET YEAR	25 TO 40 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
RAMPING RATE - NOT TO EXCEED A 10% CHANGE IN STREAMFLOW PER 24 HOURS	

d. Rush Creek

CHANNEL MAINTENANCE & FLUSHING FLOW REQUIREMENTS RUSH CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
DRY-NORMAL YEAR	NO REQUIREMENT
NORMAL YEAR	200 CFS FOR 5 DAYS
WET-NORMAL YEAR	300 CFS FOR 2 CONSECUTIVE DAYS RAMP DOWN TO 200 CFS, MAINTAIN 200 CFS FOR 10 DAYS
WET YEAR	300 CFS FOR 2 CONSECUTIVE DAYS RAMP DOWN TO 200 CFS, MAINTAIN 200 CFS FOR 10 DAYS
RAMPING RATE - NOT TO EXCEED A 10% CHANGE IN STREAMFLOW PER 24 HOURS	

Runoff year definition:		
Dry	80-100%	exceedence (68.5% of average runoff)
Dry-Normal	60-80%	exceedence (between 68.5% and 82.5% of average runoff)
Normal	40-60%	exceedence (between 82-5% and 107% of average runoff)
Wet-Normal	20-40%	exceedence (between 107% and 136.5% of average runoff)
Wet	0-20%	exceedence (greater than 136.5% of average runoff)

The ramping requirement applies to changes in flow made by LADWP. LADWP is not required to compensate for natural fluctuations in flow.

3. For purposes of determining: (1) applicable instream flows for protection of fish on Lee Vining Creek and Rush Creek; and (2) channel maintenance and flushing flow requirements on Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek, the hydrologic year type classification shall be determined using projected unimpaired runoff for the runoff year April 1 through March 31 as estimated using the LADWP Runoff Forecast Model for the Mono Basin. The unimpaired runoff is the sum of forecasts for the Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek sub-basins.

Preliminary determinations of the runoff classification shall be made by Licensee in February, March, and April with the final determination made on or about May 1. The preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming median precipitation for the remainder of the runoff year. Instream flow requirements prior to the final determination in May shall be based on the most recent runoff projection. Following issuance of final determination in May, that hydrologic year classification shall remain in effect until the preliminary runoff determination made in April of the next year. The hydrologic year type classification shall be as follows:

Wet Hydrologic Conditions:	Projected runoff greater than 136.5% of average
Normal Hydrologic Conditions:	Projected runoff between 68.5% and 136.5% of average (inclusive)
Dry Hydrologic Conditions:	Runoff less than 68.5% of average

4. For purposes of determining the channel maintenance and flushing flow requirements on Rush Creek, the hydrologic year-type determination shall be in accordance with the criteria specified in part "d" of the preceding condition. Licensee shall maintain continuous instantaneous measuring devices at each point of diversion which are satisfactory to the Chief of the Division of Water Rights and which measure the streamflow above the diversion facility and the flow immediately below the diversion facility. Licensee shall maintain detailed records from which the flow above and below the diversion facility, and the quantity of water diverted can be readily determined. Licensee shall report to the Chief of the Division of Water Rights within 72 hours any event when the flows required by this order are not met. As soon as reasonably possible, Licensee shall provide an explanation of why the required flows were not met.

5. Livestock grazing on Licensee's property within the riparian corridors of Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek, downstream of points of diversion authorized under this license, is prohibited for a minimum of ten years.

Grazing after that time shall be subject to approval of the SWRCB or its Executive Director of a plan prepared by Licensee following consultation with the Department of Fish and Game and U.S. Forest Service.

6. In addition to the instream flow requirements for fishery protection, channel maintenance and flushing purposes, diversion of water under this license is subject to the limitations specified below. For purposes of determining the applicable water diversion criteria, the water level of Mono Lake shall be measured on April 1 of each year and the limitation on water diversions shall apply for the one year period of April 1 through March 31 of the succeeding year, except as otherwise specified below. The water level shall be measured at the LADWP gage near Lee Vining Creek or such other gage as is approved by the Chief of the Division of Water Rights.

   a. <u>Water diversion criteria applicable until the water level of Mono Lake reaches 6,391 feet</u>:

      (1) Licensee shall not export any water from the Mono Basin any time that the water level in Mono Lake is below 6,377 feet above mean sea level, or any time that the water level of Mono Lake is projected to fall below 6,377 feet at any time during the runoff year of April 1 through March 31.

      (2) If the water level of Mono Lake is expected to remain at or above 6,377 feet throughout the runoff year of April 1 through March 31 of the succeeding year based on Licensee's final May 1 runoff projections and any subsequent runoff projections, then Licensee may divert up to 4,500 acre-feet of water per year under the terms of this license.

      (3) If the water level of Mono Lake is at or above 6,380 feet and below 6,391 feet, then Licensee may divert

up to 16,000 acre-feet of water per year under the terms of this license.

(4) In the event that the water level of Mono Lake has not reached an elevation of 6,391 feet by September 28, 2014, the SWRCB will hold a hearing to consider the condition of the lake and the surrounding area, and will determine if any further revisions to this license are appropriate.

b. <u>Water diversion criteria applicable after the water level of Mono Lake reaches 6,391 feet</u>:

(1) Once the water level of Mono Lake has reached an elevation of 6,391 feet, no diversions shall be allowed any time that the water level falls below 6,388 feet.

(2) Once a water level of 6,391 feet has been reached and the lake level has fallen below 6,391, diversions by Licensee shall be limited to 10,000 acre-feet per year provided that the water level is at or above 6,388 feet and less than 6,391 feet.

(3) When the water level of Mono Lake is at or above 6,391 feet on April 1, Licensee may divert all available water in excess of the amount needed to maintain the required fishery protection flows and the channel maintenance and flushing flows, up to the amounts otherwise authorized under this license.

7. Licensee's combined rate of diversion through the Mono Craters Tunnel under all bases of right shall be regulated so that the sum of discharge from East Portal and the natural flow in the Owens River at East Portal do not exceed 250 cfs as measured directly downstream of the East Portal discharge. Licensee shall make releases to the upper Owens River at a relatively stable rate consistent with operational

limitations and water availability. This standard shall be incorporated into the Grant Lake operations and management plan to be submitted as part of Licensee's stream restoration plan.

8. Licensee shall prepare and submit to the SWRCB for approval a stream and stream channel restoration plan and a waterfowl habitat restoration plan, the objectives of which shall be to restore, preserve, and protect the streams and fisheries in Rush Creek, Lee Vining Creek, Walker Creek, and Parker Creek, and to help mitigate for the loss of waterfowl habitat due to the diversion of water under this license. The plans shall include consideration of measures to promote the restoration of the affected streams and lake-fringing waterfowl habitat which are functionally linked to the streamflows and lake levels specified in this order. The restoration plans shall include elements for improving instream habitat for maintaining fish in good condition. These plans are subject to technical and financial feasibility, reasonableness, and adequacy of the measures proposed to achieve the stated objectives. The restoration plans shall identify the specific projects to be undertaken, the implementation schedule, the estimated costs, the method of financing, and estimated water requirements. The plans shall be prepared in accordance with the requirements specified below:

   a. The stream restoration plan shall make recommendations on stream and stream channel restoration including, but not limited to, the following elements:

      (1) Instream habitat restoration measures for Rush Creek;

      (2) Rewatering of additional channels of Rush Creek and Lee Vining Creek;

      (3) Riparian vegetation restoration for Rush Creek and Lee Vining Creek;

(4) A sediment bypass facility at Licensee's diversion structure on Lee Vining Creek;

(5) Flood flow contingency measures;

(6) Limitations on streamcourse vehicular access;

(7) Construction of a fish and sediment bypass system around Licensee's diversion facilities on Walker Creek and Parker Creek;

(8) Spawning gravel replacement programs downstream of Licensee's points of diversion on Rush Creek, Lee Vining Creek, Walker Creek and Parker Creek;

(9) Livestock grazing exclusions in the riparian areas below Licensee's point of diversion on all diverted streams after the period specified in Term 5 of this order;

(10) Feasibility evaluation of installing and maintaining fish screens at all points of diversion from the streams, including irrigation diversions on LADWP property.

(11) Grant Lake operations and management plan.

b. The stream restoration and protection requirements established in this order do not replace any requirements established by the Superior Court for El Dorado County in the context of granting interim relief in the consolidated <u>Mono Lake Water Rights Cases</u> (El Dorado County, Superior Court Coordinated Proceeding Nos. 2284 and 2288). Licensee shall continue to completion any and all work required pursuant to court order, including implementation of any restoration plans approved by the court, unless and until the court order is dissolved and the Licensee obtains approval of the SWRCB. In evaluating additional stream restoration work to be included in the restoration plan required under the terms of this order, Licensee shall consider the restoration work undertaken pursuant to the direction of the Superior Court. In addition, the Licensee shall consider information which has been developed by the Restoration Technical Committee and its consultants pursuant to direction from the Superior Court, including but not limited to planning documents finalized and approved by January 1, 1995.

c. The waterfowl habitat restoration plan shall make recommendations on waterfowl habitat restoration measures and shall describe how any restored waterfowl areas will be managed on an ongoing basis. The plans shall focus on restoration measures in lake-fringing wetland areas.

d. The stream restoration plan and the waterfowl habitat restoration plan shall be subject to the following requirements:

(1) The restoration plans shall be consistent with the management regulations and statutes governing the Mono Basin National Forest Scenic Area and the Mono Lake State Tufa Reserve.

(2) The restoration plans shall identify the specific projects to be undertaken, the implementation schedule, the estimated costs, the method of financing, and estimated water requirements.

(3) The restoration plans shall include an inventory of existing conditions including a status report on all restoration work undertaken pursuant to direction of the El Dorado County Superior Court.

(4) The restoration plans shall include a method for monitoring the results and progress of proposed

restoration projects. The monitoring proposal shall identify how results of restoration activities will be distinguished from naturally occurring changes and shall propose criteria for determining when monitoring may be terminated.

(5) Licensee shall be responsible for compliance with all applicable state and federal statutes governing environmental review of projects proposed in the restoration plans. In developing the restoration plans, Licensee shall emphasize measures that have minimal potential for adverse environmental effects. The time schedule specified in the restoration plans shall include procedures for compliance with the California Environmental Quality Act (Public Resources Code Section 21000, et seq.) and for obtaining all necessary permits or governmental agency approvals.

e. Licensee shall prepare or contract for the development of the plans identified in this order. SWRCB staff will provide guidance in that development. In developing the required restoration plans, Licensee shall seek active input from the following parties: California Department of Fish and Game, California State Lands Commission, California Department of Parks and Recreation, the United States Forest Service, the National Audubon Society, the Mono Lake Committee, and California Trout, Inc. It is not the intent of the SWRCB that LADWP shall have any obligation to reimburse other parties for costs they may incure in the restoration planning process, except as otherwise required by law.

f. The restoration plans shall be developed in accordance with the following schedule:

(1) Based on review of information received from the agencies and parties designated in paragraph 8e of

this order, Licensee shall prepare a draft scope of work for the restoration plans which addresses each of the plan elements specified above. The draft scope of work shall identify a time schedule within which to prepare and implement the various elements of the restoration plans. The draft scope of work shall be submitted to the Chief of the Division of Water Rights by February 1, 1995.

(2) By August 1, 1995, Licensee shall complete draft restoration plans which Licensee shall then make available to the parties designated in paragraph 8e for a 60-day review and comment period.

(3) Following any revisions to the draft plans made in response to comments from the designated agencies and parties, Licensee shall prepare final proposed restoration plans to be submitted to the SWRCB for approval by November 30, 1995. The final proposed restoration plans shall also be made available to the parties designated in paragraph 8e above who may submit comments on the proposed plans to the SWRCB by December 31, 1995.

(4) The SWRCB will review the final proposed restoration plans based primarily on the following factors:

(a) adequacy of the measures proposed to achieve restoration of the fisheries, streams, stream channels, waterfowl habitat and other public trust resources;

(b) technical and financial feasibility; and

(c) reasonableness.

(5) Following review of the final proposed restoration plans, the SWRCB will determine if the plans are

acceptable and will notify the Licensee of its determination. If the SWRCB determines that a plan, plans, or portions thereof, are not acceptable, then Licensee shall submit a revised plan or plans in accordance with direction from the SWRCB.

(6) If an environmental impact report is required for any measures proposed in the restoration plans or if revisions to the plans are necessary in order to qualify for a mitigated negative declaration, then the restoration plan or plans involved should be resubmitted for SWRCB approval following completion of the environmental impact report or negative declaration.

(7) Following the SWRCB's review of any appropriate environmental documentation and approval of the restoration plans, or portions thereof, Licensee shall implement the specified restoration measures in accordance with the time schedule set by the SWRCB. Licensee shall submit semi-annual progress reports to the Chief of the Division of Water Rights on the work undertaken pursuant to the plans. The progress reports shall include monitoring information on the status and effectiveness of previously undertaken restoration measures, and identification of appropriate revisions in any cases where restoration has not been effective.

(8) The SWRCB shall have continuing authority to require modification of restoration activities as appropriate and to modify streamflow requirements as necessary to implement restoration activities. Modification of streamflow requirements may reduce the amount of water available for export.

9. Licensee shall complete a cultural resources investigation of all areas to be impacted by the rewatering of the Mono

tributaries, including all areas subject to restoration and/or increased recreational use. The investigation shall consist of a literature and records search, a survey, the formal recordation of all cultural resources identified, the preparation of a written report documenting all research and findings, and the identification of appropriate mitigation measures in accordance with Appendix K of the CEQA Guidelines. This investigation shall also include appropriate consultation with the Mono Basin Native American community to address their concerns. Appropriate mitigation measures shall be proposed in the cultural resources report to address any identified impacts to contemporary traditional use of the Mono Basin area by Native Americans. The report shall be submitted by August 1, 1995 to the Chief of the Division of Water Rights for review and approval.

10. Licensee shall complete a Cultural Resources Treatment Plan (CRTP) based on the findings and recommendations in the written report on the cultural resources investigations, the consultation with the Native American community, and the comments received from the review of the cultural resources document by the SWRCB. The CRTP shall include provisions for the appropriate treatment of all identified cultural resources. The CRTP shall provide for access to resources and locations deemed important to their traditional lifeways by the Native American community. The CRTP shall include provisions for unanticipated discoveries that could be encountered during project activities authorized subsequent to the completion of the cultural resources document. The CRTP shall delineate the guidelines for archeological excavations and require the preparation of research designs prior to the initiation of any data recovery programs. The CRTP shall also provide for a monitoring program to ensure the effectiveness of treatment measures and to gauge the impacts of the increased recreational use of the Mono Lake tributaries. The CRTP shall outline mitigation options to be implemented if the monitoring indicates that impacts are occurring as a result of project-related activities. The

CRTP shall be submitted to the Chief of the Division of Water Rights for review and approval in conjunction with the draft stream restoration and waterfowl restoration plans and no later than November 30, 1995.

11. Upon request, Licensee shall make copies of any and all documents (research designs, interim reports, draft reports, final reports, flow data, etc.) relating to provisions of this order available to the Chief of the Division of Water Rights or his designee.

12. Pursuant to California Water Code Sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this license, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the SWRCB may be exercised by imposing specific requirements over and above those contained in this license with a view to eliminating waste of water and to meeting the reasonable water requirements of licensee without unreasonable draft on the source. Licensee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this license and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the SWRCB also may be exercised by imposing further limitations on the diversion and use of water by the Licensee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest; and is necessary to preserve or restore the uses protected by the public trust.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full and correct copy of a decision duly and regularly adopted at a meeting of the State Water Resources Control Board held on September 28, 1994.

AYE: John Caffrey
James M. Stubchaer
Marc Del Piero
Mary Jane Forster
John W. Brown

NO: None.

ABSENT: None.

ABSTAIN: None.

Maureen Marché

Maureen Marché
Administrative Assistant to the Board