DRAFT - NOT TO BE REFERENCE

Department of Fish and Game
Stream Evaluation Report
Number 95-1
Volume 1

— DRAFT —

Instream Flow and Habitat Restoration Investigations for Mill Creek, Mono County, California

June 1995

Douglas P. Wheeler
Secretary of Resources
The Resources Agency

Pete Wilson
Governor
State of California

Boyd Gibbons
Director
Department of
Fish and Game

Table 3.9-2. Water quality data for Mill Creek just downstream of the Highway 395 crossing, Mono County, California. (All values are ppm except pH [pH units] and conductivity [μmhos/cm]).

Parameter	Historic[1] average	1991 4/5	5/30	7/26	8/31	9/24	10/21	Ave
Hardness	27	26	69	57	31	31	47	42
Kjeldahl-N[2]	NA[3]	0.23	0.17	0.15	0.20	0.24	0.06	0.18
Phosphorus[4]	NA	NM[5]	<0.02	0.11	0.02	<0.02	0.04	<0.04
pH	7.2	7.2	7.4	7.2	7.4	7.4	7.3	7.3
Sulfate	8.2	21.0	9.1	8.2	11.2	13.2	11.4	12.4
Chloride	2.3	<1.0	0.32	0.26	0.36	<0.5	<0.5	<0.49
Nitrate-N	NA	NM	0.02	0.014	<0.010	0.010	<0.010	<0.013
Zinc	NA	<0.01	NM	0.01	NM	<0.01	NM	<0.01
Other metals[6]	NA	ND[7]	NM	ND	NM	ND	NM	-
TDS[8]	58	110	64	58	58	68	58	69
Alkalinity	26	NM	NM	NM	NM	NM	NM	NM
Conductivity	64	70	NC	40	60	60	50	56
Suspended solids	NA	14	<7	<10	<10	<10	<10	<10
Calcium	9.0	NM	NM	NA	NM	NM	NM	NM
Magnesium	1.1	NM	NM	NM	NM	NM	NM	NM
Sodium	2.2	NM	NM	NM	NM	NM	NM	NM
Potassium	0.9	NM	NM	NM	NM	NM	NM	NM
Silica	13	NM	NM	NM	NM	NM	NM	NM
Iron	0.08	NM	NM	NM	NM	NM	NM	NM
Boron	0.01	NM	NM	NM	NM	NM	NM	NM

1. Source: City of Los Angeles Department of Water and Power data sheets for 1967 and 1984.
2. N = nitrogen.
3. NA = not available.
4. Total reactive phosphorus.
5. NM = not measured.
6. Arsenic, cadmium, chromium, copper, lead, mercury, selenium, and silver.
7. ND = not detected.
8. TDS = Total dissolved solids.

From: Judith Unsicker
To: Rofer-Wise, Cindy
Date: 8/22/01 1:28PM
Subject: Mono Basin questions

I've been going through the old Basin Plan files to see if there's any info relevant for the 303(d) list update. I plan to delist waters that were listed for flow problems (EPA doesn't want them listed). I have two questions related to Mill Creek:

1. The "Basin Plan, Mono Lake" file includes a June 1995 Dept. of Fish and Game report, "Instream Flow and Habitat Restoration Investigations for Mill Creek, Mono County, California"- all pages have headers stating "DRAFT-NOT TO BE REFERENCE". Was this report ever finalized so that it can be cited? I would probably just say something to the effect that DFG did a habitat/instream flow needs study and identified flow-related problems as the most significant.

2. Has the Mill Creek/Wilson Creek restoration situation been finally settled? Does the State Board's 1998 water rights decision address this (the internet link to the decision isn't working for some reason)?

Thanks!

From: Cindy Rofer-Wise
To: Unsicker, Judith
Date: 8/22/01 4:06PM
Subject: Re: Fwd: Mono Basin questions

Judy,

Here is information from Jim Canaday at SWRCB.

From: Jim Canaday
To: Cindy Rofer-Wise
Date: 8/22/01 3:51PM
Subject: Re: Fwd: Mono Basin questions

Cindy:

You sure have had some great weather up there! I have been at the cabin and it sure has been nice...could use some moisture though. I hope all is going well with you.

The Mill Creek DFG report is final but the Wilson Creek report is still in draft and it may never be finaled. Copies of the reports are a rare item.

The Board's decision on restoration requirements did not address Mill and Wilson Creek. The water rights are based on a federal court decree and were not an issue during the Mono Lake Decision (D-1631).

he Mill Creek-Wilson Creek issue is complex not only because of the existing adjudication but because of differences of opinion of local folks on how those streams should be managed. There are differences of opinion at the various levels of government-local, state and federal as well. There are processes I believe could be used to resolve the issues but it would take significant dollars for environmental evaluation and possible water right hearings...ect I am not sure that anyone (interested parties) wants to engage in the effort necessary to resolve the issues and incur the associated costs at the present time. Let me know if you hear of any rumblings.

I hope that this is helpful.

Jim

Jim Canaday
FERC Relicensing Team

"The energy challenge facing California is real.
Every Californian needs to take immediate action
to reduce energy consumption. For a list of simple
ways you can reduce demand and cut your energy
costs, see our Web-site at http://www.swrcb.ca.gov.

>>> Cindy Rofer-Wise 08/22/01 02:21PM >>>
Hi Jim,

Hope you are well. Can you please help to answer the attached questions? I am pretty certain that the first answer is yes (yes, the draft study was made final) but am not sure about the second question. Any help you can provide would be great. Thanks much.

MONO LAKE
NEWSLETTER

Conway Ranch Option Presents Restoration Opportunity

A project proposed by Mono County and the Trust for Public Land (TPL), and advocated by the Mono Lake Committee, holds great promise for restoring historic wetland habitat at Mono Lake. If the project is successful, water would be returned to Mill Creek, restoring the natural hydrology of the creek's extensive bottomlands. Rewatering Mill Creek is listed in the Mono Lake restoration plans as the most important action next to raising the level of the lake itself for riparian and waterfowl habitat restoration at Mono Lake (see Newsletter, Spring 1996, 8-9).

TPL, a national land conservation organization, has acquired an option to purchase the Conway Ranch and its associated Mill Creek water rights and would like to convey them to Mono County for open space preservation, development of a fish-rearing facility, and the rewatering of Mill Creek. To this end, the county has submitted a grant for North American Wetlands Conservation Act funding, and DWP has agreed-subject to certain conditions-to provide up to $2 million in matching funds for the purchase of the Conway water rights.

Mill Creek, located in the northwest corner of the Mono Basin, is one of Mono Lake's major tributaries but was never diverted by Los Angeles. For over 100 years, however, Mill Creek water has been diverted for hydropower, as well as irrigation of the Conway Ranch. As a consequence, Mill Creek's delta and bottomlands were dewatered and the riparian habitat-rich, wooded wetlands-was lost. Because Mill Creek was frequently dry during the period when Mono Lake was falling due to DWP diversions, Mill's delta and bottomlands were less damaged by stream incision than were those on Rush Creek. As such, rewatering Mill Creek offers an excellent opportunity to compensate for irreparable damage to the Rush Creek bottomlands.

The beauty of the current situation at Mill Creek is that restoration could be accomplished by simply restoring the creek's natural hydrology.

Rewatering Mill Creek also presents some thorny issues that need to be addressed. These include:

- 1) potential loss of riparian and stream habitat along Wilson Creek
- 2) impacts on irrigated meadows on the Conway and Thompson ranches
- 3) the cost of upgrading the facilities which return Mill Creek water from the Lundy powerplant to Mill Creek.

While it remains to be seen whether the grant will come through and whether all issues can be resolved, the Committee is actively supporting the restoration of historic habitat at Mono Lake through this initiative.

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FEATURE ARTICLE, December 8, 1997

Mono Lake: Victory over Los Angeles turns into local controversy

by Jane Braxton Little

LEE VINING, Calif. - Mono Valley hovers at the western edge of the Great Basin on the Sierra Nevada range, a majestic place of stark horizons and haunting skies. In autumn, Lombardy poplars and cottonwoods blaze golden along the highway and seem to light the way to Mono Lake.

One of the oldest lakes in North America, Mono Lake has the lonely, disquieting presence of an old soul cast into a landscape sculpted by earthquake, erosion and volcano. The lake is off-round, without outlet and twice as salty as the sea. Its shoreline is studded with tufa towers, spires of porous rock covered with gargoyled knobs.

It is here, among the California gulls, brine shrimp and alkali flies, that grassroots environmentalists earned a stunning victory three years ago. An upstart band of students and scientists, who became the Mono Lake Committee in 1978, challenged the powerful Los Angeles Department of Water and Power. Since 1941, the city had been diverting four of the lake's five major streams all the way down to Los Angeles. That dropped the lake level 40 feet and unraveled its unique ecosystem.

It took 16 years of court battles and public hearings, but the Mono Lake Committee and its allies won. In 1994, the California State Water Resources Control Board ordered Los Angeles to halt all withdrawals of Mono Lake water until the lake climbed 17 vertical feet to an elevation of 6,392 feet (see story, p. 8). The bottom of the lake is irregular, and while the deepest point is about 150 feet, measurement is expressed in

elevation above sea level.

Today, as the water in Mono Lake rises over sun-cracked banks, the entire basin is alive with change. But the return of flowing water to Mono Basin has renewed conflicts put aside in the flush of triumph. Saving the lake drew old-timers and newcomers together against a common, urban enemy.

Now the reality of restoration is raising the most fundamental questions: What point in the past is the goal? Which values take precedence? And who gets to decide?

At the heart of the conflict is a plan to take irrigation water from a creek that feeds historic ranches and return it to a creek that feeds into the lake. The plan has pitted the Mono Lake Committee, bent on restoring the lake and its habitat, against many locals who feel their valley's character and history are at stake - and too high a price to pay to revive a natural stream system.

Residents who had come to appreciate the Mono Lake Committee and accept its members as valuable additions to the community have turned against it. Many say they feel excluded and duped by a group they once considered heroic.

Searching for solutions

Nowhere are the challenges of restoration felt more keenly than in the Mono Lake Committee's office in Lee Vining, a town of 419 residents which lies above the lake near the east entrance to Yosemite National Park. The committee operates an information center and bookstore out of a 1930s dance hall built for workers during construction of the aqueduct that sent Mono Lake water to Los Angeles. The business offices are behind the information center in a converted icehouse. A sign on a wooden plank over the door reads, "Water Rustlers."

Inside, Heidi Hopkins, the Mono Lake Committee's Eastern Sierra policy director, darts among the file cabinets and boxes of publications with bird-like intensity. In the 18 months since she moved to Lee Vining to work for the committee, Hopkins has immersed herself in the flora, fauna and politics of her new home.

"I have always been strongly attracted to the east side of the Sierra Nevada," she says. "History is still fresh here. We haven't covered everything with houses."

Lately, Hopkins has been immersed in regulatory documents, scientific studies and, most particularly, "screaming matches' over restoration. Her goal, which sometimes feels more like a dream, she says, is to find solutions based on facts and to end the divisive anger that has dominated recent discussions about the basin's water.

On the surface, the fight is about waterfowl habitat. More than a million ducks, geese and other water birds once found refuge on the fringes of Mono Lake in wetlands and wooded marshes. But as the city of Los Angeles drew water from the lake for five decades, much of that habitat disappeared.

When the State Water Resources Control Board issued its 1994 order regulating diversions from Mono Lake, it also required the Los Angeles Department of Water and Power to restore waterfowl habitat. The city took recommendations from three independent scientists and then developed its own restoration plan.

Next to raising the lake itself, the Los Angeles plan identifies the restoration of Mill Creek as the key to restoring the basin's lost habitat. The third largest stream in Mono Basin, Mill Creek flows through Lundy Canyon to empty into the northwest corner of Mono Lake. Its broad valley bottom once supported forests, wetlands and marshes, a rare combination of refuges in a region dominated by high-desert sage.

Although it was never tapped by Los Angeles, Mill Creek has been diverted to irrigate ranches and make hydroelectric power for over a century. This turned Mill Creek, a year-round stream meandering through towering cottonwoods and willows, into a seasonal sputter among trees dying or already dead from lack of water.

The city's restoration proposal would return historic flows to Mill Creek, re-establishing what some scientists consider the Great Basin's most threatened forest habitat. Willows would grow under a canopy of cottonwoods and Jeffrey pines, they say, while deer, bobcats, coyotes and water-loving birds would find their way back to the creek at Mono Lake's edge.

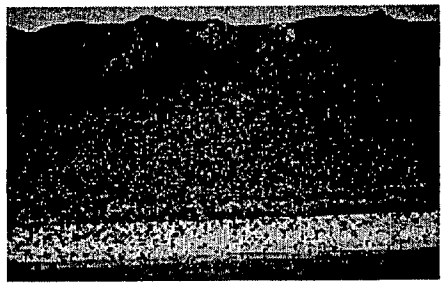
"Rewatering Mill Creek should be an exceptionally high environmental priority," says Scott Stine, a Berkeley scientist who has included Mono

Lake in his studies of physical and biological changes that have occurred over the last 2 million years. Called a purist by both his fans and his detractors, Stine says the creek's rich bottomland was once an oasis now nearly lost in the Great Basin.

Restoration has a price

There's a limit to what most Lee Vining residents are willing to sacrifice to return Mill Creek to its natural state.

Fifty years before Los Angeles began to plunder other Mono Lake streams, neighboring Wilson Creek carried over half of Mill Creek's water through ranches stretched out across open hillsides northwest of the lake.



The Conway, Thompson and Dechambeau ranches were home to some of the earliest European settlers in the Mono Basin. In the 1870s, homesteaders prospered by supplying miners in nearby Bodie with meat, dairy products and fresh vegetables. Since the 1940s, the ranches have supported sheep operations.

With their classic wooden buildings weathering under poplars at the edges of green pastures, the ranches are now part of the charm of the Mono Basin - all thanks to the network of channels diverting water out of Mill Creek. And when other ranchers sold out their water rights to Los Angeles, the Conway Ranch held firm. Mono Lake could have degraded even more through the years without water preserved by the Conway Ranch.

Then the Conway Ranch was threatened with development. The 1,031-acre ranch had been sold in the early "80s to developers who completed six homes of a proposed 106 on 40 acres. More development on the remaining 991 acres had already been approved and would have included commercial outlets, a swimming pool and a golf course, as well as more houses.

A variety of agencies - the Department of Fish and Game, the Forest Service and the Bureau of Land Management, as well as the county board of supervisors and the Mono Lake Committee - were eager to keep the area rural.

When the Conway Ranch went on the market in 1995, the Mono County Board of Supervisors decided to acquire it. Mono County is now negotiating, with the help of the Trust for Public Land, to buy the ranch from the current owner. In addition to protecting the open space and historic buildings, the supervisors hope to build a fish-rearing facility on

the ranch to restock local streams and provide jobs. They also intended to transfer the Conway Ranch water rights back to Mill Creek.

The Mono Lake Committee supports the purchase. "Mill Creek is an unusual cottonwood and willow environment. Wilson Creek is beautiful but it's not unusual," says Heidi Hopkins.

Opponents of the rewatering plan worry about its effect on all of the Mono Basin ranches. Changing the nature of the Conway Ranch - no longer a working ranch, but still a lush oasis appreciated by its neighbors - also seems ironic. During Los Angeles' quest for ever-more Mono Basin water, the Conways were the only ranchers to survive the city's conquest with their water rights intact.

Returning Conway Ranch water to Mill Creek would send the ranch itself back to an earlier condition. Sagebrush would creep into the historic ranch meadows now knee-deep in grass. Nearby freshwater ponds which have supported mallards and teals would dry up. Wilson Creek would revert to a seasonal stream, its year-round trout fishery lost.

To Bonnie Noles, whose family settled in the Mono Basin in the 1870s and later homesteaded 160 acres overlooking Mono Lake, restoring a natural creek at the expense of a century of local history is not only outrageous, it's unrealistic.

"The Mono Lake Committee wants to revert the basin to pre-European stage," Noles says. "We're here now. They'll have to load us up, too. Our ancestors came in, cleared out the sagebrush and created farmlands. We don't want to change history."

Rewatering Mill Creek means "putting on blinders and turning the clock back," adds Katie Maloney-Bellomo, an attorney who spent her childhood summers in the Mono Basin and who recently became a year-round resident.

"These are not just scientific issues. These are historical, cultural values - and aesthetic values," she adds. "They raise the question of how human beings fit into the scheme of things in the Mono Basin."

Distrust over seeming secrecy

Maloney-Bellomo, a former member of the Mono Lake Committee, first learned about the plan to rewater Mill Creek during a walking tour of the Conway Ranch organized by the Mono Lake Committee in 1996.

Although county supervisors and committee members say they had been discussing it for months, the water-rights transfer and its effects on Conway and other ranches came as a shock to Maloney-Bellomo and others in the community. That turned what might have been a simple disagreement into a battle.

Opponents of the proposal quickly formed a new group, the People for Mono Basin Preservation, to mount an all-out fight. Within a few weeks they had collected 400 signatures - most of the basin's population - opposing the restoration plan.

Heidi Hopkins insists the community overreacted. "We believe you could irrigate those ranches with much less water than has been done," she says. "The Mono Lake Committee cares deeply about what happens on the ranches. We would not condone drying (them) up."

Despite her reassurances, many opponents saw the plan as a scheme by "outsiders' trying to cut a deal behind closed doors. By the time most people learned about the Mill Creek plan it seemed to have a life of its own.

Hopkins admits the committee did little to publicize the open meetings. "It's difficult to keep the public involved in a lengthy and often tedious process," she says.

Mono County officials also blame themselves for not involving local people sooner in their plans to buy Conway Ranch and transfer its water rights. Their mistake stirred people's fears.

"For years we felt the Mono Lake Committee was overlooking our area in the best interests of the community," says Bonnie Noles. "We kicked back and let them do all of our thinking. Now the locals wonder how the Mono Lake Committee is any different from Los Angeles. They're taking water away from something we treasure."

"Wilson Creek has its own environment, too," Noles adds. "What's the point in ruining one place to change another one? It doesn't make sense."

Maloney-Bellomo has a more cynical view of the restoration plan: "This is a committee, sadly, that has outlived its cause. It has to change its mission from "Save Mono Lake" to restoration. And it needs controversy - a purpose - if it's going to get people to give it money," she says.

Grant money for restoration work, she points out, will provide the budget to support the committee's staff of up to 28 people in Lee Vining and Los Angeles.

The charge grieves Heidi Hopkins. "The Mono Lake Committee has been severely bashed over this issue. There is no money in it for us," she continues. "No one here is not grateful to the Mono Lake Committee for saving the lake - no one. Yet we have shoved in our face that we (the committee) are not a member of this community when we've been here for 20 years. It's a painful thing."

In addition to saving Mono Lake, the 18,000-member committee put the basin on the international map, drawing researchers, photographers and tourists to the area, argues Mono County Supervisor Andrea Lawrence. "There is nobody in that entire basin who was not helped economically by the Mono Lake decision."

Restoration is a natural stage of the process, Lawrence continues, and not a financial scam by outsiders. "Restoration is education, the next chapter in the environmental world."

A silver lining?

However painful it is, some think renewed controversy may be just what the region needs, a sort of rebirth of the driving energy that saved Mono Lake in the first place. Roger Porter, who manages the Mono Basin National Forest Scenic Area, says the restoration conflict is the sign of a new era which the Mono Lake Committee and the community are entering along with the basin itself. The committee must again prove its value to the ecosystem and to local residents, Porter believes.

He even sees the emergence of the People for Mono Basin Preservation as a positive sign: Community members are becoming more involved. Five years ago, few people in Lee Vining would have guessed they'd ever have the opportunity to rethink water use and habitat in the north basin. The struggle had always been to save the lake. Now, he says, locals have a rare and unexpected opportunity.

"This is a tremendous chance to improve management of all the resources of this basin - a golden opportunity to provide for change and make things better," he says. "We'll survive. We've faced hard times in the past."

As Mono County negotiates to buy the Conway Ranch, a community-based work group called the Conway Ranch Evaluation Workshop studies proposals for the land. The Trust for Public Land, which is guiding the groups, is currently preserving the ranch for public ownership with an option to purchase.

Meanwhile, overwhelming local opposition has forced the supervisors to oppose taking water from Wilson Creek to restore Mill Creek. Their 3-2 vote is a political statement without binding authority.

It is up to the State Water Board to decide whether the restoration plan involving Mill and Wilson creeks should be enacted. The board is expected to release a decision early in 1998. The water board will then conduct an environmental review with opportunity for public comments and appeals.

For now, Hopkins remains hopeful. "There are solutions out there if we can just put aside the enmity and look at the facts," she says. "We can't just have these screaming matches. What maintains me is my idealism about seeking a balance. There are always two sides and both sides are legitimate."

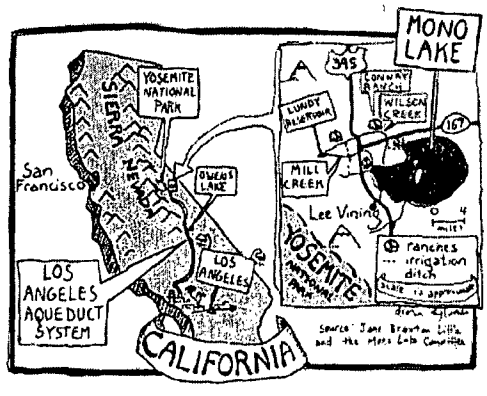
Jane Braxton Little is a freelance writer based in Plumas County, California.

You can ...

* Contact the Mono Lake Committee at 760/647-6595 or by e-mail at info@monolake.org.

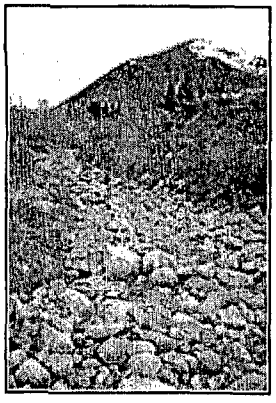
* Contact The People for Mono Basin Preservation, P.O. Box 404, Lee Vining, CA 93541.

* Contact Mono Basin National Forest Scenic Area at 760/647-3044.



Mono Basin Creeks: Rush, Parker, Walker, Lee Vining, Mill

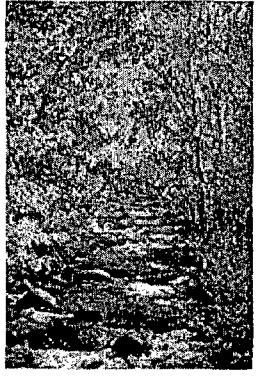
Click on footnotes -- [1] -- to see the notes at the bottom of the profiles. Click on words in *italics* to see the definition in the glossary.



Historic Conditions:

Beginning in 1941, four of the five major streams in the Mono Basin -- Rush, Lee Vining, Parker, and Walker Creeks -- were diverted by the Los Angeles Department of Water and Power (DWP) into the Los Angeles Aqueduct to increase L.A.'s water supply. Mill Creek was never diverted to Los Angeles. Below the diversion points, the creek ecosystems were destroyed by the lack of water, occasional floods, and the dropping level of Mono Lake.

Most of the streams that were not diverted into the Los Angeles Aqueduct are similar in condition to the way they were in 1940, except for their mouths which have been affected by the dropping level of Mono Lake. Before 1941, the streams in the Mono Basin were lined with almost continuous corridors of woodland habitat from montane conifer forests to within a quarter mile of the lakeshore. These wildlife corridors provided important resting, foraging, and nesting habitat.[1]



South and East Parker Creeks contribute 1,200 acre-feet of runoff from their 3.8 square mile watershed which begins at 12,600-foot Mt. Wood. DeChambeau Creek's 2.5 square mile watershed contributes 900 acre-feet, most of which is diverted for irrigation. Average net inflow to Mono Lake from ungauged sources is estimated to be 35,000 acre-feet per year.[2] These sources include springflow and intermittent streams from the Bodie Hills. Also included in this figure are Horse Creek, most of which is diverted for irrigation, Bohler Creek, which is diverted for pasture irrigation at the north end of Cain Ranch, and Post Office Creek.

Rush / Parker / Walker / Lee Vining / Mill

RUSH CREEK

Historic Conditions:

Rush Creek is the largest stream in the Mono Basin, carrying 41% of the total runoff.[3] Its 141 square mile watershed begins in the Ansel Adams Wilderness at Mt. Lyell, over 13,000 feet in elevation,[4] and provides an average of 59,200 acre-feet of runoff each year to the stream.[5] The watershed also includes Reversed Creek, which begins near June and Gull Lakes and enters Rush Creek just above Silver Lake. Southern

California Edison's Rush Creek Power Plant, on Rush Creek just upstream from this confluence, is at the foot of the sometimes-spectacular falls to the north of Carson Peak. Alger Creek adds its flow to Rush Creek between Silver Lake and Grant Lake.

Before 1916-1925, when three dams were constructed to enlarge natural lakes and flood meadows in the 23.2 square mile upper watershed[6] for hydropower, peak flows would reach up to 1,100 cubic feet per second (cfs) at the height of snowmelt.[7] The ability for Waugh Lake to store up to 4,980 acre-feet of runoff, Gem Lake to store up to 17,060 acre-feet, and Agnew Lake to store up to 860 acre-feet[8] has cut in half the maximum peak flow released below Agnew Lake,[9] and on average reduced it to about 175 cfs.[10]

Between the 1860s and the late 1930s water was diverted from Rush Creek for irrigated agriculture, and in the 1920s major irrigation diversions began after Grant Lake was enlarged by an artificial dam.[11] These diversions irrigated 1000 acres in Pumice Valley with enough water to enhance springflow in the Rush Creek Bottomlands.[12]

After Rush Creek passes through Grant Lake, Parker and Walker Creeks enter it just above the Narrows. The Narrows is a point where steep cliffs rise up from both sides of the stream, and the Rush Creek Bottomlands extend from the Narrows to Mono Lake. Before 1941, dense *riparian* vegetation in the Bottomlands supported abundant waterfowl and other wildlife such as mallards, teals, ducks, geese, deer, mountain lions, bobcats, and coyotes, while at the mouth of Rush Creek there were large riparian trees, especially cottonwoods, and rabbits, deer, and large flocks of ducks and geese.[13] The Bottomlands contained a broad riparian forest, a sinuous main channel and in some places multiple channels, excellent quality spawning gravels, exposed willow roots, some fallen trees, and shoreline debris jams, which provided wildlife habitat and especially fish habitat.

There are no fish native to the Mono Basin, but shortly after 1850 Lahontan Cutthroat Trout were introduced to the streams, and an abundant fishery flourished by 1900. Above Grant Lake Golden Trout were planted in the 1920s and 1930s, and at some point threespine stickleback were introduced into the system along with steelhead trout from the Ventura River.[14]

An egg collecting station was constructed on Lower Rush Creek in 1925 and operated through 1953, during which time most eggs were probably shipped to the Mt. Whitney Hatchery. The Fern Creek Hatchery between Silver Lake and Grant Lake produced approximately 1 million fish per year from 1928 to 1942.[15]

Brown, Rainbow, and Brook Trout were stocked from Fern Creek and Mt. Whitney State Fish Hatcheries in the Early 1900s. Brown Trout were introduced in 1919, were well established by 1931, dominated the fishery by 1940, and were stocked until 1942. 3/4lb. to 2 lb. brown trout were common, and occasionally a 5-6 lb. fish was caught. During the Great Depression trout from Rush Creek regularly supplanted the diets of local residents.[16]

Los Angeles Aqueduct Diversion Impacts:

Grant Lake was previously enlarged by an irrigation dam, and by 1941 the current dam enlarged it enough to hold 47,575 acre-feet of water.[17] Diversions of water from Grant Lake into the Los Angeles aqueduct began in 1941.

Because of high runoff, little changed below Grant Lake Dam until 1947. From 1948-1951 there was low runoff, and below Hwy 395 many pines died. There were highly variable releases during the 1950s, and during this time cottonwoods and willows declined above the narrows. Consistently low releases during the early 1960s caused a rapid loss of riparian vegetation, while some vegetation managed to survive on springflow in parts of the bottomlands. With most riparian vegetation dead and dying, extreme floods in

1967 and 1969 were able to severely scour the channels and remove large amounts of live and dead vegetation and topsoil. By this time, Mono Lake had dropped 28 feet, and Rush Creek had incised into its floodplain in order to reach this lower lake level. The water table dropped along with the elevation of the stream, and this along with little or no releases of water during the 1970s caused most remaining vegetation to die or become severely degraded. High runoff in 1980, 1982, and 1984 caused even more damage, and increased incision and widening drained groundwater from adjacent riparian habitats.[18]

These high flows brought trout down the creeks, however, and California Trout, Inc., the National Audubon Society, and the Mono Lake Committee sued LADWP for continuous low flows in Rush Creek to maintain trout populations in good condition, which was ordered by the court in 1985. These low flows and a 1991 grazing moratorium also allowed modest recovery of riparian vegetation to occur.[19]

Present Conditions:

As of 1989, there were 135 acres of mature woody vegetation, 33 acres of newly establishing riparian vegetation, and 40 acres of meadows. This is a 50% loss of pre-diversion woody riparian vegetation, and a 70% loss of pre-diversion meadowlands. Near its mouth, Rush Creek incised 30 feet below its former floodplain, and the new floodplain is considerably narrower.[20] Most of the distributary channels parallel to the main channel are dry and blocked with debris. Instream fish habitat is considerably poorer, due to a lack of pools, spawning gravels, and woody debris. There are now 48 species of birds, mammals, and reptiles that use Rush Creek habitats.[21]

In order to restore Rush Creek's previous rich habitats, various stream restoration techniques are being implemented. These include rewatering dry distributary channels, managing flows from Grant Lake to mimic natural flows, and planting vegetation in certain areas. These activities, if effective, should restore the stream to a dynamic and functioning ecosystem resembling pre-1941 conditions.

PARKER CREEK

Historic Conditions:

Parker Creek carries 6% of the total Mono Basin Runoff.[22] Its 12.2 square mile watershed begins in the Ansel Adams Wilderness at 13,000 foot Kuna Peak.[23] An average of 9,100 acre-feet of runoff each year flows down the stream,[24] and during peak snowmelt, average peak flows in Parker Creek can reach 90 cfs.[25] Several branches drain steep, mountainous terrain with permanent snowfields on the north sides of peaks. Parker Creek flows through Parker Lake, a natural alpine lake at 8,300 feet above sea level, and then through a narrow moraine-bound canyon broadening in alluvial deposits and Cain Ranch pasturelands. Here 1,500 acre-feet of water each year is diverted to Cain Ranch for irrigation. From there Parker Creek enters Rush Creek, which carries its waters to Mono Lake.[26]

Before 1941, Parker Creek below Parker Lake was lined with meadows, watercress, and dense riparian vegetation near its confluence with Rush Creek.[27] A group of 30-50 sage grouse used the Parker Creek Meadow as a lekking site.[28] In the late 1800s and early 1900s, several species of trout were introduced, and anglers could catch a limit of 8-10 inch Eastern Brook Trout in 2-3 hours.[29] It also was an important nursery and breeding area for trout in Rush Creek.[30]

Los Angeles Aqueduct Diversion Impacts:

The Lee Vining Conduit crosses Parker Creek above the irrigated pasturelands of Cain Ranch, and since 1947 diverted virtually all of the water in Parker Creek into the Los Angeles Aqueduct via Grant Lake. This dried up the stream below the conduit, causing a loss of riparian vegetation and aquatic habitat. Gravel was pushed into the dry channel by CalTrans, forming a feature known as "Parker Plug," which was

removed in 1990, marking the beginning of stream restoration on Parker Creek.[31]

Present Conditions:

As of 1989, there were 49 acres of woody riparian vegetation along Parker Creek, mostly highly stressed willow scrub; 9 acres less than pre-1941 conditions. There were also extensive rush-dominated meadows, and a total of 32 different species of birds, mammals, and reptiles.[32] The number of sage grouse has declined to an unknown but still present number.[33]

In 1990, water flowed down Parker Creek again as a result of a court order.[34] Minimum flows were set by the State Water Resources Control Board (SWRCB) in 1994, and stream restoration, which started in 1990, is continuing to restore the stream to a healthy, dynamic ecosystem.

WALKER CREEK

Historic Conditions:

Walker Creek carries 4% of the total Mono Basin Runoff.[35] Its 7.8 square mile watershed begins in the Ansel Adams Wilderness at 12,800 foot Mt. Gibbs.[36] An average of 5,400 acre-feet of runoff each year flows down the stream,[37] and during peak snowmelt, average peak flows in Walker Creek can reach 70 cfs.[38] Steep, mountainous terrain mostly above treeline drains from Mono Pass through Bloody Canyon to Walker Lake, a natural lake enlarged for irrigation and recreational use, with a usable storage of 550 acre-feet. It then flows through a narrow moraine-bound canyon broadening in alluvial deposits and Cain Ranch irrigated pasturelands. Here 2,400 acre-feet of water each year was diverted to 2,000 acres of Cain Ranch for irrigation. From there Walker Creek descends through a narrow canyon eroded into former lakebeds to Rush Creek, which carries its waters to Mono Lake.[39]

Walker Creek below Walker Lake is lined with meadows, watercress, and near the confluence with Rush Creek dense riparian vegetation. In the late 1800s and early 1900s, several species of trout were introduced, and anglers could catch a limit of 8-10 inch Eastern Brook Trout in 2-3 hours.[40] It also was an important nursery and breeding area for trout from Rush Creek.[41]

Los Angeles Aqueduct Diversion Impacts:

The Lee Vining Conduit crosses Walker Creek above the irrigated pasturelands of Cain Ranch, and since 1947 diverted virtually all of the water in Walker Creek into the Los Angeles Aqueduct via Grant Lake. This dried up the stream below the conduit, causing a loss of riparian vegetation and aquatic habitat.

Present Conditions:

As of 1989, there were 43 acres of woody riparian vegetation along Walker Creek, mostly highly stressed willow scrub; 7 acres less than pre-1941 conditions. There were also extensive rush-dominated meadows,[42] and a total of 29 different species of birds, mammals, and reptiles.[43]

In 1990, water flowed down Walker Creek again as a result of a court order.[44] Minimum flows were set by the State Water Resources Control Board (SWRCB) in 1994, and stream restoration, which started in 1990, is continuing to restore the stream to a healthy, functioning ecosystem.

LEE VINING CREEK

Historic Conditions:

Lee Vining Creek is the second largest stream in the Mono Basin, carrying 33% of the total runoff.[45] Its 47 square mile watershed begins in the Ansel Adams Wilderness at 13,053 foot Mt. Dana,[46] and provides an average of 48,500 acre-feet of runoff each year to the stream.[47] The watershed also includes several small glaciers, the Warren Fork of Lee Vining Creek, and Gibbs Creek, which has half of its flow diverted for irrigation.[48] Southern California Edison's Poole Power Plant has been operating since 1923, and is on Lee Vining Creek just below Lee Vining Creek Falls.[49]

Before dams were constructed to enlarge three natural lakes for hydropower, peak flows would reach up to 650 cfs at the height of snowmelt.[50] The ability for Saddlebag Lake to store up to 11,080 acre-feet of runoff, Tioga Lake to store up to 1,250 acre-feet, and Ellery Lake to store up to 490 acre-feet[51] has cut the maximum peak flow released below Ellery Lake to 475 cfs.[52]

Downstream from these alpine lakes, beginning after 1860, settlers diverted water for sawmills; and irrigation and hydropower diversions increased through the late 1800s and early 1900s. Forests along Lee Vining Creek supported a tremendous diversity of birds.[53] Where Lee Vining Creek reached the mouth of the glacial canyon, its floodplain broadened over alluvial deposits, allowing a multiple channel system to exist. One main channel with several subsidiary channels provided a diversity of aquatic habitats able to support all trout life stages. The channels were narrow with frequent meanders, providing deep water habitat, undercut root wads, lateral scour pools, and abundant trout spawning gravels. Dense riparian cover along most of the creek provided cover, shade, stabilization of streambanks, rootwads, and fallen trees. High summer flows and cooler water temperatures maintained productive aquatic habitat all the way to the delta in Mono Lake.[54]

Shortly after 1850, Lahontan Cutthroat Trout were introduced into the fishless stream, and an abundant fishery existed by 1900. Brown trout and Rainbow trout were planted from the early 1900s until 1941, and by 1940 Brown trout were the most abundant species of fish. 8-10 inch trout were abundant, with some fish reaching 13-15 inches.[55]

Los Angeles Aqueduct Diversion Impacts:

In 1941 diversion of water from Lee Vining Creek into the Los Angeles Aqueduct began. The Lee Vining Conduit diverts water from the stream at the diversion dam just upstream from the Lee Vining Ranger Station. After 1947, high runoff ceased and pasture irrigation ended, causing the stream to be virtually dry below the diversion dam. The canyon is narrow below the diversion dam to a point a half mile below Highway 395, and this kept soils moist enough for vegetation to survive. Below this point, vegetation declined rapidly, and was severely affected all the way to Mono Lake. In 1954 a fire consumed much of this dead and some live riparian vegetation. The stream was nearly or completely dewatered until a 1969 flood caused severe channel widening, migration, and incision.

Present Conditions:

In 1986, continuous low flows were obtained with a court order, and modest recovery of riparian vegetation occurred in places. A grazing moratorium was instituted in 1991, allowing further recovery of vegetation. As of 1989, there were 60 acres of mature woody riparian vegetation (44 acres upstream of .5 miles below Hwy 395), a loss of 50% of what existed before 1941.[56] There were 43 species of birds, reptiles, and mammals found along Lee Vining Creek, which is similar to the diversity which existed before 1941.[57] This diversity, however, is limited to a smaller area than it was before the diversions began.

Restoring the stream to pre-1941 conditions is occurring. Various measures are being used such as rewatering channels, planting trees, and managing flows. These stream restoration techniques should eventually restore the stream to a dynamic, functioning ecosystem.

MILL CREEK

Historic Conditions:

Mill Creek is the third largest stream in the Mono Basin, carrying 14% of the total runoff.[58] Its 18 square mile watershed begins in the Hoover Wilderness at the 12,000 foot peaks above Lundy Canyon,[59] and provides an average of 21,200 acre-feet of runoff each year to the stream.[60] The watershed also includes a series of connected alpine lakes in Lake Canyon and in the 20 Lakes Basin.

Lundy Lake, a natural lake at the 7808 foot elevation, was enlarged with a dam constructed by the Southern Sierra Power Company in 1911, and now has a 4000 acre-foot capacity and is operated by Southern California Edison.[61] Almost all of the water diverted from Lundy Lake for hydropower is not returned to Mill Creek, but empties into Wilson Creek, a much smaller stream which also feeds Mono Lake. Other diversions from Mill creek, mostly above Highway 395, are for pasture irrigation.[62] Conway Ranch, Thompson Ranch, and DeChambeau Ranch are the main irrigators in the area.[63]

Los Angeles Aqueduct Diversion Impacts:

Mill Creek was never diverted into the Los Angeles Aqueduct because its lower flows did not justify the costs of extending the aqueduct through a six-mile tunnel.[64] It was still significantly impacted by diversions, however, because of the dropping level of Mono Lake. Above Highway 395, a relatively intact and vigorous stand of nearly continuous willow-scrub, cottonwood-willow, quaking aspen, and conifer-broadleaf habitat exists. The 5000 feet below Highway 395 has much vegetation, but the dropping lake level has caused incision into the streambed that along with channel dewatering from irrigation and hydropower diversions, has degraded the riparian habitat. From 5000 feet below Highway 395 to Cemetery Road, only scattered and degraded vegetation remains. The channel is incised, and the former riparian zone is dominated by scoured cobbles and sagebrush scrub. Below Black Point Road, two diverging channels incised the Mill Creek Delta, with numerous Black Cottonwoods persisting down to the pre-1941 lakeshore.[65]

Present Conditions:

The impacts from hydropower and irrigation diversions and dropping lake level have not been rectified, and no stream restoration is taking place. Much of the water diverted for hydropower is staying in Wilson Creek, causing Wilson Creek to incise and erode its banks. Almost no vegetation occurs on Wilson Creek below Black Point Road.[66] Water may be returned to Mill Creek in the future, because of the opportunities to restore habitat.

Notes:

(1)p. 3F-10, Mono Basin EIR, 1993
(2)p. 3A-11, Mono Basin EIR, 1993
(3)P. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(4)P. 3A-9, Mono Basin EIR, 1993
(5)P. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(6)P. 3A-9, Mono Basin EIR, 1993
(7)Fig. 7, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(8)P. 12, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(9)Fig. 5, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(10)p. 3D-4, Mono Basin EIR, 1993
(11)p. 3D-4, Mono Basin EIR, 1993
(12)p. 3A-9, Mono Basin EIR, 1993
(13)p. 3F-11, Mono Basin EIR, 1993

(14)p. 3D-4, Mono Basin EIR, 1993
(15)p. 3D-9, Mono Basin EIR, 1993
(16)p. 3D-4, Mono Basin EIR, 1993
(17)p. 31, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(18)P. 3C-24, Mono Basin EIR, 1993
(19)P. 3C-24, Mono Basin EIR, 1993
(20)P. 3C-24, Mono Basin EIR, 1993
(21)p. 3F-11, Mono Basin EIR, 1993
(22)P. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(23)P. 3A-7, Mono Basin EIR, 1993
(24)p. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(25)Fig. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(26)P. 3A-7, Mono Basin EIR, 1993
(27)P. 3D-7, Mono Basin EIR, 1993
(28)P. 3F-11, Mono Basin EIR, 1993
(29)p. 3D-8, Mono Basin EIR, 1993
(30)p. 39, State Water Resources Control Board Draft Decision 1631, 1994
(31)p. 3C-25, Mono Basin EIR, 1993
(32)p. 3F-47, Mono Basin EIR, 1993
(33)P. 3F-11, Mono Basin EIR, 1993
(34)p. 47, SWRCB Draft D1631, 1994
(35)P. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(36)P. 3A-6, Mono Basin EIR, 1993
(37)p. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(38)Fig. 3, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(39)P. 3A-6, Mono Basin EIR, 1993
(40)p. 3D-8, Mono Basin EIR, 1993
(41)p. 39, State Water Resources Control Board Draft Decision 1631, 1994
(42)p. 3C-25, Mono Basin EIR, 1993
(43)p. 3F-47, Mono Basin EIR, 1993
(44)p. 47, SWRCB Draft D1631, 1994
(45)P. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(46)P. 3A-5, Mono Basin EIR, 1993
(47)P. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(48)p. 3A-5, Mono Basin EIR, 1993
(49)p. 3D-3, Mono Basin EIR, 1993
(50)Fig. 6, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(51)P. 12, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(52) Fig. 2, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(53)p. 3F-11, Mono Basin EIR, 1993
(54)p. 3D-3, Mono Basin EIR, 1993
(55)p. 3D-3, Mono Basin EIR, 1993
(56)p. 3C-26, Mono Basin EIR, 1993
(57)p. 3F-11, Mono Basin EIR, 1993
(58)P. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(59)P. 3A-10, Mono Basin EIR, 1993
(60)P. 4, Appendix 1, LADWP Draft Stream Restoration Plan, Dec. 1995
(61)p. 3A-10, Mono Basin EIR, 1993
(62)p. 3C-27, Mono Basin EIR, 1993
(63)p. 3A-10, Mono Basin EIR, 1993
(64)p. 331, Kahrl, William L., Water and Power, U.C. Press, 1982
(65)p. 3C-27, Mono Basin EIR, 1993
(66)p. 3C-28, Mono Basin EIR, 1993

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SWRCB WATER RIGHTS ORDER 98 - 05

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

ORDER WR 98 - 05

In the Matter of Stream and Waterfowl Habitat Restoration Plans and Grant Lake Operations and Management Plan Submitted by the Los Angeles Department of Water and Power Pursuant to the Requirements of Water Right Decision 1631 (Water Right Licenses 10191 and 10192, Applications 8042 and 8043)

SOURCES: Lee Vining Creek, Walker Creek, Parker Creek and Rush Creek

COUNTY: Mono

LICENSEE: City of Los Angeles

ORDER REQUIRING STREAM AND WATERFOWL HABITAT RESTORATION MEASURES

CITATIONS TO THE RECORD

The following notation is used to cite information from the hearing record:

Citations to Hearing Transcript: Citations to the hearing transcript are indicated by a "T" followed by the starting page and line number, followed by the ending page and line number. (Example: T 136:10-136:24.)

Citations to Exhibits: Citations to exhibits in the record are indicated by the letter "R" (to indicate that the hearing involves restoration issues), followed by the abbreviation for the party submitting the exhibit, followed by the number of the party's exhibits, followed by the page number or other location of the information in the exhibit.

Abbreviations Used for Parties

DFG California Department of Fish and Game

DPR California Department of Parks and Recreation

SLC California State Lands Commission

CalTrout California Trout, Incorporated

DWP. City of Los Angeles Department of Water and Power

MLC Mono Lake Committee

NAS National Audubon Society

PMBP People for Mono Basin Preservation

SWRCB State Water Resources Control Board

BLM United States Bureau of Land Management

USFS United States Forest Service

STATE OF CALIFORNIA

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ORDER REQUIRING STREAM AND WATERFOWL HABITAT RESTORATION MEASURES

BY THE BOARD:

1.0 BACKGROUND

On September 28, 1994, the State Water Resources Control Board (SWRCB) adopted Water Right Decision 1631. Decision 1631 revised the conditions of Licenses 10191 and 10192 which authorize the City of Los Angeles Department of Water and Power (Los Angeles) to divert water from four streams which flow into Mono Lake. The decision established: (1) minimum flow requirements necessary to maintain fish in good condition below Los Angeles' diversion structures; (2) higher flow requirements to be met on a periodic basis for channel maintenance purposes; and (3) detailed water diversion criteria intended to regulate water exports from the Mono Basin in a manner that will result in an eventual long-term average water elevation at Mono Lake of approximately 6,392 feet. The conditions adopted in Decision 1631 were established to protect fish and other public trust resources in the Mono Basin while continuing to allow diversion of some water for municipal use.

No party sought reconsideration or judicial review of Decision 1631. The conditions established in Decision 1631 are leading to significant restoration and recovery of fish habitat, waterfowl habitat, and other public trust resources in the Mono Basin. Footnote1 Decision 1631 resolved the major controversies relating to Los Angeles' diversion of water from the Mono Basin, but the record before the SWRCB in 1994 was not sufficient to determine what additional restoration measures should be required in order to promote recovery of streams and waterfowl habitat. Therefore, Decision 1631 directed Los Angeles to evaluate potential restoration measures and to submit proposed plans for restoration of Rush Creek, Lee Vining Creek, Parker Creek, and Walker Creek and restoration of waterfowl habitat in the Mono Basin. In view of the effect of Grant Lake on stream flows and water exports from the Mono Basin, Decision 1631

also required that the stream restoration plan include an element addressing the operation and management of Grant Lake.

Los Angeles engaged in a cooperative process with parties designated in Decision 1631 to develop the required restoration plans, but some proposals remain in dispute. The SWRCB conducted eight days of hearing on the restoration plans ending on May 7, 1997. The focus of the hearing was to determine the extent to which the restoration plans comply with the requirements of Decision 1631 and to determine what, if any, changes are needed. Final legal briefs were submitted by interested parties in July 1997.

This order begins with a brief review of the findings and requirements of Decision 1631 regarding stream and waterfowl habitat restoration and the process through which the restoration plans were developed. The order then addresses the evidence regarding various proposed restoration measures, as well as a proposed settlement agreement submitted by Los Angeles and some of the other parties near the end of the hearing.

Based on our review of the evidentiary record and the requirements of Decision 1631, this order requires implementation of stream restoration measures which generally are consistent with the proposed settlement agreement. This order also requires a waterfowl and waterfowl habitat monitoring program and other specified measures to promote waterfowl habitat restoration. For the reasons discussed in Sections 6.0 through 6.5 below, this order does not require funding of a waterfowl habitat restoration foundation as proposed by some of the parties.

2.0 FINDINGS AND REQUIREMENTS OF DECISION 1631 REGARDING RESTORATION PLANS

The SWRCB's prior findings regarding the stream and waterfowl habitat restoration plans, and the evaluation criteria governing our review of the plans, are summarized in Sections 2.1 through 2.4 below.

2.1 Prior SWRCB Findings Regarding Stream Restoration Plans

Decision 1631 concluded that restoration of continuous flows as specified for each of the affected streams was by far the most important step needed to restore and maintain the fisheries that existed prior to Los Angeles' diversions. The decision also concluded that providing channel maintenance and flushing flows for each stream will help to maintain conditions that benefit the fishery and will promote the recovery of adjacent riparian areas. (Decision 1631, p. 76.) The decision includes a number of specific findings regarding potential restoration measures for each of the four streams from which Los Angeles diverts water. (Decision 1631, pp. 37, 38, 45, 46, 52, 53, 74 and 75.) The SWRCB's findings regarding the need for additional stream restoration measures are summarized as follows:

"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. Those 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." (Decision 1631, p. 76.)

2.2 Prior SWRCB Findings Regarding Waterfowl Habitat Restoration Plans

Decision 1631 found that the loss of open water habitats and fresh water sites around Mono Lake due to water diversions by Los Angeles coincided with the decline in migratory waterfowl populations at Mono Lake, that the lake probably supported several hundred thousand ducks during the fall historically, and that the current (i.e., 1994) habitat probably supports a small fraction of historic numbers. (Decision 1631, p.

117.) The decision states:

"Restoration of pre-diversion waterfowl habitat would permit substantial increases in migratory waterfowl use at Mono Lake. The actual numbers 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 . . . and in view of the competing public trust uses which would not best be 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 habitat. Additional waterfowl habitat could be restored through other restoration measures identified in the record." (Decision 1631, pp. 117 and 118.) Footnote2

Decision 1631 goes on to discuss the "physical solution doctrine" as a basis for requiring Los Angeles to undertake waterfowl habitat restoration measures as part of a physical solution which would allow for continued diversion of water for municipal use. The decision states that, with the exception of the natural restoration which will occur due to restored flows and a rising lake elevation, the record in 1994 was insufficient to specify the waterfowl habitat restoration measures to be undertaken. The decision concludes that Los Angeles should be required to consider various waterfowl habitat restoration measures as part of the restoration plans required under the decision. (Decision 1631, p. 118.) The decision states:

"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 established in this 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 habitat restoration projects should focus on lake-fringing wetland areas." (Decision 1631, pp. 118 and 119.)

Decision 1631 does not require Los Angeles to mitigate for all waterfowl habitat lost as a result of previously authorized water diversions. Rather, Decision 1631 cites the "physical solution doctrine" as the basis for requiring Los Angeles to consider measures to mitigate for at least some of the loss of waterfowl habitat that is expected to continue as a result of continuing water diversions. Although pre-project (i.e., pre-1941) conditions provide a helpful reference point, Decision 1631 does not require that Los Angeles undertake restoration measures aimed at restoring pre-project conditions. The specific criteria governing the SWRCB's evaluation of proposed restoration measures are discussed in Section 2.4 below.

2.3 Prior Findings Regarding Grant Lake Operations and Management Plan

The inflow, outflow and quantity of water in storage at Grant Lake substantially affect the amount of water available for instream flows and channel maintenance flows in Rush Creek, as well as the amount of water available for export from the Mono Basin. In view of the importance of Grant Lake to stream flows and water diversions in the Mono Basin, Decision 1631 specifically requires that Los Angeles include a Grant Lake operations and management plan as an element of its stream restoration plan. (Decision 1631, p. 205.) Due to the complexity of Grant Lake operations, Los Angeles addressed the subject of Grant Lake operations and management in a separate document. As recognized in the Los Angeles plan and the proposed settlement agreement, Grant Lake operations must be considered in conjunction with downstream restoration measures.

2.4 Requirements and Evaluation Criteria Governing Restoration Plans Required by Decision 1631

The general requirements and evaluation criteria governing the stream and waterfowl habitat restoration plans are stated on page 204 of Decision 1631 as follows:

"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 restoration of the affected streams and lake-fringing wetlands 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. The 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 specific requirements and the evaluation criteria for the stream and waterfowl habitat restoration plans required by Decision 1631 are set forth on pages 204 through 211 of the decision. Among other requirements, the plans are required to include a method for monitoring results and progress of proposed restoration projects. In addition, Los Angeles was directed to "emphasize measures that have minimal potential for adverse environmental effects." (Decision 1631, pp. 206 and 207.)

3.0 PREPARATION OF RESTORATION PLANS SUBMITTED BY CITY OF LOS ANGELES

The stream and waterfowl restoration plans submitted to the SWRCB are the result of a lengthy process with repeated opportunities for input from the California Department of Fish and Game (DFG), the California State Lands Commission (SLC), the California Department of Parks and Recreation (DPR), the United States Forest Service (USFS), the National Audubon Society (NAS), the Mono Lake Committee (MLC), and California Trout, Inc. (CalTrout). Los Angeles also used information provided by other parties, including consultants with expertise in stream and waterfowl habitat restoration. Following completion of draft restoration plans, Los Angeles circulated the draft plans for review and comment by interested parties. Los Angeles revised the plans in response to comments from interested parties and then submitted the following documents dated February 29, 1996, to the SWRCB.

(1) Executive Summary for the Stream Restoration, Grant Lake Operations and Management, and Waterfowl Habitat Restoration Plans;

(2) Stream and Stream Channel Restoration Plan;

(3) Stream and Stream Channel Restoration Plan Appendices;

(4) Grant Lake Operations and Management Plan;

(5) Grant Lake Operations and Management Plan Appendices;

(6) Waterfowl Habitat Restoration Plan; and

(7) Comments and Response to Comments on the Draft Stream Restoration, Grant Lake Operations and

Management, and Waterfowl Habitat Restoration Plans.

Interested parties were allowed until April 8, 1996, to submit written comments to the SWRCB regarding the restoration plans. Based on the extensive comments received, the SWRCB initially scheduled a hearing on the proposed plans for July 29 and 30, 1996. At the request of DPR, DFG, USFS, MLC, NAS, and CalTrout, the hearing was postponed to provide additional time for those parties to attempt to resolve contested issues with Los Angeles. The hearing was rescheduled to October 9 and 10, 1996, but postponed again at the joint request of DPR, MLC, NAS, CalTrout and Los Angeles in order to provide a further opportunity for resolution of differences.

Disagreements over the restoration plans were not fully resolved and the hearing began on January 28, 1997. The SWRCB conducted six days of evidentiary hearings between January 28 and February 26, 1997, at which time the hearing was recessed at the request of several parties who expressed confidence that they could reach agreement on a proposed settlement. After the SWRCB was notified that a proposed settlement was reached by some, but not all, of the parties to the hearing, the hearing was resumed on May 6, and completed on May 7, 1997.

At the resumption of the hearing, counsel for Los Angeles presented a proposed settlement agreement dated March 28, 1997, reached by representatives of some of the parties to the proceeding. (T 1514:9-1518:21.) The settlement agreement was marked for identification as Los Angeles Exhibit R-DWP-68, but was not offered into the evidentiary record. A second agreement, the Mono Basin Waterfowl Habitat Restoration Foundation Conceptual Agreement, was referred to in the proposed settlement agreement and also submitted and marked for identification. (R-DWP-68A.) No testimony was offered in support of the proposed agreements. Rather, the agreements were submitted on behalf of the signatories as a proposed modification of Los Angeles' previously submitted restoration plans, with the understanding that the parties would address the proposed settlement in post-hearing briefs. (T 1518:2-1521:9.).

The parties were granted the opportunity to submit closing briefs and reply briefs. The final day for submission of legal briefs was July 17, 1997. The briefs addressed the evidence presented at the hearing as well as the proposed settlement agreement.

The preparation and review of stream and waterfowl habitat restoration proposals were parts of a lengthy process extending from adoption of Decision 1631 on September 24, 1994, to the present. As discussed in Section 5.4 below, that process successfully resolved most of the issues concerning the stream restoration work to be undertaken by Los Angeles in a manner that is generally consistent with Decision 1631 and which has widespread support among the parties to this proceeding.

As discussed in Section 6.3 below, the proposed settlement does not define most of the specific waterfowl habitat projects which would be undertaken pursuant to the agreement. Rather, having completed a multi-year planning process pursuant to the provisions of Decision 1631, the parties to the suggested settlement now propose to initiate a new planning process through which specific waterfowl habitat restoration measures would be determined at a future time by a newly created waterfowl habitat restoration foundation. In contrast to the broad support for the stream restoration measures in the proposed settlement, the proposal regarding waterfowl habitat restoration met considerable opposition from local citizens and organizations, the Mono County Board of Supervisors, and various other governmental officials and employees.

4.0 PARTICIPANTS IN HEARING

Los Angeles presented the restoration plans and related documents described in Section 3.0. Los Angeles also presented testimony in support of approving the restoration plans. Following the recess of the hearing on February 26, 1997, and negotiations among some of the parties, Los Angeles joined with several other parties to request that the SWRCB approve the March 28, 1997, proposed "Mono Lake Settlement Agreement" as a modification of the previously submitted restoration plans.

DFG, SLC, DPR, MLC, NAS, CalTrout, USFS, and Richard Ridenhour submitted testimony and exhibits regarding various aspects of the initial restoration plans. Those participants later joined in requesting that the SWRCB adopt an order based on the March 28, 1997, proposed settlement agreement. Footnote3 Although DFG is a signatory to the proposed settlement agreement, DFG's primary witnesses testified about numerous problems with the approach to waterfowl habitat restoration under the provisions of the proposed settlement. (See Section 6.3 below.)

The United States Bureau of Land Management (BLM) introduced substantial evidence about the importance of the wildlife and other resources dependent upon the flows in Wilson Creek which could be adversely affected by proposed waterfowl habitat restoration measures for Mill Creek as discussed in Section 6.4.2.

The People for Mono Basin Preservation (PMBP) participated in the hearing on behalf of many Mono County residents and others who oppose aspects of the waterfowl habitat restoration plan submitted by Los Angeles and the approach to waterfowl habitat restoration described in the proposed settlement agreement. PMBP is primarily concerned about protection of the resources currently dependent upon flows in Wilson Creek. As discussed in Section 6.4.2, PMBP opposes restoring higher flows to provide waterfowl habitat along Mill Creek at the expense of the environmental, fishery, wildlife, and other values served by the current level of flow in Wilson Creek. PMBP also opposes payment of $3.6 million to a waterfowl habitat restoration foundation under the provisions of the Waterfowl Habitat Restoration Foundation Conceptual Agreement. (R-DWP-68A.) PMBP supports waterfowl habitat restoration in the Rush Creek bottomlands and introduced evidence regarding other potential waterfowl habitat restoration measures. PMBP did not offer evidence regarding stream restoration proposals for Rush Creek, Lee Vining Creek, Walker Creek or Parker Creek, but the group expressed general support for the stream restoration measures identified in the proposed settlement agreement.

A representative of Arcularius Ranch and Inaja Land Company participated in the early stage of the hearing prior to introduction of the settlement agreement, but did not participate when the hearing resumed on May 6, 1997. Correspondence from the Arcularius Ranch representative recommends that none of the flow modifications undertaken for stream restoration purposes should supersede or interfere with the provisions of Decision 1631 regulating the release of water from the Mono Basin into the Upper Owens River. Footnote4

Counsel for Arnold Beckman submitted testimony and other evidence relating to the water rights of the Conway Ranch under the 1914 Mill Creek Decree. Footnote5 The water rights which attach to the Conway Ranch could be relevant with respect to future changes in the use of water rights on Mill Creek. However, the present proceeding does not involve a proposal by either Los Angeles or Mr. Beckman to dedicate the Conway Ranch water rights to instream flows or other purposes related to restoration of Mill Creek. Therefore, based on the understanding that the SWRCB's decision on the waterfowl habitat restoration plan submitted by Los Angeles would not affect the status of the Conway Ranch water rights, counsel for Mr. Beckman withdrew from the proceeding. Footnote6

5.0 STREAM RESTORATION PLAN AND GRANT LAKE OPERATIONS PLAN

Sections 5.1 through 5.5 below address the stream restoration plan and related documents submitted by Los Angeles, the modifications to the Los Angeles plan in the proposed settlement agreement, and the SWRCB's analysis and conclusions regarding restoration proposals for Rush Creek, Lee Vining Creek, Parker Creek and Walker Creek. Footnote7

5.1 Stream Restoration Plan Submitted by Los Angeles

The stream restoration plan and related materials submitted by Los Angeles are the Stream and Stream Channel Restoration Plan (R-DWP-16), the Appendix to Stream and Stream Channel Restoration Plan (R-DWP-17), the Grant Lake Operations and Management Plan (GLOMP) (R-DWP-18), the Appendix to Grant Lake Operations and Management Plan (R-DWP-19), and the Comments and Responses to Comments on the Draft Stream Restoration, GLOMP, and Waterfowl Habitat Restoration Plans (R-DWP-21). Los Angeles also submitted two documents describing its proposed plan for monitoring the recovery of the four Mono Basin streams from which it diverts water. (R-DWP-22 and R-DWP-23.) Los Angeles presented detailed written and oral testimony in support of the stream restoration proposals described in its planning documents. (See e.g., R-DWP-24 through R-DWP-32.)

The stream restoration program proposed by Los Angeles establishes the overall goal of developing "functional and self-sustaining stream systems with healthy riparian ecosystem components." The program proposes to "restore the stream systems and their riparian habitats by providing proper flow management in a pattern that allows natural stream processes to develop functional, dynamic, and self-sustaining stream systems." The stream restoration plan depends primarily on providing high seasonal flows which equal or exceed the channel maintenance flow requirements established in Decision 1631 for all types of years. Footnote8 (R-DWP-16, p. vi.)

In addition, the plan proposes twelve other restoration measures to help "jumpstart" the recovery that is occurring due to the restoration of flows in the four streams and the additional restoration expected to occur as a result of the higher seasonal flows. The measures include installation of large woody debris in Rush Creek and Lee Vining Creek, rewatering additional channels in Rush Creek, a limited planting program in the riparian areas of the four streams, sediment passage facilities at diversion structures (at Lee Vining, Parker and Walker Creeks), flood flow contingency plans to protect Highway 395, limited vehicular access to sensitive areas, a livestock grazing moratorium for 10 years after entry of Decision 1631, possible installation of fish screens on irrigation diversions based on consultation with DFG, removing bags of gravel which were previously placed in Lee Vining Creek as part of previous restoration efforts, removing limiter logs and modifying channel entrances in Lee Vining Creek, Footnote9 supporting the California Transportation Department in rehabilitation of the Parker Plug area on Parker Creek, and rehabilitation of the Mono Return Ditch and Lee Vining Conduit in order to allow for providing higher channel maintenance flows to Rush Creek. The plan contains an evaluation of various other measures which Decision 1631 required Los Angeles to consider and explains why those measures are not recommended. In addition, Los Angeles proposed a detailed monitoring plan to evaluate stream recovery.

The stream restoration plan contains a detailed description of the work to be done, the proposed schedule for undertaking various projects and the cost of each proposed restoration measure. The estimated cost of the stream restoration work proposed by Los Angeles is $2 million. (R-DWP-16, pp. vii and viii.)

Los Angeles presented testimony from experts with experience in stream restoration and fishery biology in support of its proposed restoration plan. The expert witnesses presented by Los Angeles included Dr. William Trush and Mr. Christopher Hunter who had previously participated in portions of the interim restoration work undertaken by the former Restoration Technical Committee (RTC) at the direction of the Superior Court. (R-DWP-6, R-DWP-7, R-DWP-31.) Both Dr. Trush and Mr. Hunter supported the concept

of promoting stream restoration primarily through providing appropriate flows to aid the natural recovery of the stream and adjoining area. Both also recognized that high stream flows which occurred prior to the 1997 hearing washed out much of the structural stream restoration work that had been attempted in previous years. (T 326:12-329:9.) Dr. Trush testified that even if the required flows were insufficient to affect channel morphology, he could not "recommend structures because it wouldn't make any sense; they would go away." (T 328:7-328:22.)

Los Angeles presented testimony from several other witnesses in support of a flow-based approach to stream restoration. Dr. Robert Beschta and Dr. Boone Kauffman testified that some of the well-intended human interventions to promote stream restoration undertaken in recent years actually had detrimental effects on the establishment of vegetation and improvement of channel morphology. (T 68:3-68:25; T 83:1-83:15.) Dr. Beschta and Dr. William Platts agreed that providing appropriate flows and control or removal of grazing in riparian areas are the most desirable elements of a stream restoration program. (T 69:16-69:19; T 331:12-332:18.) Although Dr. Platts recognized the need for sediment bypass structures and monitoring, he testified that providing proper flows and land management are the essential elements of stream restoration. Dr. Platts described various other restoration proposals for the streams under consideration as things which are "done to make people feel good," not necessarily to help the fish populations. (T 332:5-332:18.)

Dr. Kauffman testified that the re-establishment of willows, cottonwoods and riparian vegetation along the Mono Basin tributaries is among the highest that he has seen on any riparian ecosystem in the Western United States. (T 75:1-76:20.) Biologist Brian Tillemans presented extensive testimony and photographic evidence regarding the recovery of the Mono Basin streams following the restoration of flows and the imposition of a grazing moratorium. (R-DWP-25; R-DWP-37 through R-DWP-62; and T 47:1-61:15.) Mr. Tillemans testified that he is confident that the Los Angeles stream restoration proposals will produce high quality streams and an overall fishery that is better than what existed before Los Angeles began its Mono Basin diversions. (T 49:4-49:14.) Dr. Beschta and Dr. Platts also testified that they believe the restoration program will result in better stream conditions than existed in 1941. (T 103:2-104:15.)

5.2 Proposed Settlement Agreement Regarding Stream Restoration Projects

The proposed settlement agreement calls for Los Angeles to implement its stream and stream channel restoration plan with certain specified changes. The changes are summarized as follows:

(1) The "channel maintenance flows" proposed in the Los Angeles plan are increased for specified water year types based upon flow recommendations in a February 13, 1996 memorandum of the "ad hoc flow committee" until such time as the SWRCB determines that the stream restoration program is complete. Footnote10

(2) Los Angeles is to implement its proposed stream monitoring program under the direction of Dr. Trush, Mr. Hunter, and other independent scientists to be agreed upon by the parties to the proposed settlement. The monitoring team is to perform a number of tasks including: (a) making recommendations on flows needed for restoration of Rush Creek below the Department of Water and Power return ditch and the need for a Grant Lake bypass to achieve those flows; (b) submitting reports evaluating the results of the monitoring program and recommending any appropriate changes; and (c) making a recommendation to the SWRCB that the stream restoration program is complete. The proposed settlement also provides for establishing quantified criteria for determining when monitoring of stream restoration and recovery can be terminated.

(3) Los Angeles is to upgrade the Rush Creek Return Ditch as proposed in its plan, but agrees not to raise

the cost of that upgrade as a reason in the future for not constructing a Grant Lake bypass if such a facility is needed to provide appropriate stream flows.

(4) Los Angeles will implement its plan for large woody debris and will thereafter add large woody debris to Rush and Lee Vining Creeks on an opportunistic basis, based on the recommendations of the monitoring team.

(5) If channels opened for stream restoration purposes become closed, Los Angeles will follow the case-by-case recommendation of the monitoring team regarding reopening of any closed channels.

(6) Los Angeles will hire experts agreeable to the parties to the proposed settlement to analyze and design sediment bypass systems at diversions on Walker, Parker, and Lee Vining Creeks. The SWRCB will be asked to resolve any disagreements regarding construction of recommended sediment passage facilities.

(7) Los Angeles will comply with applicable law regarding fish passage, but need not include fish passage in the stream restoration plan.

(8) Los Angeles will implement its February 29, 1996, Grant Lake Operations and Management Plan with certain specified changes.

(9) Existing facilities for collecting flow data will be retrofitted to make data available "on a same day basis on a web site."

The proposed settlement is based on the anticipation that the SWRCB will enter an order consistent with the agreement. The proposed settlement represents a generally successful effort among the signatories to resolve their remaining differences regarding the stream restoration plan submitted by Los Angeles. The stream restoration plan, as modified by the proposed settlement agreement and the provisions of this order, provides a workable basis for compliance with the applicable provisions of Decision 1631. As discussed in Section 5.4 below, the provisions of this order requiring implementation of stream restoration measures are structured in the manner necessary to maintain appropriate SWRCB enforcement authority over the licensee.

5.3 Analysis of Stream Restoration Proposals

Experience in recent years has shown it is impossible to control high flows sufficiently to establish a successful Mono Basin stream restoration program which places a heavy reliance on structural "improvements" to stream channels. (T 327:6-329:9) Therefore, the SWRCB agrees with the conclusion reflected in Los Angeles' stream restoration plan and the proposed settlement agreement that it is preferable to promote stream restoration and recovery through providing appropriate flows and sound land management. The modifications to the stream restoration plan which are called for in the proposed settlement agreement are addressed below.

5.3.1 Higher Peak Flows to Promote Stream Restoration and Recovery

The stream restoration plan and the settlement proposal both call for providing higher peak flows to help promote recovery of the streams and stream channels. Footnote11 The flows now proposed are higher than the channel maintenance flows which were established in Decision 1631 based on the testimony presented by DFG in 1994. In addition to the fishery flow and channel maintenance flows established in Decision 1631, the decision provides that Los Angeles' diversions from the Mono Basin are subject to additional limitations up until the time the water elevation in Mono Lake reaches 6,391 feet. Therefore, until that

time, there will frequently be more water in the four affected streams than would be needed solely to comply with the instream flow requirements and the channel maintenance flows required under Decision 1631. Footnote12

Up until the time that the water level in Mono Lake reaches 6,392 feet, the proposed settlement agreement calls for higher flows for stream restoration in Rush Creek as specified in a February 13, 1996 memorandum, except in dry years, and except when the higher flows cannot be provided without reducing water exports from the Mono Basin during dry/normal and normal years. The settlement agreement would also provide for specified higher flows for stream restoration purposes in all four streams between the time the lake reaches 6,392 feet and when the stream restoration program is determined to be "complete" by the SWRCB. The higher flows during this period would apply in extreme wet years, wet years, and wet/normal years. Footnote13 During all other years, the proposed settlement agreement calls for stream restoration flows based upon the provisions of the Grant Lake Operation Management Plan. The proposed settlement agreement also states that upon completion of the stream restoration program, it may be necessary to modify the channel maintenance and flushing flow requirements established in Decision 1631.

Dr. Platts testified that there may be a difference regarding the level of flows needed to help restore a degraded stream system and the flows needed to maintain the habitat once the stream system has been reestablished. Dr. Platts supports higher peak flows as a means of promoting stream restoration, but recommends revisiting the subject of channel maintenance flows later on in the stream restoration and recovery process. (T 205:21-206:18.) Dr. Trush also recognized a distinction between flows that are needed for channel maintenance and flows that are needed for restoration of the adjoining floodplain. (T 467:18-469:17.) As discussed in Section 5.1, the record of recent high flows in the Mono Basin indicates that the ability to control peak flows in wet years is limited. Thus, in some years, higher flows of the type presently recommended for stream restoration purposes may occur whether required or not.

In view of the evolving recommendations of various experts regarding the level of flows needed for channel maintenance and stream restoration purposes, it would be unwise to revise the long-term channel maintenance flow requirements established in Decision 1631 at the present time. In addition, the SWRCB does not have sufficient evidence before it to determine the impacts on lake level of meeting the settlement agreement flows on a long-term basis. Footnote14 However, based on the evidence presented regarding the anticipated benefits of higher spring peaking flows for stream restoration purposes, and the willingness of Los Angeles to provide those flows, the SWRCB concludes that it would be reasonable to provide the higher flows called for in the settlement agreement on an interim basis subject to the provisions of this order. The subject of stream restoration flows can be reviewed by the SWRCB in the future with the benefit of the additional information which will be developed through monitoring stream restoration and recovery in the Mono Basin.

5.3.2 Stream Monitoring

Decision 1631 provided that the monitoring program proposed in the stream restoration plan shall identify how results of "restoration activities will be distinguished from naturally occurring changes." (Decision 1631, p. 207.) In those instances where artificial replanting is undertaken or where "structural measures" such as placement of woody debris are undertaken, it may be possible to distinguish changes due to intentional restoration activities from "naturally occurring changes." However, in the case of a restoration program which relies primarily on "natural changes" related to increased flows, it generally will not be possible to distinguish the results of restoration activities from naturally occurring changes. (T 153:16-155:3.)

As discussed in Section 5.1 above, the goal of the stream restoration program proposed by Los Angeles is

to develop "functional and self-sustaining stream systems with healthy riparian ecosystem components." (R-DWP-16, p. vi.) The proposed settlement calls for implementation of the stream monitoring program proposed by Los Angeles with specified modifications, including establishment of a monitoring team under the direction of Dr. Trush and Mr. Hunter and such other independent scientists as are agreed upon by the parties. The monitoring team is to evaluate and make recommendations regarding various subjects related to stream restoration. The settlement agreement identifies a number of factors to be considered for determining when stream restoration monitoring may be discontinued.

Several experts on stream and fishery restoration testified in support of monitoring the restoration and recovery of the four affected streams. Their testimony highlights the difficulty in attempting to specify criteria for establishing when restoration should be considered complete. Dr. Kauffman testified that ecological restoration is an ongoing process which is not completed at any one point in time, but the restoration plan proposed by Los Angeles "sets the ecosystem in the right trajectory for a goal of naturally functioning ecosystems" similar to predisturbance conditions. (T 108:14-108:23.) Dr. Trush testified that the scientists on the former RTC had difficulty in trying to define endpoints for stream restoration on Lee Vining Creek, and decided to "replace the idea of an end product, and endpoint, with a process, with the idea that the channel can be made to react and function alluvially. . . ." (T 129:17-131:6; 155:4-155:23.) Mr. Hunter agreed with Dr. Trush about the difficulty of establishing quantitative stream restoration goals. He explained the RTC:

". . . spent a lot of time trying to do that, and it just didn't work out very well. There just wasn't the pre-1941 data to give us anything quantitative for restoration goals. That is why we shifted gears on this monitoring plan to monitor the processes that actually are going to create the habitat that will be utilized by fish.

"In the long run, this is probably a much better approach, to make sure that those processes are actually happening that create fish habitat or create seedbeds for riparian vegetation . . . ." (T 134:1-136:1.)

Despite contrary testimony of various experts, the proposed settlement agreement calls for establishment of quantified criteria for determining when stream restoration will be considered complete. The information collected regarding the specified "termination criteria" will provide helpful information regarding recovery of the four streams. In accordance with the intention of the parties to examine certain characteristics of each stream, this order provides that the stream restoration monitoring team employed by Los Angeles shall report on a number of specified factors relevant to the condition of the four affected streams. However, based on the extensive expert testimony regarding restoration of the four streams degraded by Los Angeles' past water diversions, the SWRCB concludes that, in this instance, more general criteria should be used as the basis for determining when the stream restoration program can be regarded as complete or when stream restoration monitoring may be terminated.

Based on the record before us, this order provides that the SWRCB's eventual determination of when the stream restoration monitoring program may be discontinued will be based on consideration of the following factors:

(1) Whether fish are in good condition. This includes self-sustaining populations of brown trout and other trout similar to those that existed prior to the diversion of water by Los Angeles and which can be harvested in moderate numbers.

(2) Whether the stream restoration and recovery process has resulted in functional and self-sustaining stream systems with healthy riparian ecosystem components for which no extensive physical manipulation is required on an ongoing basis. Footnote15

The first of these factors reflects the importance of providing appropriate fishery habitat pursuant to the provisions of Fish and Game Code sections 5937 and 5946, and the direction of the Court of Appeal in *California Trout* v. *Superior Court* (1990) 218 Cal.App.187 [266 Cal.Rptr. 788]. The second factor is based on the overall goal of the stream restoration plan submitted by Los Angeles and is consistent with the emphasis the stream restoration scientists place on establishment of ecological processes. Footnote16

5.3.3 Provisions of Proposed Settlement Regarding Rush Creek Return Ditch, Placement of Large Woody Debris, Reopening Side Channels, Sediment Bypass Facilities, Fish Passage Facilities, the Grant Lake Operations and Management Plan, and Flow Data Collection Facilities

As explained in Section 5.2 above, the proposed settlement agreement includes various changes and clarifications in the provisions of Los Angeles' stream restoration plan. The changes and clarifications concern the Rush Creek Return Ditch, placement of large woody debris in stream channels, reopening side channels, sediment bypass facilities, fish passage facilities, the Grant Lake Operations and Management Plan, and flow data collection facilities. Except as modified by this order based on the findings herein, the provisions of the proposed settlement regarding these subjects constitute a reasonable approach to resolution of the parties' remaining differences regarding the Mono Basin stream restoration plan in a manner which is consistent with the requirements of Decision 1631. In order to allow for easy monitoring of the flows in Rush Creek, Lee Vining Creek, Parker Creek, and Walker Creek, this order provides that the retrofitted streamflow data collection facilities referred to in the proposed settlement shall be installed and operated in a manner acceptable to the Chief of the Division of Water Rights and that data from those facilities shall be made available on a real-time basis.

5.4 Higher Streamflows Due to Additional Water Needed to Maintain Water Level of Mono Lake

Until the water elevation of Mono Lake reaches 6,391 feet, the water diversion criteria established in Decision 1631 limit water exports from the Mono Basin based on the need for additional water to raise the water level in the lake. These restrictions on diversions are in addition to the restrictions needed to meet the instream flow requirements and channel maintenance flow requirements in Decision 1631. The Grant Lake Operations and Management Plan refers to this water as "Mono Lake maintenance water." The plan proposes to release a portion of the "Mono Lake maintenance water" to increase the "base" flows for instream purposes in the four affected streams in some months of some water year types as set forth in Table 1 on page *x* of the plan. (R-DWP-18.)

The proposed settlement agreement makes a slight modification to the provisions of the Grant Lake Operation Management Plan concerning excess water needed for "lake level" purposes. The agreement provides that, to the extent practicable, the water needed for lake level purposes be allowed to flow down the four affected streams "in a manner as to mimic the impaired natural hydrograph." The SWRCB finds that releasing or bypassing the additional water required for lake level purposes in a manner which reflects the natural impaired hydrograph is a reasonable water management approach.

The instream flow requirements established in Decision 1631 were based on a detailed review of extensive evidence regarding flows needed for protection of fish in the affected streams. Revision of the instream flow requirements for protection of fish and fishery habitat was not the subject of the present proceeding. Therefore, approval of the settlement agreement provision regarding the release or bypass of additional water needed for maintaining the water level in Mono Lake, should not be construed as a revision of the instream flows for fishery habitat specified in Decision 1631.

5.5 Summary and Conclusions Regarding Stream Restoration Plan

The stream restoration measures called for in Los Angeles' plan and the proposed settlement agreement emphasize facilitating the natural recovery of the affected streams and adjoining area through providing proper flows and sound land management. The evidence before the SWRCB establishes that the emphasis on flows and sound land management is desirable and that, in this instance, an approach to stream restoration which relies on extensive structural measures cannot be justified.

Decision 1631 provided that the required restoration plans are to be "functionally linked to the stream flows and lake levels" provided in the decision. (Decision 1631, p. 204.) The higher peak flows proposed in the settlement agreement for stream restoration purposes exceed the channel maintenance flows specified in Decision 1631, but the higher stream restoration flows were agreed to by Los Angeles and they would not require a reduction of exports from the Mono Basin in years with normal or below normal precipitation. This order establishes higher flows for stream restoration purposes on an interim basis pending future review and revision by the SWRCB.

No evidence was presented concerning the relationship between the higher peak flows recommended in the proposed settlement and the regulation of water exported from the Mono Basin which is discharged as flow into the upper Owens River. Therefore, it is appropriate to provide that this order does not alter the requirements governing discharges from the East Portal to the upper Owens River. Footnote17

The SWRCB's enforcement authority regarding requirements established in a water right decision stems from the Board's jurisdiction under the Water Code, the California Constitution and the public trust doctrine over the diversion and use of water. Consequently, it is appropriate for the requirements of a water right decision or order to be directed at the water right holder or other party whose diversion or use of water is under consideration. The requirements in this order are structured to avoid improper delegation of SWRCB authority and to allow for effective enforcement of the order by the SWRCB or the Chief of the SWRCB's Division of Water Rights. Footnote18

Several witnesses testified regarding the need for adaptive management to respond to changing conditions and new information. The evidence before the SWRCB regarding the results of past stream restoration efforts and the significant changes in recommendations regarding the nature of future restoration work demonstrate the need for flexibility as additional knowledge and experience are acquired. It generally would not be feasible for the SWRCB members to consider minor modifications to restoration work conducted under the requirements of this order within the timeframe in which a decision is needed. Therefore, this order provides that any revisions to required restoration measures shall be subject to the approval of the Chief of the Division of Water Rights. The delegation of authority to the Chief of the Division of Water Rights establishes a workable procedure allowing for adaptive management during the stream restoration and recovery process.

The stream restoration plan and the Grant Lake Operations and Management Plan submitted by Los Angeles, with the modifications in the proposed settlement agreement and this order, set forth restoration proposals which are reasonable, feasible, and which appear to be adequate to achieve reasonable restoration of the four affected streams and stream channels with minimum potential for adverse environmental effects. The plans identify the specific projects to be undertaken, the implementation schedule, estimated costs, method of financing, and estimated water requirements. The requirements of this order are generally consistent with the provisions of the stream restoration plan and the stream restoration provisions of the proposed settlement. The SWRCB concludes that implementation of the specified stream restoration measures pursuant to the provisions of this order will satisfy the stream restoration requirements of Decision 1631.

6.0 WATERFOWL HABITAT RESTORATION PLAN

As discussed in Section 2.2 above, Decision 1631 recognized the trade-offs between establishing an average lake level of 6,405 feet (which would lead to restoration of the largest amount of waterfowl habitat) and establishing an average lake level of 6,392 feet. The target average elevation of 6,392 feet, and the accompanying inflow to Mono Lake, will lead to restoration of a significant amount of waterfowl habitat while also maintaining access to popular tufa sites and allowing diversion of water for municipal use. In furtherance of the constitutional mandate to maximize the beneficial use of water for all purposes, Decision 1631 relied upon the physical solution doctrine as the basis for requiring Los Angeles to prepare a waterfowl habitat restoration plan which proposes reasonable, financially feasible waterfowl habitat restoration measures which have minimum potential for causing adverse environmental impacts. Footnote19 Among other things, the waterfowl habitat restoration plan was required to identify the specific projects to be undertaken, the implementation schedule, and the estimated costs.

Based on the recommendations of several parties specified in Decision 1631, Los Angeles retained a group of three waterfowl experts to develop a waterfowl habitat restoration proposal. The three scientists' report served as the primary technical document for development of the waterfowl habitat restoration plan submitted by Los Angeles. (R-DWP-20.) There was considerable disagreement among the parties to the hearing regarding measures proposed in that plan. Near the close of the hearing, Los Angeles and several other parties proposed that the SWRCB adopt a revised approach to waterfowl habitat restoration as set forth in the "Mono Basin Waterfowl Habitat Restoration Foundation Conceptual Agreement." (R-DWP-68A, hereinafter referred to as the "conceptual agreement.") The executed agreement was provided to the SWRCB following the hearing. The approach to waterfowl habitat restoration proposed in the conceptual agreement is supported by the parties to the agreement, but opposed by PMBP, Mono County, and numerous Mono County residents and organizations.

Sections 6.1 through 6.5 below discuss the three scientists' report, the waterfowl habitat restoration plan initially submitted by Los Angeles, the approach to waterfowl habitat restoration called for in the conceptual agreement, specific waterfowl habitat restoration measures addressed at the hearing, and the waterfowl habitat restoration measures which the SWRCB concludes should be implemented pursuant to the provisions of Decision 1631 and this order.

6.1 Waterfowl Scientists' Report

Most of the proposed waterfowl habitat restoration projects addressed at the hearing were based in whole or in part on a report dated February 1996 prepared by Dr. Roderick C. Drewien, Dr. Frederic A. Reid and Mr. Thomas D. Ratcliff pursuant to a contract with Los Angeles. (R-DWP-20, Appendix I.) The report concludes that the most important and highest priority restoration effort is to increase the lake level to 6,392 feet as ordered in Decision 1631. The increased lake elevation is expected to "restore the largest acreage, and the most diversity of waterfowl habitats." (R-DWP-20, Appendix I, p. 111.) For example, in the Lee Vining Creek area, the scientists estimate that rising lake levels and increased stream flows will result in an increase of 8 to 10 acres in the hypopycnal environment, Footnote20 formation of 20 to 40 acres of brackish lagoons, and 10 acres of restored riparian area in the Lee Vining Creek bottomlands. (R-DWP-20, Appendix 1, p. 92.) Footnote21

The second priority recommended in the report would be to rewater Mill Creek. Other recommended projects include rewatering "distributaries" in the Rush Creek bottomlands, developing additional freshwater habitats in the County Ponds and Black Point areas, developing a prescribed burn program to enhance marsh and wetland habitats, developing a program to remove the non-native plant Salt Cedar (Tamarisk) in lake fringing wetlands, investigating the feasibility of enhancing artificial ponds near Simons

Springs and creating other shallow ponds in lake-fringing areas, and implementing a detailed monitoring program to evaluate changes in habitats and to determine the responses of waterfowl populations to restoration efforts and rising lake levels. (R-DWP-20, Appendix I, pp. 111-114.)

PMBP presented testimony regarding a lengthy conversation in which Mr. Ratcliff disagreed with some of the main recommendations of the report, particularly the emphasis placed on restoring Mill Creek as a means of providing waterfowl habitat. (T 1742:13-1745:10.) Footnote22 Of the three authors of the report, only Dr. Reid testified in the SWRCB proceedings. Dr. Reid testified that his opinion regarding the expected success of the proposal to rewater Mill Creek was based on the assumption that the USFS water rights for DeChambeau Ranch would be dedicated to instream use on Mill Creek. (T 980: 4-980:21.)

Although the report includes some information about the cost of potential restoration measures, Dr. Reid testified that the scientists were instructed by Los Angeles not to include cost considerations as an element in making their recommendations of waterfowl habitat restoration projects. (T 883:9-883:20.) The relatively high cost of several recommended projects confirms that economic feasibility was not a major consideration in the scientists' report.

Dr. Reid testified that Ducks Unlimited, the organization for which he works, has a reputation for promoting cost-effective waterfowl habitat restoration. In 1993, Dr. Reid testified that Ducks Unlimited typically undertakes projects which cost about $100 per acre and generally does not get involved in waterfowl habitat restoration proposals that cost more than $1,000 per acre. (T 970:16-973:24.) Yet the County Ponds proposal described in the scientists' report proposes to restore approximately 20 acres of ponds at an estimated cost of $638,437, or approximately $31,922 per acre. (R-DWP-20, Appendix 1, p. 89.)

There was other evidence indicating that waterfowl habitat projects on the eastern slope of the Sierra are typically more expensive than restoration projects in other areas. Dr. Reid acknowledged that the cost of the County Ponds proposal was high but said the proposal was considered a reasonable project "based on the fact that there were few other options for creating fresh water habitat." (T 973:1-973:24.) Nevertheless, on a per acre basis, the County Ponds proposal described in the scientists' report is more than twice as costly as the DeChambeau Ponds restoration project jointly undertaken by the Forest Service, Ducks Unlimited and MLC, and much more costly than the alternative of providing water to the County Ponds area through resumption of diversions from Wilson Creek under USFS water rights. (See Section 6.4.3.) The Los Angeles waterfowl habitat restoration plan concluded that the three phase project that includes the County Ponds proposal as described in the waterfowl scientists' report "is not financially feasible without significant funding contributions from other sources." (R-DWP-20, p. 23.)

Decision 1631 directed that the restoration plans should emphasize restoration proposals with minimum potential for adverse environmental impacts. (Decision 1631, p. 207.) However, the waterfowl scientists' report included very little discussion or recognition of the potential adverse environmental effects of restoring flows to Mill Creek at the expense of flows in Wilson Creek. As discussed in Section 6.4.2 below, evidence presented by BLM and the PMBP establishes that Wilson Creek provides important habitat for fish and wildlife, and that the present level of flow in Wilson Creek serves numerous other beneficial uses. Certainly, if proposals to restore higher flows to Mill Creek are pursued by Los Angeles or others, then the environmental effects of those proposals must be fully evaluated before deciding if benefits of the proposal outweigh the adverse effects.

In summary, the waterfowl scientists' report provides a detailed assessment of numerous waterfowl habitat restoration possibilities in the Mono Basin. The report was used in developing the waterfowl habitat restoration plan submitted by Los Angeles and it provides much of the basis for the conceptual agreement

submitted as part of a suggested settlement. In reviewing the waterfowl habitat restoration proposals addressed in the report and at the hearing, the SWRCB must consider the evidence in the record regarding potential adverse environmental effects of proposed restoration measures, economic feasibility and reasonableness, and the extent to which proposed restoration measures comply with other criteria specified in Decision 1631.

6.2 Waterfowl Habitat Restoration Plan Submitted by Los Angeles Department of Water and Power

The waterfowl habitat restoration plan submitted by Los Angeles is based in large part upon the recommendations in the waterfowl scientists' report. However, the role of Los Angeles in carrying out and funding some of the restoration proposals was modified based on an assessment of economic costs and reasonableness. The plan also includes significantly more information regarding the costs of the proposed projects, methods of financing, a proposed implementation schedule, and the review and approval of other agencies having jurisdiction. The plan recognizes the importance of rising lake levels as identified in the scientists' report. The Los Angeles plan proposes to: partially rewater Mill Creek; rewater distributaries in the Rush Creek bottomlands; develop habitat in the DeChambeau Ponds, County Ponds, and Black Point areas; develop a prescribed burn program for lake-fringing wetlands; and participate in interagency efforts to control Salt Cedar. (R-DWP-20, pp. vi, vii and 10.)

The estimated initial cost to be borne by Los Angeles under its plan is $150,000 including the cost of environmental documentation. The Los Angeles plan proposes to secure $753,000 in outside funding for habitat restoration work in the DeChambeau Ponds, County Ponds, and Black Point area. In accordance with the recommendation of the waterfowl scientists' report, the main portion of the $753,000 would go for development of ground water supplies to replace surface water which has previously been available under the USFS right. In addition, Los Angeles estimates that its plan would involve average annual expenses of $180,000 of which approximately $140,000 would be used for annual monitoring expenses. (R-DWP-20, p. vii.)

The Los Angeles waterfowl habitat restoration plan was the subject of criticism by some parties who argue that the plan did not commit Los Angeles to enough waterfowl habitat restoration work. The plan was also subject to extensive criticism from PMBP and numerous residents and organizations from the Mono Basin and surrounding areas who oppose waterfowl habitat restoration proposals for the north end of the Mono Basin which could adversely affect resources and uses dependent upon Wilson Creek.

At the request of several parties to the proceeding, the SWRCB announced on February 25, 1997, that it would recess the hearing in order to allow the parties an opportunity to prepare a proposed settlement for consideration by the SWRCB. The result of those negotiations was the proposed settlement agreement discussed in Section 5.2 above. On May 6, 1997, counsel for Los Angeles requested that the Waterfowl Habitat Restoration Foundation Conceptual Agreement (R-DWP-68A) be regarded as a modification of the waterfowl habitat restoration plan which Los Angeles had previously submitted.

6.3 Proposed Settlement Based on Waterfowl Habitat Restoration Foundation Conceptual Agreement

The proposed settlement regarding waterfowl habitat restoration calls for payment by Los Angeles of $3.6 million to a proposed Mono Basin Waterfowl Habitat Restoration Foundation composed of DPR, SLC, DFG, USFS, NAS, and MLC. With the exception of waterfowl habitat restoration in the Rush Creek bottomlands as previously proposed in the Los Angeles plan, Los Angeles would be relieved of any obligation for waterfowl habitat restoration. Any further waterfowl habitat restoration measures would be carried out at the direction of the foundation in accordance with the provisions of the Mono Basin

Waterfowl Habitat Foundation Conceptual Agreement. (R-DWP-68A.) The conceptual agreement calls for:

(1) Spending $410,000 for monitoring various conditions relevant to waterfowl and waterfowl habitat over the next ten years;

(2) A preliminary allocation of $340,000 for "restoring, operating, and maintaining open water habitat over the next ten years;" Footnote23

(3) Rewatering Mill Creek with year-round flows following environmental evaluation "consistent with the California Environmental Quality Act and the National Environmental Policy Act to determine the appropriate water allocation to achieve the waterfowl scientists' restoration goals;" Footnote24 and

(4) Consideration of other restoration and monitoring measures such as the feasibility of rewatering the County Pond system immediately below the DeChambeau Ponds.

With the exception of the amounts allocated to monitoring activities and restoration and maintenance of open water habitat, the conceptual agreement does not specify how the remaining $2.85 million of the funds to be contributed to the foundation is to be spent among the various potential restoration projects or related activities. Neither the conceptual agreement, nor any of the parties to the agreement, have identified the specific restoration projects which would justify payment of $3.6 million to the proposed foundation.

Although DFG officially supports approval of the entire settlement agreement, the testimony of DFG witnesses raises questions regarding whether the approach to waterfowl habitat restoration taken in the settlement agreement is reasonable, cost effective, or likely to result in productive waterfowl habitat restoration. In response to questioning by the representative of PMBP, DFG's Environmental Services Division Chief acknowledged having expressed misgivings about the waterfowl habitat provisions of the proposed settlement agreement. (T 1585:4-1586:13, T 1639:3-1639:12.) Similarly, the DFG biologist most involved with waterfowl habitat issues in the Mono Basin testified at length regarding numerous deficiencies of the proposed settlement regarding waterfowl habitat restoration. (T 1586:14-1620:19.)

Whatever merit the conceptual agreement on waterfowl habitat restoration may have, it is clear that the measures called for in the agreement do not comply with the requirements of Decision 1631. Contrary to the requirements of Decision 1631, the conceptual agreement does not identify most of the specific restoration measures to be undertaken; it does not identify the estimated costs for most of the proposed projects; it does not specify an implementation schedule for most of the work that is to be done; and it does not identify the estimated water requirements for proposed projects. Contrary to the direction of Decision 1631 that the proposed restoration plans "shall emphasize measures that have minimum potential for adverse environmental effects," the conceptual agreement places a high priority on the rewatering of Mill Creek despite evidence that rewatering Mill Creek could result in significant adverse effects to fish and other public trust resources dependent upon flow in Wilson Creek. Footnote25

Decision 1631 called for a cooperative restoration planning process, followed by a decision on what measures were to be pursued and, finally, followed by implementation of the selected measures. SWRCB approval of the conceptual agreement would essentially establish a new planning process with no resolution of what specifically is to be done, at what cost, where, or with what environmental impacts. The SWRCB's clear authority over a water right licensee would be replaced by a less clear oversight role with respect to a newly created foundation not subject to the statutory authority of the SWRCB. Footnote26

Moreover, the conceptual agreement is opposed by numerous Mono Basin residents, the Mono County Board of Supervisors and other elected officials, and many other local groups. The widespread opposition

to the proposed settlement makes it apparent that the benefits normally expected from accepting a settlement proposal involving many, but not all, parties cannot be expected in the present case. Rather than retaining SWRCB oversight of specific restoration projects to be undertaken by a water right licensee, approval of the waterfowl habitat portion of the proposed settlement would result in endowing a new independent foundation with $3.6 million of public funds to pursue unspecified projects over the opposition of Mono County and numerous residents of the Mono Basin. Rather than representing resolution of the disputes over waterfowl habitat restoration proposals, SWRCB approval of the conceptual agreement could cause an escalation of those disputes.

6.4 Analysis of Waterfowl Habitat Restoration Proposals

The diversion of water from Mono Basin streams for use in Los Angeles resulted in greatly reduced inflow to Mono Lake and a lower water level at the lake. This, in turn, caused a reduction in freshwater habitat areas around the lake and a large reduction in the hypopycnal Footnote27 areas at the mouths of Rush Creek and Lee Vining Creek. Footnote28 The waterfowl scientists' report agrees with the finding in Decision 1631 that the most significant measure to improve waterfowl habitat is to restore the flow in the four tributary streams and thereby raise the water level of Mono Lake.

Dr. Scott Stine testified that, with the flow requirements for Rush Creek and Lee Vining Creek established in Decision 1631, there will be larger hypopycnal areas at Mono Lake during the fall and winter than existed under natural conditions. (T 1818:5-1818:20.) The increased hypopycnal areas will be present during the most important periods for waterfowl habitat in the Mono Basin. (T 1842:1-1842:17.) Thus, the requirements of Decision 1631 will restore a significant amount of important waterfowl habitat through increasing the water level of Mono Lake and restoring large hypopycnal areas at the mouths of Rush Creek and Lee Vining Creek. Footnote29

Requiring a higher lake level (above the 6,392 feet provided for in Decision 1631) could restore additional waterfowl habitat, but would also result in flooding additional tufa areas, as well as reduce the amount of water available for consumptive uses. Rather than requiring a higher water level in Mono Lake, Decision 1631 directed Los Angeles to evaluate other potential measures that could restore or help mitigate for the loss of waterfowl habitat due to water diversions by Los Angeles.

Both the Los Angeles waterfowl habitat restoration plan and the settlement proposal represented in the conceptual agreement are based in large part upon recommendations in the waterfowl scientists' report. Therefore, evaluation of the waterfowl habitat restoration proposals before the SWRCB requires examination of several of the major restoration measures identified in the scientists' report. As indicated in the hearing notice, the focus of the SWRCB's inquiry is on determining if the restoration proposals presented comply with the criteria established in Decision 1631, and, if not, what revisions are necessary.

6.4.1 Restoration of Secondary Stream Channels in Rush Creek Bottomlands

The long periods of little or no flow in Rush Creek due to diversion of water by Los Angeles resulted in major changes in the configuration of Rush Creek and the adjoining side channels or distributaries. The waterfowl scientists' report states that approximately 15 acres of waterfowl habitat in the Rush Creek "delta trench" will be restored by the rising lake level and "many" more acres of habitat can be restored by rewatering abandoned channels. Approximately 58 acres of habitat in the Rush Creek bottomlands was considered to be irretrievably lost due to stream incision. (R-DWP-20, Appendix I, p. 54.) The predicted net loss of bottomlands habitat along Rush Creek is approximately 43 acres. (R-SLC/DPR-403, p. 6.)

The waterfowl scientists' report recommends that several secondary stream channels be reopened in the

Rush Creek bottomlands to provide small flows for restoration of waterfowl habitat in backwater depressions. The report recommends that consideration be given to sites which will be self-maintaining and which will not require extensive maintenance. The report also advises that mechanical disturbance to surface areas should be minimized. The report identifies five specific channels and channel complexes which have a high potential for waterfowl habitat restoration. (R-DWP-20, Appendix I, pp. 91 and 92.)

The waterfowl habitat restoration plan submitted by Los Angeles proposes to rewater all of the five channels and channel complexes identified in scientists' report. (R-DWP-20, p. 9.) The Los Angeles plan also recommends that periodic evaluations be conducted to assess the recovery of secondary channels and depressional areas. Some of the channels which are proposed to be rewatered for waterfowl habitat purposes were also identified in the stream restoration plan discussed in Sections 5.0 through 5.4 above. The Los Angeles waterfowl habitat restoration plan provides that Los Angeles will fund the $68,000 estimated cost for the project and that work will begin during the first full field season after approval of the plan by the SWRCB. The goal is to complete as much of the work as possible in the first year, although two or more years may be required to open all of the identified channels. (R-DWP-20, p. 22.) There was no evidence presented of adverse environmental effects attributable to reopening the secondary channels in the Rush Creek bottomlands.

The proposed settlement agreement provides that Los Angeles will carry out the reopening of Rush Creek channels as specified in its waterfowl habitat restoration plan. (R-DWP-68A, p. 12.) There was no evidence or argument presented in opposition to the proposed restoration of waterfowl habitat through reopening the Rush Creek distributaries. Based on the evidence before us, the SWRCB concludes that the proposal to rewater the Rush Creek distributaries as described in Los Angeles' waterfowl habitat restoration plan meets the requirements of Decision 1631 and should be implemented. Footnote30

6.4.2 Rewatering of Mill Creek

Diversion of water from Mill Creek for irrigation began before the turn of the century. Dr. Stine testified that the bottomlands of Mill Creek are marked by the trunks of dead cottonwood trees killed by the dewatering of the stream that began in the 1870's. By early in this century, most of the riparian vegetation on the Mill Creek bottomlands had died. (R-SLC/DPR-400, p. 2.) Construction of the "Lundy Project" hydroelectric facilities in 1911 by a predecessor to Southern California Edison resulted in diversion of water from Mill Creek through the Lundy Powerhouse and release into the tailrace. From the tailrace, the majority of the water flows to Wilson Creek. The net result of water diversion for irrigation and power purposes at the north end of the Mono Basin is that the quantity of flow in lower Mill Creek has been substantially reduced from what existed in a state of nature, and much of that water now flows downstream to Mono Lake through Wilson Creek. Although Los Angeles uses its water rights on Mill Creek for irrigation of Thompson Ranch, Los Angeles does not divert any water from either Mill Creek or Wilson Creek for export from the Mono Basin.

Due to water diversions for agriculture and power production, the wetland areas adjoining Mill Creek did not contribute significant habitat to the abundant waterfowl populations reported at Mono Lake during the early 1930's to early 1960's. (R-DWP-20, Appendix I, p. 97.) The waterfowl scientists' report discusses the possibility of restoring a portion of the riparian habitat and vegetation which once adjoined Mill Creek as a means of mitigating for losses of similar habitat elsewhere in the Mono Basin. The report cites a study by Dr. Stine who estimated that restoration of flow to Mill Creek could create "approximately 14 acres of hypopycnal environment at the mouth of Mill Creek, 16 acres of riparian wetlands in the stream bottomlands, and 25 acres of riparian vegetation on the exterior delta . . . ." (R-DWP-20, Appendix I, p. 97.) The scientists' report acknowledges that restoring the maximum amount of waterfowl habitat in Mill Creek would require reinstating most, if not all, of the annual flows which are currently in Wilson Creek.

Although the report places a high priority on increasing flows to Mill Creek, it recognizes that: "[r]estoration of all potential waterfowl habitat on Mill Creek does not appear feasible under current conditions due to complicated issues involving water rights and the need for structural improvement to convey increased flows." (R-DWP-20, Appendix I, pp. 97 and 98.) Footnote31

The scientists' report goes on to recommend: (1) dedication of Los Angeles' water right on Mill Creek to restoration of instream flows in Mill Creek; (2) possible dedication of the USFS water right for use in rewatering Mill Creek; (3) reopening of several Mill Creek channels; (4) assessing the feasibility of reopening other Mill Creek channels; and (5) negotiations among Los Angeles and other parties with the Conway Ranch and other entities to explore methods of obtaining water during the September to March period. (R-DWP-20, Appendix I, pp. 98 and 99.) Despite the presence of elevated flows in Wilson Creek since early in this century and the development of an extensive riparian zone, self-sustaining Brown trout fishery, and varied wildlife populations dependent upon the existing pattern of flow, the report refers to Wilson Creek as "historically an ephemeral channel, flowing only at peak runoff" which has limited value to waterfowl and little potential for restoration. Without any discussion of the fish, wildlife, and other resources dependent upon Wilson Creek, the report concludes that the "best ecological use of current Wilson Creek water is to return most of it to Mill Creek as close to the headwaters as possible." (R-DWP-20, Appendix I, p. 99.)

The scientists' recommendation to pursue rewatering Mill Creek through use of flows now in Wilson Creek was carried over to the proposed settlement as set forth in the provisions of the conceptual agreement. The conceptual agreement "endorses" the recommendations of the February 1996 waterfowl scientists' report and provides that the "proposed project" is rewatering Mill Creek with high springtime and summer flows, high flows during late summer and fall to ensure maximum water availability during times when waterfowl are most abundant, and rewatering abandoned channels in the bottomlands and delta trenches in order to maximize spring recharge and provide for large hypopycnal areas beyond the stream mouth. (R-DWP-68A, pp. 1 and 3.) Footnote32

Dr. Stine testified that he expected that the proposed rewatering of Mill Creek botttomlands could "provide habitat for hundreds, but not thousands or tens of thousands, of ducks." (T 1823:18-1823:25.) Dr. Stine went on to explain that the primary purpose of rewatering Mill Creek would be to increase the hypopycnal area at the mouth of Mill Creek. (T 1824:8-1825:13.) In a meeting before a group in the Mono Basin, Dr. Stine explained his views regarding Mill Creek restoration as follows:

"The reason this [the rewatering of Mill Creek] is being discussed in terms of ducks is that the waterfowl issue has been raised by the State Water Board. There have been lots of us, who for a long time, have been seeing that in terms of an environmental issue, in terms of a species issue, in terms of a nature issue, Mill Creek is the big issue left in the Mono Basin. Not just because of waterfowl, but for lots and lots and lots of reasons. So I would -- just want to make it clear that by putting water back into Mill Creek is not being suggested simply because of waterfowl. I would say that there's [sic] a relatively one of, perhaps even one minor element, of a whole bunch of different elements of why to rewater Mill Creek, why to put Mill Creek back to the way it has been for the past 10,000 years." (R-PMBP-31; T 1828:25-1831:13.)

Although Dr. Stine believes that many of the resources currently served by water in Wilson Creek could continue to be served if flows were returned to Mill Creek, he believes that it would not be possible to restore the hypopycnal area at the mouth of Mill Creek and retain sufficient water in Wilson Creek to protect the existing year-round fishery. (T 1836:4-1837:21.)

Testimony and exhibits submitted by several parties referred to the existing brown trout fishery in Wilson Creek. (e.g., R-BLM-3, p. 3; R-PMBP-30, pp. 2, 13 and 14.) In commenting on a proposed hydroelectric

project on Wilson Creek in 1993, DFG stressed that Wilson Creek had a self-sustaining brown trout fishery which compared favorably with other streams in the area, and that "[i]nstream flows necessary to maintain this population in good condition are required by law." (R-PMBP-18, DFG letter dated June 1, 1993 regarding "Paoha Project," FERC No. 3259.) The testimony of Dr. Stine and others indicates that there appears to be insufficient flow in Wilson Creek and Mill Creek to simultaneously restore the large hypopycnal area at the mouth of Mill Creek and maintain sufficient flow in Wilson Creek to maintain the existing fish in good condition. Footnote33

BLM presented written and oral testimony from Terry Russi, a wildlife biologist with 14 years of experience in BLM's Bishop Resource Area in which the Mono Basin is located. (R-BLM-3; T 806:13-812:21.) Over a period of 18 years, BLM has developed an extensive data base on all reaches of Wilson Creek. BLM's evaluation of the available data led it to classify the portion of Wilson Creek upstream of Highway 167 in the highest available ranking for streams under the Department of the Interior's system for evaluating the ecological status of streams on public land. BLM reported that "[r]iparian vegetation conditions and streambank stability are robust" in this reach of Wilson Creek. BLM describes the vegetation along Wilson Creek as "structurally and compositionally varied, providing not only an important mix of wildlife habitats but ecologically important reference sites as well." BLM reports that a "highly diverse assemblage of birds and mammals" uses the riparian corridor of Wilson Creek, including a "high number of songbird species, waterfowl, . . . mule deer, and an unusually high density of small mammals dominated by meadow voles and shrews." (R-BLM-3.) Footnote34

BLM expressed concern that Los Angeles' waterfowl habitat restoration plan failed to consider the presence and value of physical and biotic conditions between the point where water is diverted into Wilson Creek and Highway 167, a distance of approximately 3.4 stream miles. BLM concludes that:

". . . the goal of creating habitat on Mill Creek, at what may be the eventual expense of the substantial natural values along Wilson Creek is not supported by current practices employed in landscape (ecosystem) management and the wise conservation of biodiversity." (R-BLM-3; see also T 806:13-813:2.)

Biologist Brian Tillemans testified that Wilson Creek provides some of the best waterfowl habitat in the north shore area at the present time and that he would be very concerned about impacts to waterfowl if all the flow were removed from Wilson Creek. (T 658:7-658:25.) Similarly, PMBP presented testimony of long-time Mono Basin resident Joseph Bellomo that terminating irrigation of upper and lower Thompson Meadows in order to increase flows in Mill Creek, as proposed in the waterfowl habitat restoration plan, would cause the destruction of large meadow areas which provide habitat for many species of birds including geese which graze on grass in the meadows. (R-PMBP-30, pp. 1-6.)

PMBP introduced petitions with over 300 signatures of many long-time Mono Basin residents and others opposed to restoration of Mill Creek at the expense of Wilson Creek. (R-PMBP-27.) The depth of the local residents' opposition to sacrificing resources dependent upon flows in Wilson Creek is evident in the declarations of Martin A. Strelneck, Don L. Banta, Lily La Brague Mathieu, Heidi Hess-Griffin, August Hess, and Jeffrey P. and Kathleen A. Hansen. (R-PMBP-10, R-PMBP-11, R-PMBP-12, R-PMBP-13, R-PMBP-14, and R-PMBP-15.) Several participants in PMBP have described the prospect of attempting waterfowl habitat restoration along Mill Creek at the expense of the existing wildlife and other resources dependent upon flows in Wilson Creek as "restoration by destruction." In addition to the fish, wildlife and riparian resources in the immediate vicinity of Wilson Creek, PMBP urges the SWRCB to consider the wildlife, recreational, aesthetic, and cultural heritage benefits served by continued irrigation of nearby ranches. (T 1309:8-1325:23.)

It is apparent from the testimony and other evidence presented by PMBP that many Mono Basin residents

view Wilson Creek and the resources dependent upon it from a distinctly different perspective than is reflected in the waterfowl scientists' report. Rather than seeing Wilson Creek as an unnatural, historic artifact to be disregarded in the pursuit of restoring "natural conditions," the record shows that many Mono Basin residents view Wilson Creek, and the resources dependent upon its flow, as being an invaluable part of their heritage with benefits to fish, wildlife, recreational users, and the scenery. Rather than focusing on the fact that the current channel configuration and flows of Wilson Creek did not exist some 80 to 100 years ago, the participants in PMBP urge that full consideration be given to the current uses and condition of the stream. Footnote35

There was no evidence presented regarding the effect which restoring the full (or nearly full) flow of water to Mill Creek would have on the water elevation of Mono Lake. If irrigation at the north end of the Mono Basin were to be reduced in order to restore "natural" flows to Mill Creek, the inflow to Mono Lake would increase. Determining the impact the additional flow from Mill Creek would have on lake level would require evaluation of the inflows from other Mono Basin streams and the water diversion criteria established in Decision 1631. Evaluation of those issues is beyond the scope of the present proceeding.

In the period in which waterfowl were reported to be abundant in the Mono Basin during the 1930's to early 1960's, the flow in Mill Creek had already been reduced as discussed previously. (R-DWP-20, Appendix 1, p. 97.) Thus the large hypopycnal areas attributable to inflow to Mono Lake from surrounding streams was largely due to flows from Rush Creek and Lee Vining Creek. As discussed in Section 6.4 above, the testimony indicates that the flows in Rush Creek and Lee Vining Creek required by Decision 1631 will result in larger hypopycnal areas at the mouths of those streams than occurred under natural conditions during the months most important to waterfowl. Footnote36 The SWRCB concludes that establishment or restoration of a large hypopycnal area at the mouth of Mill Creek is not necessary to provide suitable waterfowl habitat pursuant to the provisions of Decision 1631.

In summary, the diversion of water under Licenses 10191 and 10192 did not cause the reduction of flows in Mill Creek. In view of the increased hypopycnal areas at near the mouths of Rush Creek and Lee Vining Creek resulting from the flows required by Decision 1631, the need for an expanded hypopycnal area near the mouth of Mill Creek has not been established. The record indicates that the other benefits which rewatering Mill Creek would provide for waterfowl habitat are relatively minor. (See, e.g., T 1823:18-1825:73.) The present level of flow in Wilson Creek serves a wide variety of resources including fish, wildlife, recreation, irrigation, and scenic values which have not been adequately addressed or considered by the proponents of restoring Mill Creek. In contrast to the rewatering of small distributaries in the Rush Creek bottomlands discussed in Section 6.4.2, the proposal to rewater Mill Creek at the expense of present flows in Wilson Creek has a potential for significant adverse environmental impacts. Footnote37

The present proceeding was not intended to provide a forum for resolution of complicated land and water use issues at the north end of the Mono Basin which have relatively little to do with waterfowl habitat. However, the evidence presented at the hearing clearly establishes that rewatering Mill Creek sufficiently to create significant waterfowl habitat cannot be considered to be a project which has "minimum potential for adverse environmental effects." Thus, regardless of the ultimate merits of some future proposal that may involve increased flow in Mill Creek, the evidence before the SWRCB does not merit inclusion of that proposal in the context of considering waterfowl habitat restoration measures meeting the requirements of Decision 1631. Footnote38 Proposals to rewater Mill Creek involve changes in the exercise of existing water rights which are beyond the scope of the current proceeding.

6.4.3 DeChambeau Ponds, County Ponds and Black Point

The waterfowl scientists' report briefly discusses the historical development of artificial freshwater ponds

on the DeChambeau Ranch which were heavily used by waterfowl. The report states that by 1992 only two of the ponds held water due to degradation from lack of maintenance. (R-DWP-20, Appendix I, p. 79.) Based on the recommendations in the scientists' report, the waterfowl habitat restoration plan submitted by Los Angeles discusses a three-phase project in the DeChambeau/County Ponds/Black Point area which would involve: (1) installation of underground irrigation pipe from an existing well to irrigate 10 acres of riparian vegetation and small depressional wetlands near DeChambeau Ponds at an estimated initial cost of $90,000; (2) artificial flooding of 20 acres in the County Ponds complex with water from new wells at an estimated cost of $640,000; and (3) increasing wetlands in the Black Point area by up to 10 acres through making two to five shallow scrapes which would be flooded with water from an existing artesian well. Los Angeles' waterfowl habitat restoration plan states that the three-phase project, as proposed in the waterfowl scientists' report, is not financially feasible without significant funding contributions from other sources. (R-DWP-20, p. 23.)

The DeChambeau Ponds and County Ponds areas are located on the DeChambeau Ranch which was acquired by the USFS on February 7, 1992. Prior to acquisition by the USFS, the ranch utilized water from Wilson Creek for irrigation and for maintenance of the water level in DeChambeau Ponds. The water from Wilson Creek has also served to maintain riparian and wet meadow habitat and some freshwater habitat in the County Ponds area. Due to the poor condition of the ditches from Wilson Creek, and opposition to continued use of surface water for maintenance of ponds, the USFS ceased irrigation of DeChambeau Ranch from Wilson Creek in 1992 or 1993. (T 759:22-765:22.) The absence of a gaging station to verify that USFS diversions from Wilson Creek were within its 12.6 cubic feet per second water right also contributed to the decision to stop diverting water from Wilson Creek for use on DeChambeau Ranch. (T 796:11-796:13.)

In 1992 the USFS, Ducks Unlimited and the MLC undertook a project to restore waterfowl habitat at the DeChambeau Ponds. The waterfowl scientists' report states that the project was completed at a cost of $430,000 in September 1995 and that it includes 15 acres of ponds and 20 acres of seasonal meadows. (R-DWP-20, Appendix 1, p. 79.) Testimony at the hearing addressed the problems of unexpectedly high leakage from the ponds, the high cost of running propane pumps to supply groundwater to the ponds, the fact that some of the ponds were not yet full, the additional work still needed in 1997 to complete the project, and the relatively slight use of the ponds following restoration efforts. (T 773:21-778:11; T 779:24-780:11.) Footnote39

PMBP presented the testimony of Joseph Bellomo regarding recent work by local residents and the USFS to repair the ditch systems and headgates, and resume diversion of water from Wilson Creek for irrigation and wildlife enhancement at the DeChambeau Ranch. Following the resumption of water deliveries to DeChambeau Ranch as a result of the repairs, there was an increase in birds on the ranch, including ducks on a new shallow ponded area. The testimony indicates that a substantial amount of work was done at minimal cost over a period of three weekends with volunteer labor and USFS assistance. (T 1725:18-1726:10.) In addition to resuming irrigation of the ranch, the joint USFS/volunteer effort also makes it possible to deliver surface water from Wilson Creek to serve the troubled DeChambeau Ponds project and the surrounding area. Footnote40 (T 1715:15-1726:1.) A letter from the USFS dated May 4, 1997 confirms that the USFS has resumed irrigation of DeChambeau Ranch in order to assess the feasibility of resuming use of the existing ditch system. The letter also reaffirms that any changes from the historic use of the USFS water right would be examined in a separate environmental analysis. (R-PMBP-42.)

The recent resumption of irrigation of the DeChambeau Ranch with water from Wilson Creek is consistent with USFS policy as set forth in the "Decision and Finding of No Significant Effect Concerning the Environmental Assessment for the DeChambeau Enhancement Project" entered on May 26, 1993.

(R-PMBP-43.) Although the testimony establishes that the USFS did not irrigate the ranch from Wilson Creek for several years, the 1993 decision called for development and repair of the DeChambeau Ditch, with a pipeline, as well as development of wells to supply water for the DeChambeau Ponds. The decision commits up to 1.0 cfs of the USFS surface water right for use in the ponds and it also provides that:

"a minimum of 11.6 cfs of the Forest Service's surface water right will remain available for the historic use of that water at the DeChambeau Ranch. Continuing to exercise that historic use should result in little or no change to the conditions of the riparian, wildlife and fisheries habitat that have developed as a result of that historic use of water at Wilson Creek, Wilson Creek ditch, DeChambeau Marsh, or the county ponds." (R-PMBP-43.)

PMBP also presented testimony from Mr. Bellomo about waterfowl at various locations in the north end of the Mono Basin. Based on 20 years of hunting experience in the Mono Basin, Mr. Bellomo testified that several ponded areas near springs on DeChambeau Ranch were "exceptional" areas for waterfowl, and that the County Ponds also provided good waterfowl habitat when they were receiving tailwater from the DeChambeau Ranch in the past. (T 1704:10-1708:17.) PMBP also presented testimony from John Frederickson regarding heavy waterfowl use, during windy weather, by several hundred ducks on a small pond on Wilson Creek near his house. (T 1695:25-1696:6.)

The record shows that the DeChambeau Ponds, County Ponds, and Black Point areas once provided considerably more waterfowl habitat than they have in recent years and that they have the potential to provide good waterfowl habitat in the future. The record also shows that the deterioration of the waterfowl habitat in those areas in recent years has been due in part to changes in the water diversion and land management decisions of the landowners. With improved maintenance of the ditches serving the DeChambeau Ranch, it appears that resumption of historic water uses on the DeChambeau Ranch, as called for in the 1993 USFS decision notice for the DeChambeau Enhancement Project, could restore a significant amount of habitat for waterfowl and other wildlife. The strong local interest and availability of volunteer labor indicates that any necessary work on the ditch system and irrigation facilities serving DeChambeau Ranch can be done for a small fraction of the cost of the projects proposed in the waterfowl scientists' report for the DeChambeau Ponds and County Ponds area. (T 1721:6-1726:15.)

The record also shows that the cost of the work already completed at DeChambeau Ponds as part of the USFS, Ducks Unlimited, and MLC project has been very high for the amount of waterfowl habitat provided to date. In view of the even higher estimated cost of the County Ponds project as proposed in the waterfowl scientists' report, the SWRCB concludes that the proposed method of rehabilitating the County Ponds does not comply with the reasonableness and financial feasibility criteria specified in Decision 1631. Evidence in the record indicates that similar habitat could be restored at much lower cost through the exercise of existing water rights in accordance with the USFS policy as set forth in the 1993 decision notice on the DeChambeau Enhancement Project.

The type and extent of any additional waterfowl habitat restoration efforts on the USFS property at the north end of the Mono Basin will depend in part upon the success of the previous work at DeChambeau Ponds and the resumption of surface water use on DeChambeau Ranch. If the USFS decides to continue exercising its surface water rights in accordance with the 1993 decision notice, restoration of waterfowl habitat in the County Ponds area would be a reasonable project which could be done in a manner consistent with the provisions of Decision 1631.

The record indicates that repairs and improvements to the surface water diversion and distribution facilities which have historically served the DeChambeau Ranch from Wilson Creek can be done for a small fraction of the cost of developing and operating an entirely new groundwater pumping and distribution system to

serve the County Ponds. In view of the potential value of the County Ponds and Black Point areas for waterfowl habitat, and the loss of habitat elsewhere in the Mono Basin due to Los Angeles' diversions, the SWRCB concludes that it would be reasonable to direct that, upon request of the USFS, Los Angeles provide financial assistance to the USFS for repairs to water diversion and distribution facilities and for related waterfowl habitat restoration work at County Ponds and Black Point.

Although the subject of specific habitat enhancements at the County Ponds was not analyzed in 1993, the USFS Decision Notice for the DeChambeau Enhancement Project concludes that 11.6 cfs of the USFS water right remains available for use at the DeChambeau Ranch and that continuing to exercise that right can benefit riparian and wildlife uses at various locations including the DeChambeau Marsh and County Ponds. (R-PMBP-43, p. 2.) As the owner of the DeChambeau Ranch and the appurtenant water rights, the USFS has authority to determine how to manage its property at the County Ponds and Black Point areas, as well as responsibility for the costs of managing that property. Any financial contribution to the USFS which Los Angeles is directed to make pursuant to this order is limited to money needed for initial repairs or improvements to water delivery facilities and waterfowl habitat areas as may be requested by the USFS.

Based on the evidence regarding the joint work of the USFS and PMBP in the spring of 1997, and the availability of volunteer assistance from Mono County residents, the SWRCB concludes that any additional work necessary for restoring a reliable surface water distribution system serving the County Ponds area should be relatively minor. If the USFS develops a project requiring installation of a lengthy pipeline, the cost would increase but water loss could be significantly reduced. Although the costs of a viable restoration project at County Ponds may be substantially less, the SWRCB concludes it would be reasonable to require Los Angeles to contribute up to $250,000 for a waterfowl habitat restoration project at County Ponds in the event the USFS develops a project which requires that much financial assistance. A cost of $250,000 for restoration of 20 acres of waterfowl habitat at County Ponds would be approximately equal to the per acre cost of the De Chambeau Ponds project. De Chambeau Ponds is the most costly waterfowl habitat restoration project previously undertaken in the Mono Basin. Based on the cost estimates in the waterfowl habitat restoration plan, the SWRCB concludes that the responsibility of Los Angeles for the reasonable costs for waterfowl habitat improvements at the Black Point area should not exceed an additional $25,000. (R-DWP-20, pp. 23 and 38.) Footnote41 The primary decision regarding the extent and type of waterfowl habitat work that may be undertaken on USFS land lies with the landowner.

As an alternative to waterfowl restoration at the DeChambeau/County Ponds/Black Point complex, the waterfowl scientists' report states that additional freshwater habitat could be developed through making shallow "scrapes" in lake-fringing wetland areas. However, the scientists' report concludes that:

". . . we do not recommend developing scrapes at this time, as we believe that concentrating low impact engineering project improvements at the DeChambeau/County Ponds/Black Point complex is a preferred option to mitigate losses of open freshwater habitats. These areas have already undergone changes in hydrography by humans and serve as a better landscape for mitigation. We further recommend that development of these scrapes be reconsidered if monitoring indicates other habitat development does not produce desired results." (R-DWP-20, Appendix I, p. 75.)

The waterfowl scientists' report also discusses the statutes and policies governing habitat manipulation on: (1) land in the Mono Lake Tufa State Reserve composed of state-owned land adjoining Mono Lake below elevation 6,417 feet; and (2) the 117,000 acres which comprise the Mono Basin National Scenic Area. Both categories of land are subject to statutory restrictions and policies limiting development and other activities. The report states that large scale, visually obtrusive engineering projects generally are not consistent with either agency's management policies and that, on land within the Tufa State Reserve, "prescribed burns may be the only important and acceptable management tool that can be used to

manipulate vegetation density and composition in order to increase freshwater waterfowl habitat." (R-DWP-20, Appendix I pp. 57 and 58.)

The waterfowl habitat restoration plan submitted by Los Angeles does not propose development of scrapes except in the Black Point area. In accordance with the waterfowl scientists' recommendation and the laws and policies governing the Mono Lake Tufa State Reserve and the Mono Basin National Scenic Area, the SWRCB concludes that Los Angeles should not be required to undertake or provide financial assistance for additional "scrapes" in lake-fringing wetlands areas at this time. However, in the event that the USFS decides not to undertake waterfowl habitat restoration at County Ponds or Black Point, and in the event that the relevant state and federal agencies determine that shallow scrapes or other unobtrusive projects should be undertaken on wetland areas adjoining Mono Lake, then it would be appropriate for Los Angeles to provide financial assistance for those projects up to the total amount of $275,000 discussed above for work at County Ponds and Black Point. Similarly, in the event that projects are completed in the County Ponds and Black Point areas at a cost to Los Angeles of less than $275,000, then it would be appropriate to make the remaining funds available for shallow scrapes or other unobtrusive waterfowl habitat projects which the relevant state and federal agencies may elect to undertake on their wetland property adjoining Mono Lake. In the event that the relevant state and federal agencies elect not to approve or pursue waterfowl habitat projects in wetland areas adjoining Mono Lake, then it would not be feasible to require Los Angeles to assist with those projects.

6.4.4 Controlled Burning

Based on positive responses by waterfowl and other birds to prescribed burning in other areas, the waterfowl scientists' report recommends development of a controlled burn program in order to maintain open water sites and increase the vigor of surrounding wetland vegetation. The report states that the specific methodology and time schedules for prescribed burns to achieve optimum vegetative response are not known. Therefore, the report recommends experimental prescribed burns at five year intervals to be followed by appropriate monitoring to assess the results. (R-DWP-20, Appendix I, pp. 60-71.)

The waterfowl habitat restoration plan submitted by Los Angeles proposes to burn 400 acres on an experimental basis. The initial burn would be followed by subsequent burns every five years on a rotational basis of approximately 1,000 to 1,200 acres of marsh and seasonal wet meadow habitat near Mono Lake. The plan estimates that the cost will be approximately $12,000 for the initial burn and approximately $36,000 for subsequent burns. The plan also recommends "spot burning" of large accumulations of old woody debris in abandoned creek channels. Large accumulations of woody debris are thought to retard regeneration of desirable riparian vegetation and reduce areas of open water and ponds in abandoned creek channels. (R-DWP-20, pp. 25-27.)

The plan submitted by Los Angeles expresses "very strong concerns" about fire escaping from the project areas to areas where other types of habitat restoration is already occurring and states that Los Angeles will strictly adhere to all precautions required by the California Department of Forestry. The plan states that Los Angeles intends to include prescribed burns in the Mono Basin in the vegetative management plan being developed for other lands it manages in the eastern Sierra Nevada. (R-DWP-20, pp. 25 and 26.)

The testimony at the hearing generally favored use of prescribed burning, although there was some evidence that the benefits may be short-term and that the costs may be higher than estimated in the Los Angeles plan. (e.g. T 1484:8-1484:18; T 1504:21-1505:12.) More information about the effects of prescribed burning in the Mono Basin can be developed from review of the Department of Parks and Recreation prescribed burning program which was described in the written testimony of Dr. James Barry and Ranger David Carle. (R-SLC/DPR-100 and R-SLC/DPR-200.)

Controlled burning in the Mono Basin is subject to the regulatory authority of the California Department of Forestry and the Great Basin Air Pollution Control District, as well as the permission and cooperation of the landowner(s) where burning is to take place. The record before the SWRCB indicates that the controlled burning program proposed in the waterfowl habitat restoration plan would have benefits for waterfowl habitat and should be implemented if the necessary regulatory approvals are obtained and the participating agencies comply with provisions of the California Environmental Quality Act. This order directs Los Angeles to: (1) proceed with obtaining the necessary approvals for implementation of the proposed controlled burning program; and (2) to provide the SWRCB Chief of the Division of Water Rights with a copy of any environmental documentation for the program. Following review of the environmental documentation, the Chief of the Division of Water Rights may direct Los Angeles to proceed with implementation of the controlled burning program pursuant to the requirements of Decision 1631. This order also authorizes the Chief of the Division of Water Rights to modify requirements related to the controlled burning program in the event that the necessary permits cannot be obtained, there is evidence the burning may cause significant adverse environmental effects or damage to nearby property, or other information indicates that the program should be revised.

6.4.5 Control of Salt Cedar in Lake-Fringing Wetlands

The waterfowl scientists' report states that "Salt Cedar . . . has the potential to negatively impact riparian and lake-fringing wetlands in the basin." (R-DWP-20, Appendix 1, p. 72.) Based on the waterfowl scientists' recommendations, the Los Angeles plan states that Los Angeles will assist and participate in a joint approach to the control of Salt Cedar and other exotic (i.e., non-native) plant species. (R-DWP-20, p. 27.) The SWRCB agrees with Los Angeles that other agencies with land management responsibilities in the Mono Basin should share in the obligation to control harmful exotic species. In the event that an interagency program to control exotic species in the Mono Basin is developed, this order directs Los Angeles to participate in the interagency efforts and to manage Los Angeles' land in the Mono Basin accordance with the provisions of the interagency exotic species control program.

6.4.6 Monitoring Waterfowl Habitat Restoration and Waterfowl Population

Decision 1631 required that the waterfowl habitat restoration plan include a method for monitoring the results and progress of habitat restoration projects. (Decision 1631, pp. 206 and 207.) The information developed through the monitoring program can be used to evaluate the results of increased streamflows, rising lake levels, waterfowl habitat restoration measures required by this order, and waterfowl habitat restoration efforts undertaken by other agencies and landowners in the Mono Basin.

The waterfowl habitat restoration plan submitted by Los Angeles focuses on monitoring the condition of waterfowl habitat in the Mono Basin rather than on a projected number of waterfowl. The proposed monitoring plan proposes to collect and evaluate information relevant to the following conditions:

(1) Hydrologic data including lake elevation data, stream flows and spring surveys.

(2) Lake limnology and secondary producers, including data on phytoplanton and brine shrimp population levels, as well as meteorological data and data on the physical and chemical environment of Mono Lake.

(3) Vegetation in riparian and lake-fringing wetlands. The plan proposes establishment of vegetation transects in lake-fringing wetlands and the establishment of photo points on permanent vegetation transects. The plan also proposes aerial photographs to be taken every five years.

(4) Waterfowl population surveys and studies including fall aerial counts, aerial photography, ground counts, and a waterfowl "time activity budget study." (R-DWP-20, pp. 27-29.)

The proposed monitoring activities are either already underway or are scheduled to begin during the first year after SWRCB approval of restoration plans. The estimated cost of the monitoring program is $140,000 per year, including $80,000 per year for monitoring of lake limnology and secondary producers.

An issue arose during the hearing regarding whether the monitoring program should be required to include alkali fly populations at Mono Lake. Decision 1631 concluded that a water level in Mono Lake at or near 6,390 feet will maintain the aquatic productivity of Mono Lake (including alkali flies) in good condition. (Decision 1631, p. 82.) The record from the 1997 hearing provides no basis for changing that conclusion. Therefore, this order does not direct Los Angeles to add alkali flies to the other monitoring work which it has proposed.

Los Angeles' plan proposes that aerial photographs on a 1:6,000 scale be taken every five years to be used in monitoring changes in vegetation. (R-DWP-20, p. 28.) The Los Angeles plan also proposes that aerial photography be undertaken in conjunction with its fall waterfowl population surveys. In accordance with the recommendations of the waterfowl scientists' report, Los Angeles proposes that aerial photography be done as part of the waterfowl population surveys once every other year. (R-DWP-20, p. 29.) However, the waterfowl scientists' report also states that the importance of waterfowl population data may justify aerial counts on an annual basis. The report estimates the annual cost of aerial flights and associated work for photography of waterfowl habitat at $5,000 per year. (R-DWP-20, Appendix I, p. 107.)

In view of the rapidly changing conditions in the Mono Basin, aerial photography of vegetation performed at five year intervals would not be sufficient for evaluation of more rapid changes and would be of limited value for use in adaptive management of ongoing restoration activities by Los Angeles or others. Annual aerial photography of waterfowl habitats also would provide more complete information for use in the waterfowl population studies proposed by Los Angeles.

In summary, the waterfowl habitat restoration monitoring plan presented by Los Angeles will provide useful information for evaluating the effect of changes in the Mono Lake area and planning future restoration activities accordingly. However, the plan proposed by Los Angeles should be modified to include annual aerial photography of waterfowl habitat areas for use in the waterfowl population surveys and for use in documenting the annual vegetative changes. Footnote42 With that modification, the SWRCB believes that the waterfowl habitat monitoring plan is adequate and should be implemented upon entry of this order. If information developed through the monitoring plan shows a need for changes in monitoring activities, this order provides that requests for such changes may be submitted to the Chief of the Division of Water Rights.

6.5 Conclusions Regarding Waterfowl Habitat Restoration Proposals

As anticipated in Decision 1631, the record continues to reflect general agreement that the rising water level at Mono Lake will provide the largest increase in future waterfowl habitat in the Mono Basin. Footnote43 An average lake level of 6,392 feet and the streamflows required under Decision 1631 will result in large hypopycnal areas at the mouths of Rush Creek and Lee Vining Creek, new "hypopycnal rias" or lagoons extending back up the streams away from the lake, brackish water lagoons in some areas, and increased wetland and riparian areas along the streams. That process is occurring and will continue to occur pursuant to the provisions of Decision 1631.

The record also shows that the completion of the DeChambeau Ponds Enhancement Project and irrigation

on the DeChambeau Ranch following USFS repairs to the DeChambeau Ditch in 1997 should increase the amount of fresh water waterfowl habitat in the Mono Basin from what was available when Decision 1631 was entered. This order directs Los Angeles to provide financial assistance for additional waterfowl habitat restoration work at the County Ponds and Black Point areas or other property in lake fringing wetland areas.

Numerous other waterfowl habitat restoration or enhancement projects are addressed in the testimony and exhibits. The SWRCB finds that the proposal to rewater the Rush Creek distributaries meets the criteria established in Decision 1631 to propose specific, reasonable, and feasible restoration measures with minimal potential for adverse environmental effects. In addition, this order directs Los Angeles to take steps necessary for implementation of a controlled burning program and to participate in interagency efforts to control Salt Cedar and other exotic plants if a basin-wide project is developed. Finally, the SWRCB finds that a comprehensive waterfowl and waterfowl habitat monitoring program will be useful in evaluating changing conditions for waterfowl in the Mono Basin due to the actions of Los Angeles and others. The monitoring program required by this order will also provide information which may be helpful for adjusting ongoing actions and planning future activities in a manner beneficial to waterfowl.

Based on recommendations in the waterfowl scientists' report regarding Mill Creek, Los Angeles filed Water Right Application 30565 to appropriate water from Wilson Creek and return it to Mill Creek for instream uses in that stream. The desirability of establishing waterfowl habitat along Mill Creek at the cost of reduced flows in Wilson Creek is an extremely complicated issue which cannot be resolved in the present proceeding, and which goes beyond considerations regarding waterfowl habitat. In any event, DFG contends that it is the appropriate agency to hold the water right application for restoration of flow in Mill Creek. (R-DFG-5, Attachment dated 4/8/96, p. 13.) The SWRCB recognizes that the Legislature has designated DFG as the state agency with authority and responsibility to undertake various wildlife habitat programs of the type that might benefit from providing additional flow to Mill Creek. Therefore, in this instance, the SWRCB concludes that, upon request of DFG, it would be appropriate for Los Angeles to assign Application 30565 to DFG for possible use in any Mill Creek restoration project which DFG may decide to pursue. As announced at the beginning of the hearing, issues regarding the merits of Application 30565 and potential approval of the application are not before the SWRCB in this proceeding.

7.0 SUMMARY AND CONCLUSIONS

Decision 1631 substantially resolved the long-standing debate over imposing restrictions on water diversions from the Mono Basin in order to protect environmental and public trust resources. In recent years, attention has shifted to examining other actions that could be taken to help restore various resources damaged through years of water diversions and in-basin development. The focus of this order is on the still narrower issue of determining the stream and waterfowl habitat restoration measures that Los Angeles should be required to implement or participate in under the provisions of Decision 1631 which amended the conditions governing Los Angeles' diversion of water under Licenses 10191 and 10192.

Just as the nature of the debate has evolved over the years, so too has the orientation and identity of the participants. All of the participants in the 1997 hearing were concerned with how best to restore Mono Basin streams and waterfowl habitat. Footnote44 The record reflects a large degree of consensus regarding the stream restoration measures to be pursued by Los Angeles. None of the participants in the SWRCB hearing are on record as opposing the stream restoration aspects of the proposed settlement agreement. That proposal relies primarily on stream restoration and recovery occurring through natural processes with periodic high flows and proper land management to assist the recovery process. Based on the record before us, the SWRCB concludes that the stream restoration plan described in the settlement proposal, as modified by the provisions of this order, is in compliance with the criteria established in Decision 1631.

In order to avoid confusion with the channel maintenance flows established in Decision 1631, the higher flows required under this order for stream restoration purposes are referred to as "stream restoration flows." The stream restoration flows required under this order will apply on an interim basis pending future review by the SWRCB of the status of the stream restoration program. At that time, the SWRCB can determine whether it is appropriate to revise any of the long-term flow requirements established in Decision 1631. In addition, this order establishes qualitative criteria for use in determining when the stream restoration program may be terminated.

In contrast to the general consensus on stream restoration work, the record shows heated disagreement over the recommendations in the waterfowl scientists' report, the waterfowl habitat restoration plan submitted by Los Angeles and the "Waterfowl Habitat Restoration Foundation Conceptual Agreement" referred to in the proposed settlement. (R-DWP-68 and 68A.) The plan originally submitted by Los Angeles and the proposed settlement have generated stringent opposition from numerous individuals, local agencies and organizations, and witnesses with considerable expertise and many years of knowledge regarding conditions in the Mono Basin.

As discussed in Sections 6.0 through 6.5, the proposed approach to waterfowl habitat restoration reflected in the conceptual agreement and some of the waterfowl habitat restoration proposals presented in the original Los Angeles plan do not comply with the requirements of Decision 1631. Consequently, this order does not require implementation of all proposals addressed in the conceptual agreement or the original Los Angeles waterfowl habitat restoration plan. However, the extensive information developed in the preparation of the Los Angeles plan, together with the evidence presented at the hearing, provide a sufficient basis for the SWRCB to determine waterfowl habitat restoration measures which will comply with Decision 1631.

As recognized in the three waterfowl scientists' report and confirmed by other evidence in the record, by far the most significant restoration of waterfowl habitat in the Mono Basin will occur due to the rising water elevation at Mono Lake and the restoration of flows in the tributary streams as required by Decision 1631. The additional waterfowl habitat restoration measures to be undertaken pursuant to this order include: (1) reopening distributary channels in the Rush Creek bottomlands; (2) providing financial assistance for restoration of waterfowl habitat at County Ponds and Black Point or other lake-fringing wetland areas; (3) participation in a controlled burning program subject to applicable permitting and environmental review requirements; (4) participation in exotic species control efforts if an interagency program is established in the Mono Basin; and (5) a comprehensive waterfowl and waterfowl habitat monitoring program.

This order does not require Los Angeles to pursue proposals to rewater Mill Creek or to pursue other proposals to alter the historic uses of water presently in Wilson Creek. Those proposals could involve sweeping changes in established land management practices on public and private property and substantial changes in the exercise of established water rights held by parties not subject to SWRCB jurisdiction in the present proceeding. Any proposal to significantly alter the distribution of flows between Mill Creek and Wilson Creek must be preceded by an appropriate environmental document which fully addresses potential environmental impacts. In accordance with Water Code sections 174, 275, and 1200 et seq., and article X, section 2 of the California Constitution, the SWRCB has authority to review the environmental impacts, public interest considerations, and reasonableness of any future proposals to restore flows to Mill Creek by diversion of water presently used elsewhere.

In accordance with Decision 1631 and the findings above, and in the exercise of its continuing authority over Licenses 10191 and 10192, the SWRCB approves the elements of the stream restoration and waterfowl habitat restoration proposals described below and concludes that Los Angeles should be required

to implement the specified measures pursuant to the provisions of this order.

ORDER

IT IS HEREBY ORDERED THAT the Los Angeles Department of Water and Power (Licensee) shall implement stream restoration and waterfowl habitat restoration measures in accordance with the provisions below:

1. Licensee shall implement its February 29, 1996, Mono Basin Stream and Stream Channel Restoration Plan with the following revisions: Footnote45

a. Stream Restoration Flows ("SRFs"):

(1) Until the water elevation in Mono Lake initially reaches 6392 feet, Licensee shall provide SRFs in Rush Creek in the amounts and for the times specified in Table 1 attached to this order. Licensee need not provide any SRFs in dry years. In addition, Licensee may reduce the SRFs in dry/normal and normal years to the extent necessary to maintain the water exports allowed by Decision 1631. In dry/normal and normal years , Licensee shall seek to have between 30,000 and 35,000 acre-feet of water in storage in Grant Lake at the beginning and the end of the run-off year. Licensee is not required to reduce storage in Grant Lake below 11,500 acre-feet in order to provide SRFs.

(2) After the water level in Mono Lake reaches 6392 feet, Licensee shall provide SRFs in Rush Creek, Lee Vining Creek, Parker Creek, and Walker Creek as set forth in Table 2. SRFs required under this paragraph shall remain in effect until the State Water Resources Control Board determines that the specified flows are no longer needed for stream restoration purposes. Upon termination of the SRFs required pursuant to this order, it may be necessary to modify the channel maintenance and flushing flows established in Decision 1631.

(3) The SRFs specified in this order are minimum flows and are in addition to the flow requirements set forth in Decision 1631. Licensee shall in all years attempt to maximize SRFs through coordination with Southern California Edison (SCE) and may encourage SCE to coordinate their spills and releases with spills from Grant Lake. Licensee's coordination with SCE may include granting SCE waivers from the 5 percent storage rule otherwise applicable to SCE facilities, developing annual operation plans in consultation with SCE, and encouraging SCE to coordinate the release of excess water from Tioga Lake with peak flows in Lee Vining Creek. In wet and extreme wet years, Licensee shall attempt to maximize SRFs in Rush Creek through operation of Grant Lake to maximize the probability and magnitude of spills with a target of holding 40,000 acre-feet of water in storage at Grant Lake on April 1. If Licensee is unable to achieve this target, it shall provide a written explanation to the Chief of the Division of Water Rights, and to other parties upon request, by May 1 of each year.

(4) Licensee shall not irrigate from Parker Creek and Walker Creek when providing SRFs in Rush Creek. If Licensee can anticipate peak flows in Parker Creek and Walker Creek, it shall not irrigate from Parker Creek during SRFs in Parker Creek or from Walker Creek during SRFs in Walker Creek. Licensee shall use its best efforts to anticipate peak flows in Parker Creek and Walker Creek.

b. Stream Monitoring: Licensee shall implement its January 1997 stream monitoring plan (R-DWP-22 and R-DWP-23) with the following changes, subject to the provisions specified below:

(1) Licensee shall fund and implement a stream monitoring program to be carried out under the direction Bill Trush, Chris Hunter and such other independent scientists as may be approved by the Chief of the

Division of Water Rights. Any member of the stream monitoring team may be replaced upon approval of the Chief of the Division of Water Rights.

(2) The stream monitoring team shall oversee implementation of the stream monitoring program including the following functions:

(a) The stream monitoring team shall evaluate and make recommendations, based on the results of the monitoring program, regarding the magnitude, duration and frequency of the SRFs necessary for the restoration of Rush Creek; and the need for a Grant Lake bypass to reliably achieve the flows needed for restoration of Rush Creek below its confluence with the Rush Creek Return Ditch. This evaluation shall take place after two data gathering cycles (as defined in the stream monitoring plan), but at no less than 8 years nor more than 10 years after the monitoring program begins. Licensee shall implement the recommendation of the monitoring team unless it determines that the recommendation is not feasible. Licensee shall have 120 days after receiving the recommendation from the monitoring team to determine whether to implement the recommendation of the monitoring team. If any party disagrees with Licensee's determination regarding implementation of the monitoring team's recommendation, the party may request review by the Chief of the Division of Water Rights who shall then decide the matter.

(b) The stream monitoring team shall evaluate the effect on Lee Vining Creek of augmenting Rush Creek flows with up to 150 cubic feet per second (cfs) of water from Lee Vining Creek in order to provide SRFs. The stream monitoring team shall also evaluate: (1) the reliability of attaining the specified SRFs in Rush Creek through augmentation with water from Lee Vining Creek; and (2) the need for a Grant Lake outlet after consideration of relevant factors including any material adverse impacts on Lee Vining Creek and reliability of providing SRFs in Rush Creek. Licensee shall implement the recommendation of the monitoring team unless it determines that the recommendation is not feasible. Licensee will have 120 days after receiving the monitoring team's recommendation to make this determination. If any party disagrees with Licensee's determination, the party may request review by the Chief of the Division of Water Rights who shall then decide the matter.

(c) The stream monitoring team shall prepare a written annual report by December 31 of each year which evaluates the results of the stream monitoring program and recommends any proposed changes in the stream restoration program and monitoring program. Among other things, this report shall include a quantitative comparison in chart or comparable form of the criteria specified in paragraph (5) below and the corresponding conditions measured in each stream for that year. The report shall discuss the progress since the start of the monitoring program toward achievement of the specified criteria on each stream. To the extent reliable information is available, the report shall also include a comparison with the stream conditions in existence prior to 1941 and the stream conditions in existence prior to resumption of flows in Rush Creek in 1983, Lee Vining Creek in 1986, Walker Creek in 1990, and Parker Creek in 1990. The report shall be provided upon request and without charge to any of the parties to the hearing which preceded this order.

(d) The stream monitoring team shall develop and implement a means for counting or evaluating the number, weights, lengths and ages of fish present in various reaches of Rush Creek, Lee Vining Creek, Parker Creek and Walker Creek.

(e) The stream monitoring team shall make a recommendation to the State Water Resources Control Board regarding any recommended actions to preserve and protect the streams.

(3) On or about April 1 of each year, Licensee shall submit to the Chief of the Division of Water Rights an annual report on the monitoring program. This report shall set forth the monitoring team's evaluation of

results, the monitoring team's recommendations for any changes in the restoration program, and Licensee's position on such evaluation and recommendations.

(4) The stream restoration program may be terminated upon approval of the State Water Resources Control Board following public notice and opportunity for public comment. The State Water Resources Control Board will base its determination upon consideration of the following factors:

(a) Whether fish are in good condition. This includes self-sustaining populations of brown trout and other trout similar to those that existed prior to diversion of water by Licensee and which can be harvested in moderate numbers. Footnote46

(b) Whether the stream restoration and recovery process has resulted in a functional and self-sustaining stream system with healthy riparian ecosystem components for which no extensive physical manipulation is required on an ongoing basis.

(5) The State Water Resources Control Board's evaluation of the recovery and restoration of each of the four affected streams will include consideration of information provided by the Department of Fish and Game and information provided by the monitoring team regarding the following factors:

(a) Acreage of riparian vegetation, including mature trees of sufficient diameter, height, and location to provide woody debris in the streams;

(b) length of main channel

(c) channel gradient

(d) channel sinuosity

(e) channel confinement

(f) variation of longitudinal thalweg elevation

(g) size and structure of fish populations

(h) other relevant factors

c. Rush Creek Return Ditch: Licensee shall upgrade the Rush Creek Return Ditch as specified in Licensee's Stream and Stream Channel Restoration Plan without the long-term loss of fish habitat in the ditch.

d. Large Woody Debris: Licensee shall implement the provisions in the Stream and Stream Channel Restoration Plan for placement of large woody debris. Thereafter, Licensee shall add large woody debris to Rush Creek and Lee Vining Creek on an opportunistic basis, based on recommendations of the stream monitoring team.

e. Reopening Channels: If channels reopened through restoration efforts become closed, the monitoring team shall decide on a case by case basis whether or not to again reopen them. Licensee shall implement the monitoring team's decisions subject to compliance with Fish and Game Code section 1601 et seq.

f. Sediment Bypass: Licensee shall hire experts approved by the Chief of the Division of Water Rights to analyze and design sediment bypass systems for Licensee's diversion structures on Walker Creek, Parker

Creek, and Lee Vining Creek. The systems shall be designed to bypass sediment on a year round basis. The experts shall also evaluate fish passage and the feasibility of rewatering Parker Creek and Walker Creek distributaries. The conceptual analysis and design, and the experts' recommendations, shall be completed as soon as practicable, but no later than March 1, 2000. Licensee shall have 120 days from receipt of the conceptual analysis and design to advise the Chief of the Division of Water Rights which sediment passage facilities it will construct. Facilities for Lee Vining Creek shall be included in the Licensee's proposal. If any party to the Mono Lake Settlement Agreement disagrees with Licensee's decision, then that party may ask the Chief of the Division of Water Rights to determine what sediment bypass facilities shall be constructed and to advise Licensee and other interested parties accordingly. Licensee shall comply with the determination of the Chief of the Division of Water Rights.

2. Licensee shall implement its Grant Lake Operations and Management Plan dated February 29, 1996, with the following changes:

a. In years when flows in Rush Creek, Lee Vining Creek, Parker Creek, and Walker Creek exceed the minimum flows required under Decision 1631 and this order, Licensee shall regulate those flows, to the extent practicable, in a manner which reflects the impaired natural hydrograph for each stream at Licensee's point of diversion as specified in Table 1 on page *x* of the February 29, 1996 Grant Lake Operations and Management Plan. Nothing in this paragraph shall affect the minimum instream flows required by Decision 1631, the SRFs as required by this order, or Licensee's attempt to maximize the SRFs pursuant to the provisions of this order.

b. Licensee shall make reasonable efforts to maintain flows in Rush Creek between October 1 and March 31 below 70 cubic feet per second in order to avoid potential injury to the Rush Creek fishery. The Chief of the Division of Water Rights may revise or eliminate this requirement upon written recommendation of the Department of Fish and Game or based upon other evidence that the requirement is no longer needed.

c. Licensee shall make data from all existing Mono Basin data collection facilities available on a same day basis on an internet web site. Licensee shall retrofit all its existing Mono Basin data collection facilities as necessary in order to comply with this requirement.

3. Licensee shall prepare an annual operations plan for covering its proposed water diversions and releases in the Mono Basin in accordance with the provisions on pages 103 and 104 of the February 29, 1996, Grant Lake Operations and Management Plan. If for any reason, Licensee believes it cannot meet the flow requirements specified in this order, it shall provide a written explanation to the Chief of the Division of Water Rights by May 1 of each year and shall inform the Chief of the Division of Water Rights of the flows that will be provided. If unanticipated events prevent Licensee from meeting the flow requirements specified in this order, it shall notify the Chief of the Division of Water Rights within 20 days and provide a written explanation of why the requirement was not met.

4. Licensee shall implement the following measures to help restore waterfowl habitat in the Mono Basin and to monitor the restoration and recovery of waterfowl habitat and waterfowl populations in the Mono Basin:

a. Licensee shall implement the proposal to rewater distributary stream channels of Rush Creek in accordance with the provisions of its Mono Basin Waterfowl Habitat Restoration Plan dated February 29, 1996.

b. Upon request of the United States Forest Service (USFS), Licensee shall provide financial assistance in an amount up to $250,000 for repairs and improvements to surface water diversion and distribution

facilities and related work to restore or improve waterfowl habitat on USFS land in the County Ponds area. Upon request of the USFS, Licensee shall also provide financial assistance in an amount up to $25,000 for waterfowl habitat improvements on USFS land in the Black Point area. This order does not require Licensee to assume responsibility for management or decisions regarding management of federal land, nor does it require Licensee to pay for any environmental review or studies undertaken by the USFS in accordance with its land management decisions and responsibilities. The financial assistance to the USFS required by this order is limited to funds needed to perform work which the USFS determines is appropriate to improve its water diversion and distribution facilities and related work to restore or improve waterfowl habitat in the County Ponds and/or Black Point areas.

(1) In the event that the USFS does not decide prior to December 31, 2004, to undertake waterfowl habitat restoration in the County Ponds area, and in the event that relevant state and federal agencies determine that shallow scrapes or other unobtrusive projects may be undertaken on wetland areas adjoining Mono Lake, then Licensee shall provide financial assistance in an amount up to $250,000 for unobtrusive lake-fringing waterfowl habitat restoration projects having all necessary state and/or federal approvals.

(2) In the event that the USFS does not decide prior to December 31, 2004, to undertake waterfowl habitat restoration at in the Black Point area, and in the event that relevant state and federal agencies determine that shallow scrapes or other unobtrusive projects may be undertaken on wetland areas adjoining Mono Lake, then Licensee shall provide financial assistance in an amount up to $25,000 for unobtrusive lake-fringing waterfowl habitat restoration projects having all necessary state and/or federal approvals.

(3) In the event that waterfowl habitat restoration projects at County Ponds and Black Point are completed at a cost to Licensee of less than $275,000, then Licensee shall make the remaining funds available to provide financial assistance for shallow scrapes or other unobtrusive waterfowl habitat projects which may be undertaken on wetland areas adjoining Mono Lake and which have all necessary state and/or federal approvals.

c. Licensee shall proceed with obtaining the necessary permits and approvals for the prescribed burning program described in its Mono Basin Waterfowl Habitat Restoration Plan dated February 29, 1996, and Licensee shall provide the SWRCB Chief of the Division of Water Rights a copy of any environmental documentation for the program. Following review of the environmental documentation, the Chief of the Division of Water Rights may direct Los Angeles to proceed with implementation of the prescribed burning program pursuant to the requirements of Decision 1631 and this order. The Chief of the Division of Water Rights may modify the requirements related to the prescribed burning program in the event that necessary permits cannot be obtained, there is evidence the burning may cause significant adverse environmental effects or damage to nearby property, or other information indicates that the program should be modified.

d. Licensee shall implement the waterfowl and waterfowl habitat restoration monitoring plan as proposed in its Mono Basin Waterfowl Habitat Restoration Plan dated February 29, 1996 with the revisions and subject to the conditions specified below:

(1) The waterfowl and waterfowl habitat monitoring program shall be carried out under the direction of a waterfowl expert or experts approved by the Chief of the Division of Water Rights.

(2) The monitoring program shall include monitoring of hydrology, lake limnology and secondary producers, vegetation in riparian and lake-fringing wetland habitat, and waterfowl population surveys and studies in accordance with the provisions of the Waterfowl Habitat Restoration Plan dated February 29, 1996. Licensee shall also undertake annual aerial photography sufficient for use in annual waterfowl

population studies and sufficient to identify annual changes in vegetation in waterfowl habitat areas. The aerial photography for waterfowl population studies shall include waterfowl in the Mono Basin, at Bridgeport Reservoir, and at Crowley Lake. The frequency of aerial photography can be modified upon a determination by the Chief of the Division of Water Rights that less frequent aerial photography is appropriate. Licensee shall provide data in a format compatible for use with Geographic Information Systems (GIS).

(3) Licensee shall file a report by April 1 of each year on: the status of Mono Basin waterfowl habitat restoration projects undertaken by the Licensee and others; the recovery of waterfowl habitat resulting from the stream flows and rising lake level due to limitations on water diversions imposed by Decision 1631; the results of waterfowl population surveys and studies called for in Licensee's Waterfowl Habitat Restoration Plan; and other information relevant to the recovery or restoration of waterfowl and waterfowl habitat in the Mono Basin. The report shall be filed with the Chief of the Division of Water Rights and shall be provided upon request and without cost to any governmental agency with land management or regulatory responsibilities in the Mono Basin and to any of the parties to the hearing which preceded this order.

e. In the event that an interagency program is established for the control or elimination of Salt Cedar or other non-native vegetation deemed harmful to waterfowl habitat in the Mono Basin, Licensee shall participate in that program and shall report on any work which it undertakes to control Salt Cedar or other non-native vegetation. Licensee's report on work undertaken to control Salt Cedar or other non-native vegetation shall be included as a part of the annual report on waterfowl habitat restoration projects filed with the Chief of the Division of Water Rights.

5. Any disputes regarding interpretation or compliance with the requirements of this order may be resolved by the Chief of the Division of Water Rights. Upon a showing of good cause, the Chief of the Division of Water Rights shall have the discretion and authority to modify provisions of this order regarding measures for restoration of streams and waterfowl habitat in the Mono Basin, provided that the Chief of the Division of Water Rights shall promptly advise the State Water Resources Control Board of any such action(s). All actions by the Chief of the Division of Water Rights taken pursuant to this paragraph are subject to review by the State Water Resources Control Board and shall be preceded by notice to the parties and opportunity for comment. In the event of a decision requiring action prior to providing an opportunity for comment, the Chief of the Division of Waters Rights shall promptly notify the parties and provide an opportunity for comment on the action which was taken. The Chief of the Division of Water Rights shall advise the State Water Resources Control Board regarding when it would be appropriate to schedule a hearing to determine when the stream and waterfowl habitat restoration measures required under this order may be deemed complete.

6. Licensee shall serve as lead agency for purposes of conducting the environmental review of programs or actions which it intends to carry out pursuant to the provisions of this order, in accordance with the provisions of the California Environmental Quality Act (CEQA, Public Resources Code section 21000 et seq.). Licensee shall prepare a negative declaration, mitigated negative declaration, or environmental impact report for any projects it proposes to carry out which it determines are not categorically exempt from CEQA, and shall submit a copy of relevant environmental documents to the Chief of the Division of Water Rights. The Chief of the Division of Water Rights shall review any environmental document(s) submitted by Licensee. Licensee shall not proceed with any project which is not exempt from CEQA prior to: (1) notification that the Chief of the Division of Water Rights has reviewed the environmental document; and (2) notification from the Chief of the Division of Water Rights to proceed with the specified project in accordance with: the provisions of Decision 1631 and this order, any mitigation measures proposed by Licensee, and any other mitigation measures determined to be necessary by the Chief of the Division of Water Rights.

7. In the event Licensee provides financial assistance for waterfowl habitat restoration projects proposed by another governmental agency pursuant to the provisions of this order, Licensee shall not assume the environmental review responsibilities of the agency proposing the project. Prior to providing financial assistance pursuant to the provisions of this order for projects proposed by another governmental agency, Licensee shall inform the Chief of the Division of Water Rights of the specific project for which financial assistance is to be provided and shall provide a copy of relevant environmental documents to the Chief of the Division of Water Rights. The Chief of the Division of Water Rights shall review any environmental document(s) submitted by Licensee. Licensee shall not provide financial assistance for projects pursuant to this order prior to: (1) notification that the Chief of the Division of Water Rights has reviewed the environmental document; and (2) notification from the Chief of the Division of Water Rights that the proposed project is consistent with the requirements of Decision 1631 and this order.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on September 2, 1998.

AYE: John Caffrey

James M. Stubchaer

Mary Jane Forster

John W. Brown

NO: Marc Del Piero

ABSENT: None

ABSTAIN: None

/s/

Maureen Marché

Administrative Assistant to the Board

TABLE 1. STREAM RESTORATION FLOWS DURING TRANSITION PERIOD		
CREEK	**YEAR TYPE1**	**STREAM RESTORATION FLOW REQUIREMENT** (Based on Flows Proposed in Settlement Agreement)2
RUSH	Extreme Wet	500 cfs (5 days) followed by 400 cfs (10 days)3
	Wet	450 cfs (5 days) followed by 400 cfs (10 days) 3
	Wet/Normal	400 cfs (5 days) followed by 350 cfs (10 days) 3
	Normal	380 cfs (5 days) followed by 300 cfs (7 days)
	Dry/Normal	250 cfs (5 days) when anticipated runoff is 75-82.5% of normal 200 cfs (7 days) when anticipated runoff is 68.5-75% of normal
	Dry	None
LEE VINING	Extreme Wet	Flow through conditions3
	Wet	Allow peak to pass3
	Dry/Normal, Normal, & Wet/Normal	Allow peak to pass3
	Dry	None
PARKER	Dry/Normal through Extreme Wet	Flow through conditions4
	Dry	None
WALKER	Dry/Normal through Extreme Wet	Flow through conditions4
	Dry	None

1 "Year Types" are based on 1941-1990 average runoff of 122,124 acre-feet. (See Grant Lake Operations and Management Plan, Table T.) The Year Types are established based on the LADWP April 1 preliminary runoff forecast and may be adjusted after the final May 1 forecast is issued. The Year Types are defined as follows:

Dry less than 68.5% of average runoff

Dry/Normal between 68.5% and 82.5% of average runoff

Normal between 82.5% and 107% of average runoff

Wet/Normal between 107% and 136.5% of average runoff

Wet between 136.5% and 160% of average runoff

Extreme Wet greater than 160% of average runoff

2 The Settlement Agreement identifies the above flows as "Channel Maintenance Flows." This order refers to the flows above as "Stream Restoration Flows" (SRFs) in order to distinguish between the flows required for stream restoration under this order and the Channel Maintenance Flows required by Decision 1631. The SRFs specified above are required during the transition period until Mono Lake reaches 6,392 feet. After Mono Lake reaches 6,392 feet, the SRFs in all four streams are as set out in Table 2. In Dry/Normal and Normal years, SRFs may be reduced to the extent necessary to maintain the quantity of water exports allowed under the provisions of Decision 1631. In Dry/Normal and Normal years, Licensee will attempt to hold 30,000 to 35,000 acre-feet in storage in Grant Lake at the beginning and end of the runoff year and will not be required to release water for SRFs that would reduce Grant Lake storage to below 11,500 acre-feet.

3 Rush Creek SRFs may be augmented with Lee Vining Creek diversions (up to 50 cfs) in Wet-Normal, (up to 100 cfs) in Wet, and (up to 150 cfs) Extreme Wet years. If water is diverted from Lee Vining Creek to augment Rush Creek SRFs , the diversions should not start less than 7 days after the peak flow in Lee Vining Creek has been attained and the diversions should continue, exclusive of ramping, for a maximum of 15 days in Extreme Wet and Wet runoff years, and a maximum of 5 days in Wet/Normal runoff years. There shall be no diversion of Lee Vining Creek water to augment Rush Creek SRFs during Normal, Dry/Normal and Dry runoff years.

4 Walker and Parker Creeks shall be allowed to flow without any diversions, either for irrigation from above or below the Lee Vining conduit or into the Lee Vining conduit during the period when Rush Creek SRFs are being made.

TABLE 2. POST-TRANSITION STREAM RESTORATION FLOWS		
CREEK	**YEAR TYPE1**	**STREAM RESTORATION FLOW REQUIREMENT** (Based on Flows Proposed in Settlement Agreement)2
RUSH	Extreme Wet	500 cfs (5 days) followed by 400 cfs (10 days)3
	Wet	450 cfs (5 days) followed by 400 cfs (10 days) 3
	Wet/Normal	400 cfs (5 days) followed by 350 cfs (10 days) 3
	Normal	Normal I = 250 cfs (5 days); or Normal II = 380 cfs for 5 days and 300 cfs for 7 days4
	Dry/Normal	100 cfs (5 days)
	Dry	None
LEE VINING	Extreme Wet	450 cfs (5 days) followed by 350 cfs (10 days)3
	Wet	400 cfs (5 days) followed by 350 cfs (10 days)3
	Wet/Normal	350 cfs (5 days) followed by 300 cfs (10 days)3
	Normal	Allow peak flow to pass point of diversion
	Dry	None
PARKER	Dry/Normal through Extreme Wet	Allow peak flow to pass point of diversion
	Dry	None
WALKER	Dry/Normal through Extreme Wet	Allow peak flow to pass point of diversion
	Dry	None

1 "Year Types" are based on 1941-1990 average runoff of 122,124 acre-feet and are established based on the LADWP April 1 preliminary runoff forecast and may be adjusted after the final May 1 forecast is issued. Year Types are defined as follows:

Dry less than 68.5% of average runoff

Dry/Normal between 68.5% and 82.5% of average runoff

Normal between 82.5% and 107% of average runoff

Wet/Normal between 107% and 136.5% of average runoff

Wet between 136.5% and 160% of average runoff

Extreme Wet greater than 160% of average runoff

2 The Settlement Agreement identifies the above flows as "Channel Maintenance Flows." This order refers to the flows above as "Stream Restoration Flows" (SRFs) in order to distinguish between the flows required for stream restoration under this order and the Channel Maintenance Flows required by Decision 1631. The SRFs represented in this table (Table 2) are required to be provided after Mono Lake reaches 6,392 feet. All flows in Table 2 are subject to modification by the SWRCB. Based on results of the monitoring program, it may also be necessary to modify the Channel Maintenance Flows established by Decision 1631.

3 Rush Creek SRFs may be augmented with Lee Vining Creek diversions (up to 50 cfs) in Wet/Normal, (up to 100 cfs) in Wet, and (up to 150 cfs) in Extreme Wet years. If water is diverted from Lee Vining Creek to augment Rush Creek SRFs, the diversions should not start less than 7 days after the peak flow in Lee Vining Creek has been attained and the diversions should continue, exclusive of ramping, for a maximum of 15 days in Extreme Wet and Wet runoff years and a maximum of 5 days in Wet/Normal runoff years, after which the Lee Vining Creek flows should no longer be diverted to augment Rush Creek SRFs. There shall be no diversion of Lee Vining Creek water to augment Rush Creek SRFs during Normal, Dry/Normal and Dry runoff years. Walker and Parker Creeks shall be allowed to flow without any diversions, either for irrigation from above or below the Lee Vining conduit or into the Lee Vining conduit during the period when Rush Creek SRFs are being made.

4 SRF releases for Rush Creek in Normal years are based on criteria in the Grant Lake Operations and Management Plan for bifurcating the Normal water year type (based on the May 1 runoff forecast) into a Normal I water year type (82.5% to less than or equal to 95% of average runoff) and a Normal II water year type (greater than 95% to less than or equal to 107% of average runoff).

Footnote1

Decision 1631 found that an average water elevation at Mono Lake of 6,392 feet will "protect nesting habitat for California gulls and other migratory birds, maintain the long-term productivity of Mono Lake brine shrimp and alkali fly populations, maintain public accessibility to the most widely visited tufa sites in the Mono Lake State Tufa 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." (Decision 1631, pp. 194 and 195.)

Footnote2

The SWRCB selected a target average water elevation of 6,392 feet following a balancing of competing public trust uses, as well as consideration of water use for municipal purposes. Decision 1631 specifically recognizes that "[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." (Decision 1631, p. 154.) In view of the fact that a target lake level of 6,405 feet was rejected based in part upon the desire to protect frequently visited tufa sites, and in

view of the uncertainty about waterfowl populations in the interior portion of the Pacific Flyway, Decision 1631 does not require Los Angeles to fully mitigate for the difference between the amount of waterfowl habitat expected at a water level of 6,405 feet and the amount expected to exist at the target lake elevation of 6,392 feet.

Footnote3

CalTrout is a party to the proposed settlement, but is not a signatory to the Mono Basin Waterfowl Habitat Foundation Conceptual Agreement. The signature page of the "conceptual agreement" indicates that the agreement was "approved as to form" by CalTrout. (R-DWP-68A.)

Footnote4

Mr. Frank Hazleton submitted a written closing statement on behalf of Arcularius Ranch and Inaja Land Company which requests that any further SWRCB orders be considered "in light of the base and minimum commitments extended to the Upper Owens River through Decision 1631 and the Grant Lake Operations and Management Plan as submitted by LADWP in February, 1996."

Footnote5

Hydro Electric Co. v. *J. A Conway, et al.*, (1914) Mono County, Superior Court No. 2088.

Footnote6

Future proposals to change the use of the Conway Ranch water rights would fall within the Mono County Superior Court's jurisdiction over the Mill Creek adjudication or within the jurisdiction of the SWRCB pursuant to Water Code section 1707.

Footnote7

As discussed in Sections 6.1 through 6.3 below, various parties have also proposed measures intended to restore the lower portion of Mill Creek at the north end of the Mono Basin based on the rationale that restoration of Mill Creek would result in more waterfowl habitat. Since Los Angeles diverts no water from Mill Creek under Licenses 10191 and 10192, it was not required to consider restoration proposals for Mill Creek as part of the stream restoration plan required by Decision 1631.

Footnote8

Based on evidence presented by DFG, Decision 1631 established specified flow requirements for channel maintenance purposes in each of the four streams from which Los Angeles diverts water. The stream restoration plan submitted by Los Angeles proposes higher short-duration flows for the purpose of imitating the high seasonal flows that ordinarily would occur under natural conditions. The higher flows proposed in the Los Angeles plan are also referred to as "channel maintenance flows." In order to avoid confusion with the channel maintenance flow requirements established in Decision 1631, this order refers to the periodic high flows which are proposed for stream restoration purposes as "stream restoration flows."

Footnote9

"Limiter logs" are logs that were artificially placed in the stream channel of Lee Vining Creek as part of the interim stream restoration work undertaken by the Restoration Technical Committee which was formed

under the authority of the Superior Court. Use of limiter logs and other structural or mechanical approaches to stream restoration of the Mono Basin streams were less successful than anticipated when those measures were undertaken.

Footnote10

As explained in Section 5.3.1 below, the flows provided for stream restoration purposes may differ from flows needed for channel maintenance on a long-term basis. The proposed settlement uses the term "channel maintenance flow" to describe both the higher flows proposed in the settlement agreement for stream restoration, and the long-term channel maintenance flows established in Decision 1631.

Footnote11

Depending upon the stream and the water year type, the higher flows for stream restoration purposes called for in the proposed settlement agreement are often higher than the flows called for in the stream restoration plan and Grant Lake Operations and Management Plan submitted by Los Angeles.

Footnote12

Decision 1631 found that the water elevation of Mono Lake was expected to reach 6,391 feet in approximately 18 to 28 years depending upon future hydrology. (Decision 1631, P. 158.) If the water level does not reach 6,391 feet by September 28, 2014, Decision 1631 calls for the SWRCB to consider if further revisions to the conditions in Los Angeles' licenses are appropriate. Decision 1631 sets water diversion criteria intended to result in a long-term average water elevation in Mono Lake of 6,392 feet. In the event the water elevation at Mono Lake has reached 6,391 feet by 2014, Decision 1631 does not require a further hearing.

Footnote13

The water year classifications referred to in the proposed settlement are based on the classifications set forth in the Grant Lake Operation and Management Plan. (R-DWP-18, p. 88, Table T.) During the period before Mono Lake reaches 6,392 feet, the primary effect of the stream restoration flows is expected to be on the way in which available water is released in order to promote channel recovery and restoration, rather than on the amount of water available for export.

Footnote14

Decision 1631 called for development of stream and waterfowl habitat restoration proposals which are consistent with the streamflows and lake levels established in that decision. (Decision 1631, p. 204.) Any long-term revision of the channel maintenance flow requirements established Decision 1631 would require an analysis of the effects of that revision on the water level of Mono Lake, public trust resources in the Mono Basin, and the quantity of water available for diversion under Licenses 10191 and 10192.

Footnote15

The evidence presented in the current proceeding and the proceedings leading to Decision 1631, which is extensive, establishes that it is impossible (and in some respects, undesirable) to restore the Mono Basin streams to the conditions which existed prior to when Los Angeles began its diversions in 1941. (See e.g., T 316:12-320:1.) Evidence of pre-1941 conditions may provide a helpful reference point, but neither Decision 1631 nor this order establishes "pre-1941 conditions" as the goal of the stream and waterfowl

habitat restoration plans. (See R-DWP-17, Appendix 4, p. 2.) Although the stream conditions will be different than existed before 1941, there is considerable evidence in the record indicating that the flows and other requirements imposed by Decision 1631 and this order will result in a better fishery than existed prior to Los Angeles' diversions.

Footnote16

Decision 1631 required Los Angeles to "propose criteria for determining when monitoring shall be terminated." (Decision 1631, p. 207.) To the extent that this provision may have led interested parties to assume that quantified measurement(s) of various stream characteristics would be the only acceptable basis for eventual termination of the stream monitoring program, the SWRCB regrets the misunderstanding.

Footnote17

The Grant Lake Operations and Management Plan discusses the possibility of revisions to the pattern of water exports from the Mono Basin in order to maximize the beneficial use of water in the upper Owens River Basin. The plan proposes that any such changes would be made in consultation with the upper Owens River landowners and DFG. Any changes in the pattern of Mono Basin water exports which are not consistent with the provisions of Decision 1631 would require approval of the SWRCB.

Footnote18

In addition to issues regarding improper delegation of authority, the repeated requests for delay in the hearing which preceded this order demonstrate the problems and delay that would be inherent in establishing a procedure in which decisions or actions require the repeated agreement of numerous parties.

Footnote19

In contrast to long-standing disputes over the nature and extent of stream restoration work to be undertaken by Los Angeles, the subject of active waterfowl habitat restoration measures has not been the subject of litigation or court orders. Rather, the requirement to prepare a waterfowl habitat restoration plan originated with Decision 1631.

Footnote20

Section 6.4 below discusses the relationship between stream flows and the "hypopycnal conditions" which result where freshwater from tributary streams meets the saline water of Mono Lake.

Footnote21

The waterfowl scientists' report recommends no additional restoration projects for Lee Vining Creek other than continuing to provide the flows required under Decision 1631.

Footnote22

Testimony from other witnesses regarding potential problems with restoration of Mill Creek is discussed in Section 6.4.2

Footnote23

The specific projects through which "open-water habitat" would be restored or maintained have not been determined, nor is the acreage of proposed waterfowl habitat specified.

Footnote24

The conceptual agreement states that a final decision on rewatering Mill Creek will not be made prior to the conclusion of the CEQA/NEPA process. That process had not begun by the close of the hearing.

Footnote25

The proposal to rewater Mill Creek is discussed in greater detail in Section 6.4.2 below.

Footnote26

The SWRCB would have jurisdiction if the foundation proposes to initiate a new appropriation or petitions for a change subject to Water Code section 1707. Similarly, the California Regional Water Quality Control Board, Lahontan Region, would have jurisdiction over any discharge of water by the foundation. In the absence of a diversion or use of water by the foundation, however, the foundation is not subject to the SWRCB's continuing authority to apply public trust or reasonableness requirements, and the SWRCB would not be able to ensure that the funds provided to the foundation achieve the purposes of Decision 1631.

Footnote27

The phenomenon of "hypopycnal stratification" is discussed on page 96 of Decision 1631. It occurs in areas where the lighter freshwater from tributary streams meets the denser saline water of Mono Lake and forms a freshwater lens on top of the saline lake water.

Footnote28

Historically, the Rush Creek and Lee Vining Creek delta areas provided habitat for large numbers of ducks.

(R-DWP-20, Appendix I, pp 30-33.)

Footnote29

The hypopycnal area near the mouth of Mill Creek at the time that Los Angeles began its diversions in 1941 was already reduced from what it had been under natural conditions due to the diversion of flow from Mill Creek to Wilson Creek in the early 1900's. A detailed discussion of the projected hypopycnal conditions at an average lake elevation of 6,392 feet is presented in Exhibit R-SLC/DPR-401. That report states that "the Board-ordered flows down Rush and Lee Vining Creeks will largely restore the hypopycnal lenses that previously characterized Mono Lake in the vicinity of the stream mouths." The report also states that the hypopycnal lens near Rush Creek during October through December will be slightly smaller while the hypopycnal lens near Lee Vining Creek in the autumn will be more extensive. The report also discusses locations where significant increases in hypopycnal areas are projected but concludes that "the total amount of hypopycnal lake surface will remain below that which existed prior to 1941." (R-SLC/DPR-401, p. 59.) There is no evidence in the record that the size of hypopycnal areas projected to exist at lake elevation 6,392 feet will be insufficient to accommodate potential waterfowl populations.

Footnote30

Any disturbance of the channel of Rush Creek is subject to the requirement of a streambed alteration agreement with DFG pursuant to Fish and Game Code section 1603.

Footnote31

The rights of various parties to water from Mill Creek were adjudicated in a November 30, 1914 decree of the Mono County Superior Court. (R-Beckman-2; *Hydro Electric Co.* v. *J.A. Conway et al.*, Superior Court No. 2088.)

Footnote32

Having described the "proposed project" in a manner which would require redirection to Mill Creek of most of the flow presently in Wilson Creek, the conceptual agreement goes on to state that the parties will analyze the proposed project consistent with California Environmental Quality Act and National Environmental Policy Act requirements "to determine the appropriate water allocation to achieve the waterfowl scientists restoration goals." The conceptual agreement provides that a "final decision" will not be made prior to the conclusion of the CEQA/NEPA process, but the language of the agreement appears to support the fears of PMBP that the parties to the settlement agreement are predisposed to pursue rewatering of Mill Creek as a favored waterfowl habitat restoration measure. (R-DWP-68A, p. 3.)

Footnote33

This order expresses no position regarding potential application of Fish and Game Code sections 5937 and 5946 to a proposal to substantially dewater an existing stream with a well-established fishery as part of a project which aims to restore flow to a natural stream which may have provided even better fish habitat several generations earlier.

Footnote34

A detailed listing of birds observed in the vicinity of Wilson Creek and areas irrigated from Wilson Creek is provided in the Declaration of Colleen Yancey. (R-PMBP 9.)

Footnote35

California courts have recognized that, through long-standing continued use and other conditions, an artificially created channel may acquire the attributes of a natural channel. (See *Chowchilla Farms* v. *Martin* (1933) 219 Cal. 1, 18 [25 P. 2d 435].)

Footnote36

Dr. Stine testified that, in addition to restoration of hypopycnal areas at the mouths of Rush Creek and Lee Vining Creek, the restoration of stream flows and the rising lake level will result in "hypopycnal rias," or elongated embayments of hypopycnal conditions extending back from the lake along the streams. Although Dr. Stine testified that these "hypopycnal rias" did not exist prior to the time Los Angeles began its diversions, he believes that they will provide important waterfowl habitat. Dr. Stine also believes that restoration of high flows through multiple channels of the Mill Creek bottomlands would create additional "hypopycnal rias." (R-SLC/DPR-400.)

Footnote37

The proposed settlement agreement recognized the need for further environmental review of potential proposals for restoration of Mill Creek.

Footnote38

If the proposal to rewater Mill Creek is pursued in the future, the specific environmental impacts of that proposal will have to be addressed in a detailed environmental impact report. There is evidence in the record that indicates it may be possible to increase the overall beneficial use of water presently in Wilson Creek. The SWRCB expresses no opinion on the question of whether overriding considerations might justify rewatering Mill Creek at the expense of resources currently dependent on Wilson Creek. The findings in this order are without prejudice to the SWRCB's review of future proposals that may come before the SWRCB.

Footnote39

The testimony from the USFS indicates that, after being drained and dried up during the "restoration" process, some of the DeChambeau Ponds, which formerly held water, no longer held water. In an effort to get one pond to hold water again, the USFS pumped at a rate of 400 to 500 gallons per minute for 30 straight days to fill a pond which was about 1.25 acres in size. After spending about $10,000 for propane, the USFS stopped trying to fill the pond because it still had not sealed. The two ponds which provided functional waterfowl habitat during the 1996-1997 period (Ponds 1 and 2) were ponds which had not been "reworked." (T 776:10-777:14.)

Footnote40

Mr. Bellomo testified that it would be very easy to get water from the repaired irrigation ditches to the DeChambeau Ponds, but that the USFS asked that water be kept away from the ponds until the bentonite work from the previous USFS/Ducks Unlimited/MLC project is complete. (T 1724:15-1725:7.)

Footnote41

The cooperative project which the USFS undertook to restore waterfowl habitat at the DeChambeau Ponds provides an example of institutional cooperation between the federal government, other levels of government and private groups to restore waterfowl habitat on USFS land in the Mono Basin.

Footnote42

Although this order directs that aerial photography be undertaken on an annual basis, it does not require other changes in the more detailed work proposed in Los Angeles' plan for assessing changes in vegetation.

Footnote43

The testimony by Dr. Reid indicates that there is not a current overcrowding problem at existing waterfowl habitat areas in the Mono Basin. (T 974:11-975:6.)

Footnote44

Despite the divergent positions of PMBP and the MLC in this proceeding, the record shows that one of the primary spokespersons and some of the members of PMBP are also members of MLC. (T

1318:21-1319:11.) Similarly, Decision 1631 cites the testimony of three long-time Mono Basin residents who were called as witnesses by the MLC in 1993 to testify with respect to historical waterfowl conditions in the Mono Basin. (Decision 1631, p. 112 and 113.) However, in the current proceeding the record shows that all three of those witnesses signed the petitions submitted by PMBP in opposition to the proposal of MLC and others to restore flow to Mill Creek at the expense of uses dependent upon flow in Wilson Creek. (R-PMBP-27.)

Footnote45

Many of the stream restoration provisions specified in this order are based upon provisions of the "Mono Lake Settlement Agreement" which was marked for identification as Exhibit R-DWP-68. Any references to "party" or "parties" in the provisions of this order regarding stream restoration measures refer to the parties to the Mono Lake Settlement Agreement.

Footnote46

Information regarding conditions that existed prior to Los Angeles' diversions is set forth in Decision 1631.

California Ecological Restoration Projects Inventory

Questions / Additions / Problems with this page? E-mail: memadison@ucdavis.edu

Rush / Lee Vining Creeks

Project monitors effects of changes in streamflow. Will include standard methods for collection of baseline data include soil profile and moisture retention and other physical parameters of the stream, riparian stand structure, relative importance, spp. richness, stand age, productivity, mortality, plant water potential, recruitment, photo document, aquatic sampling.

To monitor the effect that changes on streamflow would have on the maintenance and enhancement of riparian vegetation and select aquatic resources.

Contact Name:	John Irwin
Contact Type:	Primary
Job Title:	Biologist
Affiliation:	Southern California Edison Company
Department:	Hydro Generation
Address:	300 North Lone Hill Avenue San Dimas, CA 91773
Phone Number:	(909) 394-8715
FAX Number:	( ) -
E-Mail Address:	irwinjf@sce.com
URL:	

Role	Entity
Cooperator Landowner	United States Forest Service - Inyo National Forest
Cooperator	Federal Energy Regulatory Commission
Cooperator	Southern California Edison Company

Survey Date:	11/27/95
Size of Project:	100 Square Miles
County:	Mono
Time Frame:	Start Date: 1/1/96 - Ongoing
Additional Locational Information:	Location: Northern border: Rush Creek-below Waugh Lake. Southern border: Lee Vining Creek-below Saddlebag Lake. Eastern border: Glacier Creek-below Tioga Lake. Watershed: Rush Creek, Lee Vining Creek and Glacier Creek. Mono Basin Watershed.
Publicly Available Reports:	

Habitat	Targeted/Existing
Subalpine Coniferous Forest	E
Riparian Forest and Woodlands	E
Stream or River Channel (In-Stream Restoration)	E
Great Basin Scrubs	E
Eastside Pine Forests	E

Has the Project Goal been Attained:	Too Soon
Do Performance Standards Exist:	
Performance Standards for the Project:	
Have the Performance Standards been Attained:	Too Soon
Is there Monitoring Done:	Yes
Monitoring Schedule:	This will be a 30 year project. After the baseline study, monitoring will be conducted every 5 years.
Project Problems:	
Treatment and Application:	Will include standard methods for collection of baseline data include soil profile and moisture retention and other physical parameters of the stream, riparian stand structure, relative importance, spp. richness, stand age, productivity, mortality, plant water potential, recruitment, photo document, aquatic sampling.
Was Fertilizer Used:	
Was Site Irrigated:	
Irrigation Method:	
Additional Comments:	The Rush Creek study area lies within the designated Ansel Adams wilderness.

Data

Anadromous Fish

Ecological/ Biological Data

Geographic Information System (GIS)

Geology

Hydrology

Recreational Use

Remote Imagery

Soils

Vegetation

Vegetation Maps

Additional Data Information

Data: Soil pH, Soil Type. Remote imagery: Aerial Photos. Ecological data: vegetation - aerial coverage, transect, productivity and database.

Target Taxonomic Group: Fish

Gail Newton, CERPI Project Coordinator
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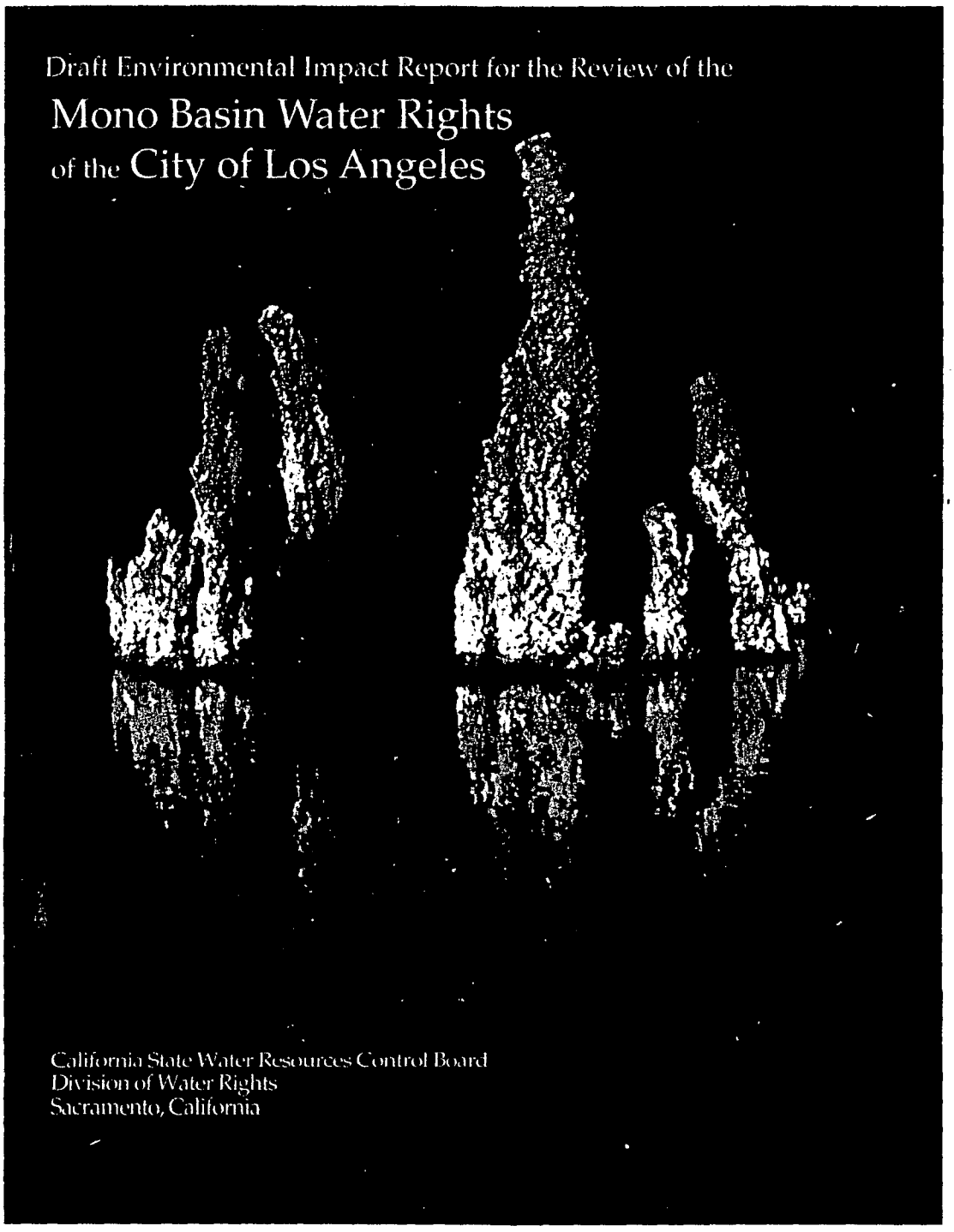
Phone: (916) 323-8564
E-Mail: gnewton@consrv.ca.gov

Draft Environmental Impact Report for the Review of the

Mono Basin Water Rights of the City of Los Angeles



California State Water Resources Control Board
Division of Water Rights
Sacramento, California

May 1993

Volume 1

MONO BASIN EIR

Prepared by Jones & Stokes Associates
Sacramento, California

(af) of water per year since the mid-1970s have augmented threefold the flows of the Upper Owens River.

The Owens River has provided a major source of water to the city since 1913, when the Los Angles Aqueduct was constructed with an intake south of Bishop near Big Pine. The Upper Owens River, regulated at Lake Crowley reservoir near Mammoth Lakes, is joined by many other streams and exports from groundwater pumping in Inyo County near Bishop before reaching the aqueduct intake. Power is generated from the Middle Owens River where it passes through the Owens River gorge. In recent decades, exports from Mono Basin made up about one-fifth of the waters taken by the aqueduct.

In 1974, the SWRCB granted licenses to the city confirming the city's right to Mono Basin waters. The city's exports have caused a decline in lake surface elevation of 40 feet and in lake surface area by 25%. Salinity and alkalinity of the lake waters have increased, bird-nesting islands have lost their security from mainland predators, riparian and freshwater habitats along the tributary streams have been irreversibly lost through erosion, and occasional massive dust storms have been induced from salt efflorescence on exposed lakebeds. Yet the lake's fascinating complex of tufa formations, formed underwater during higher lake levels, has been increasingly exposed for the enjoyment of the curious explorer.

In 1983, in response to a suit filed by the National Audubon Society, the California Supreme Court held that the public trust mandated reconsideration of the City of Los Angeles' water rights in Mono Basin. The court noted that Mono Lake is a scenic and ecological treasure of national significance and that the lake's value as a recreational and ecological resource was diminished by recession of the water level.

The court found that the city's water rights were granted without consideration of impacts on these resources and therefore the SWRCB or the court should reconsider the city's water rights. The court noted that before continued stream diversions could be approved, the effect of such diversion on interests protected by the public trust should be considered and that harm to those interests should be minimized or avoided if feasible.

In 1990, the California Court of Appeal ruled that the city's water rights licenses must be conditioned to require bypass streamflow around the diversions sufficient to reestablish and maintain the fisheries that existed before its diversion of water. The court noted that this requirement of state law must be met regardless of the city's need for water.

Subsequently, the Superior Court for El Dorado County entered preliminary injunction requiring the city to modify or cease exports as needed to maintain the surface elevation of Mono Lake at or above 6,377 feet and to provide a specified minimum flow regime in all four diverted tributary streams. These restrictions are to remain in effect until amended by the court or until the SWRCB amends the city's water rights licenses. The SWRCB decision amending the city's water rights is subject to judicial review.

Alternative or Condition	Water Quality: Mono Lake Salinity (g/l)	Water Quality: Arsenic Concentrations in Aqueduct Water[b] (μg/l)	Water Quality: Nutrient Levels in Upper Owens River Ecosystem[c] (mg/l)
Point of reference	90	23	0.26
No restriction	133[a]	23	0.25
6,372 Ft	92[a]	--	--
6,377 Ft	86	--	--
6,383.5 Ft	76	--	--
6,390 Ft	69	--	--
6,410 Ft	54	--	--
No diversion	48	26	0.85
Prediversion	48	26	0.85

[a] Significantly above federal antidegradation threshold of 85 grams per liter (g/l).

[b] Maximum contaminant level for drinking water is 50 micrograms per liter (μg/l).

[c] Recommended upper limit is 0.03 milligrams per liter (mg/l).

-- = not evaluated.

Tributary Riparian Vegetation

Alternative or Condition	Frequency of Channel Dewatering	Erosion Potential		Frequency of Recruitment Flows (%)		Riparian Vegetation and Wetlands (% of Prediversion)
		Banks	Incision	Rush and Lee Vining	Parker and Walker	
Point of reference	Very low[d]	High	Low	25	100[d]	61
No restriction	High*	High	Extreme*	23	0*[m]	<50*[f]
6,372 Ft	Very low	Low-moderate	Moderate*	7*	7*[m]	63-82[f,m]
6,377 Ft	Very low	Moderate	Low	9*, 52	85	61-81[f,m]
6,383.5 Ft	Very low	High	Very low	41	85	60-80[f,m]
6,390 Ft	Very low	High	Very low	47	85	60-79[f,m]
6,410 Ft	Very low	Very high*	Very low	55	85	59-79[f,m]
No diversion	Very low	Very high*	Very low	47	85	60-80[f,m]
Prediversion	Moderate	--	Very low	--	--	100

[d] Assumes point of reference included current required flows for Parker and Walker Creeks.

* Significant project impact.

[f] Significant cumulative impact.

[m] Impact substantially mitigable.

-- = not evaluated.

Lake-Fringing Vegetation and Aquatic Habitats

Alternative or Condition	Vegetated Wetlands (ac)	Lagoons (ac)	Alkali Lakebed (ac)
Point of reference	2,796	1	5,368
No restriction	313*√	0*m√	9,512*√
6,372 Ft	2,859	1√	3,883√
6,377 Ft	2,625	1√	1,492√
6,383.5 Ft	2,325*	6√	521√
6,390 Ft	2,071*	16√	377√
6,410 Ft	754*	261	157
No diversion	358*	261	0
Prediversion	356	260	0

* Significant project impact.

√ Significant cumulative impact.

m Impact substantially mitigable.

Upper Owens River Vegetation

Alternative or Condition	Channel Stability	Meadow and Marsh Extent	Threat of Willow Elimination	Willow Productivity (% of POR)
Point of reference	Low	See text	Moderately high	100
No restriction	Very low*✓	Same as POR	Same as POR✓m	98
6,372 Ft	Moderately low✓m	Same as POR	Same as POR✓m	102
6,377 Ft	Moderately low✓m	Same as POR	Same as POR✓m	104
6,383.5 Ft	Moderate✓m	Same as POR	Same as POR✓m	105
6,390 Ft	Moderate✓m	Same as POR	Same as POR✓m	106
6,410 Ft	Moderately high	Same as POR	Less than POR	109
No diversion	High	Somewhat less than POR*	Less than POR	96
Prediversion	High	Somewhat less than POR	Less than POR	96

* Significant project impact.

✓ Significant cumulative impact.

m Impact substantially mitigable.

Aquatic Resources of the Tributary Streams

Alternative or Condition	Meets Prediversion Fishery Condition Standards Set by Court	Rush Creek			Lee Vining Creek			Effect on Parker and Walker Creeks
		% Change in Brown Trout Adult Habitat	% Change in Brown Trout Spawning Habitat	% of Years Flows Exceed 100 cfs[a]	% Change in Brown Trout Adult Habitat	% Change in Brown Trout Spawning Habitat	% of Years Flows Exceed 100 cfs[b]	
Point of reference	No	0	0	30	0	0	30	NA
No restriction	No	-75*	-79*	40	-55*	-57*	30	None
6,372 Ft	No	+16	+69	<10	+91	+209	10	Substantial benefits
6,377 Ft	No	+17	+73	80*m	+93	+218	80*m	Substantial benefits
6,383.5 Ft	No	+18	+75	80*m	+96	+220	80*m	Substantial benefits
6,390 Ft	No	+19	+78	80*m	+98	+228	80*m	Substantial benefits
6,410 Ft	No	+20	+105	80*m	+108	+288	80*m	Substantial benefits
No diversion	No	+20	+107	80*m	+109	+317	80*m	Substantial benefits
Prediversion	Yes	Unk	Unk	80	Unk	Unk	80	NA

Note: Significant cumulative fisheries impacts (√) for Rush, Lee Vining, Parker, and Walker Creeks apply to all alternatives. Impacts include permanently altered channel morphology, constraints on fish passage and spawning gravel movement due to the presence of the diversion facilities, and resulting decreases in the prediversion fish populations. These cumulative impacts are partially mitigable through restoration. The 6,383.5-Ft Alternative is the nearest alternative that satisfies preliminary DFG recommendations developed to optimize fishery conditions and approach pre-1941 fishery conditions to the greatest extent possible.

* Significant project impact. m Impact substantially mitigable. Unk = unknown.

[a] Preliminary DFG-recommended maximum flow limit.

[b] Maximum flow limit to avoid significant adverse impacts on brown trout population.

Aquatic Resources of the Upper Owens River

Alternative or Condition	Average % Change in Brown Trout Adult Habitat	Average % Change in Rainbow Trout Adult Habitat	Significant Impacts from Water Temperature Increases	Significant Impacts from Water Quality Degradation
Point of reference	0	0	NA	NA
No restriction	+4	+4	No	No
6,372 Ft	-4	-4	No	No
6,377 Ft	-12*√	-12*√	No	No
6,383.5 Ft	-21*√	-20*√	Yes*√	Yes*√
6,390 Ft	-26*√	-24*√	Yes*√	Yes*√
6,410 Ft	-36*√	-34*√	Yes*√	Yes*√
No diversion	-36*√	-34*√	Yes*√	Yes*√
Prediversion	Unk	Unk	Yes	Yes

Note: Significant project and cumulative impacts are partially or substantially mitigable depending on Grant Lake reservoir operations.

* Significant project impact.

√ Significant cumulative impact.

Unk = unknown.

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

Alternative or Condition	Grant Lake Reservoir Net Effects	Lake Crowley Reservoir Net Effects	Middle Owens River Net Effects
Point of reference	NA	NA	NA
No restriction	No significant change	Minor improvement	Less than significant adverse
6,372 Ft	Less than significant adverse	Less than significant adverse	Minor benefits
6,377 Ft	Less than significant adverse	Less than significant adverse	Minor benefits
6,383.5 Ft	Less than significant adverse	Less than significant adverse	Minor benefits
6,390 Ft	Less than significant adverse	Less than significant adverse	Minor benefits
6,410 Ft	Less than significant adverse	Less than significant adverse	Minor benefits
No diversion	Substantial benefits	Less than significant adverse	Minor benefits
Prediversion	NA	NA	NA

Note: Significant cumulative fisheries impacts on native species (√) for the Middle Owens River apply to all alternatives. They include altered channel morphology from LADWP facilities and operations and grazing and competition from introduced species. Some of these impacts are mitigable.

Alternative or Condition	Mono Lake Alkali Fly Productivity: Third Instar Production (MT/Lake)	Mono Lake Alkali Fly Productivity: Drift Density (number/m²)	Mono Lake Brine Shrimp Productivity: Total (Thousands of MT N/Lake)	Mono Lake Brine Shrimp Productivity: Cysts (Millions/m²)
Point of reference	919	16.5	0.59	1.41
No restriction	146*	5.6*	0.33*√	0.68*√
6,372 Ft	832	15.5	0.52√	1.21*√
6,377 Ft	1,210	19.0	0.64√	1.55√
6,383.5 Ft	1,353	19.6	0.74√	1.98√
6,390 Ft	1,341	19.0	0.88	2.57
6,410 Ft	(855)	(11.0)	--[e]	--[e]
No Diversion	(708)	(8.9)	--[e]	--[e]
Prediversion	Unk	Unk	--[e]	--[e]

[e] Similar to or greater than 6,390-Ft Alternative.

* Significant project impact based only on change in productivity; for effects on feeding bird populations, see the "Wildlife" chapter.

√ Significant cumulative impact based only on change in productivity; for effects on feeding bird populations, see the "Wildlife" chapter.

[m] Impact substantially mitigable.

( ) Reliability uncertain.

-- = not evaluated.

Unk = unknown.

Alternative or Condition	% Change in Potential Gull Nesting Capacity	Invertebrate Food for Water Birds	Potential Habitat for Migratory Ducks	Potential Snowy Plover Nesting Habitat	Wildlife Habitat Values of Mono Lake Shoreline Vegetation	Wildlife Habitat Values of Tributary Streams
			Wildlife			
Point of reference		Moderate	Low	High	Moderate	Low
No restriction	-82*√	Low or nonexistent*√	Absent*√	Low*	Low or none*	None*√
6,372 Ft	-16*√	Low*√	Low√	High	Moderate	Moderate√[m]
6,377 Ft	+440*	Moderate*	Low√	High	Moderate	Moderate√[m]
6,383.5 Ft	+390	High	Moderately low√	High	Moderate	Moderately high√[m]
6,390 Ft	+326	High	Moderate√	High	Moderately low*	Moderately high√[m]
6,410 Ft	+262	Unk	High	Moderate	Low*	Moderately high√[m]
No diversion	+251	Unk	High	Low*	Low*	Moderately high√[m]
Prediversion	+256	Unk	High	Unk	Low	High

* Significant project impact.

√ Significant cumulative impact.

[m] Impact substantially mitigable.

Unk = unknown.

Alternative or Condition	Land Use: Forage Production (AUMs)	Land Use: Probability of LADWP Land Disposal	Air Quality: Maximum PM_{10} Concentration in Key Areas[f] ($\mu g/m^3$)	Air Quality: Frequency of PM_{10} Concentrations above State Standards[g] (events/yr)	Air Quality: Maximum Extent of PM_{10} Concentrations above State Standards[g] (ac)
Point of reference	13,900	Very low	970	13-14	About 56,000
No restriction	13,900	Very low	Over 1,100*√	More than 15*√	Over 65,000
6,372 Ft	6,000√[m]	Moderate	About 970√	About 13-14√	About 56,000
6,377 Ft	6,000√[m]	Moderate	About 850√	Fewer than 13√	About 29,500
6,383.5 Ft	6,000√[m]	Moderate	About 650√	Fewer than 10√	About 16,000
6,390 Ft	6,000√[m]	Moderate	About 75	About 1-2	About 3,000
6,410 Ft	6,000√[m]	Moderate	Below 50	Fewer than 1	0
No diversion	6,000√[m]	High	Below 50	Fewer than 1	0
Prediversion	24,500	N/A	Below 50	Fewer than 1	0

[f] Major public access areas or monitoring station locations.

[g] State standard is 50 $\mu g/m^3$.

* Significant project impact.

√ Significant cumulative impact.

[m] Impact substantially mitigable.

N/A = not applicable.

Table S-1. Continued

Alternative or Condition	Visual Resources[1] Mono Lake Tufa	Phalaropes	Grant Lake Reservoir Drawdown (in wet years)	Lake Crowley Reservoir Drawdown (in wet years)
Point of reference	See "Visual Resource" chapter	See "Wildlife" chapter	30 feet	4 feet
No restriction	Emergence of additional tufa	Large decrease*√	20 feet	4 feet
6,372 Ft	Basal inundation of a few towers	Phalaropes restricted to east side*√	27 feet	6 feet
6,377 Ft	Toppling of a few South Tufa towers; basal inundation of a few other towers	Phalaropes more visible to visitors	17 feet	6 feet
6,383.5 Ft	Toppling of several South Tufa towers; complete submergence of up to 10%; basal submergence up to 50%	Phalaropes more visible to visitors	4 feet	9 feet*
6,390 Ft	Toppling of 50% South Tufa towers; complete submergence of nearly 20%; all sand tufa destroyed; basal submergence up to 60%*	Phalaropes more visible to visitors	4 feet	7 feet*
6,410 Ft	All towers at South Tufa toppled; 30-100% of groves completely submerged; all sand tufa destroyed*	Phalaropes more visible to visitors	4 feet	8 foot*
No diversion	Same as for 6,410 Ft*	Phalaropes more visible to visitors	0 feet	9 feet*
Prediversion	Nearly all tufa towers completely submerged	Phalaropes more visible to visitors; migratory waterfowl increase	N/A	N/A

[1] Only those effects not covered in other resource topics shown; for other Mono Lake birds (gulls, waterflow), see "Wildlife" chapter.
* Significant project impact.
√ Significant cumulative impact.
N/A = not applicable.

Alternative or Condition	Recreation Opportunity (by Exceedance Frequency)[j]				
	Mono Lake Lakeshore Inaccessible (<6,373.5 ft)	Upper Grant Lake Reservoir Inaccessible (<7,105 ft)	Grant Lake Reservoir Boat Ramp Unusable (<7,111 ft)	Lake Crowley Reservoir Boat Ramp Unusable (<6,760 ft)	Lake Crowley Reservoir Waterski Course Inaccessible (<6,773 ft)
Point of reference	0	50	50	0	20
No restriction	100*m	30	50	0	20
6,372 Ft	64*m	50	50	0	35
6,377 Ft	0	80*m	87*m	0	50*m
6,383.5 Ft	0	80*m	87*m	0	80*m
6,390 Ft	0	87*m	90*m	0	80*m
6,410 Ft	0	97*m	100*m	0	80*m
No diversion	0	0	0	0	80*m
Prediversion	0	N/A	N/A	N/A	N/A

[j] Only those effects not covered in other resource topics (e.g., fisheries, wildlife) shown.

* Significant project impact.

m Impact substantially mitigable.

N/A = not applicable.

Alternative or Condition	Recreation Use (% of POR days/visitor)				Cultural Resources
	Mono Lake	Tributary Streams	Grant Lake Reservoir	Lake Crowley Reservoir	Potential for Site Disturbance
Point of reference	100	100	100	100	Likely
No restriction	Unk*	-20*	9	3	Likely*m
6,372 Ft	0	-7	-5	-3	Likely*m
6,377 Ft	0	33	-6	0	Likely*m
6,383.5 Ft	6	60	-7	-9	Likely*m
6,390 Ft	12	Unk	-8	-9	Likely*m
6,410 Ft	-3	Unk	-9	-12*	Certain*m
No diversion	Unk	60	Unk	-12*	Certain*m
Prediversion	Unk	Unk	Unk	Unk	Likely

* Significant project impact.

m Impact substantially mitigable.

Unk = unknown.

Alternative or Condition	Water Supply: Annual Aqueduct Water Availability (TAF)	Water Supply: Annualized Cost of Los Angeles Total Water Supply (millions of 1992 dollars)	Water Supply: Cost Increase (%)	Water Supply: LADWP Share of MWD Supply (%)	Power Supply: Annual Aqueduct Energy (GWh)	Power Supply: Annualized Fuel Cost for System (millions of (1992 dollars)	Power Supply: Cost Increase from POR (%)
Point of reference	442	175		2.6	1,038	675.6	
No restriction	450	170	-3	2.3	1,072	674.4	-0.18
6,372 Ft	425	186	6	3.1	1,005	677.5	+0.28
6,377 Ft	414	191	9	3.4	984	678.3	+0.39
6,383.5 Ft	400	201	15*m	3.8	930	679.8	+0.61
6,390 Ft	395	205	17*m	3.9	904	680.6	+0.74
6,410 Ft	384	213	22*m	4.2	845	682.2	+0.97
No diversion	375	218	25*m	4.5	817	683.8	+1.20
Prediversion	Unk	Unk	Unk	Unk	Unk	Unk	Unk

* Significant project impact.

Unk = unknown.

Annual Economic Cost and Benefits Relative to the Point of Reference (Millions of 1992 Dollars)

Alternative or Condition	Water Supply Benefits	Power Generation Benefits	Recreation Benefits	Mono Lake Preservation Benefits	Net Benefits
Point of reference	--	--	--	--	--
No restriction	+5.1	+1.3	-2.9	-759.7	-753.0
6,372 Ft	-10.8	-1.9	+0.4	0.0	-12.3
6,377 Ft	-16.5	-2.7	+1.1	+22.6	+3.2
6,383.5 Ft	-24.7	-4.2	+1.9	+63.0	+31.8
6,390 Ft	-28.7	-5.0	+2.7	+85.9	+49.9
6,410 Ft	-35.4	-6.7	+1.2	0.0	-43.4
No diversion	-41.2	-8.2	+1.2	0.0	-50.9
Prediversion	--	--	--	--	--

-- = not evaluated.

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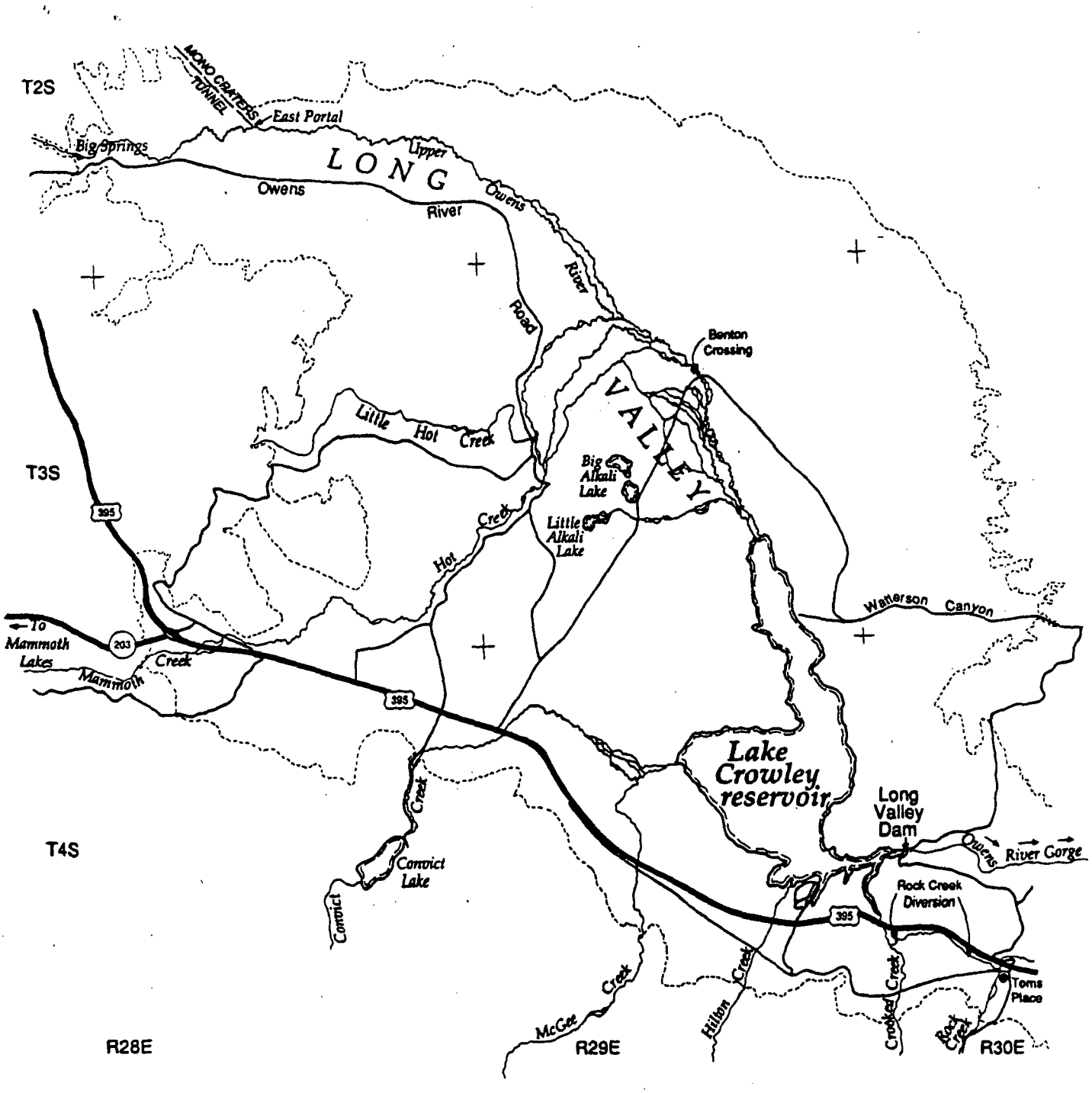
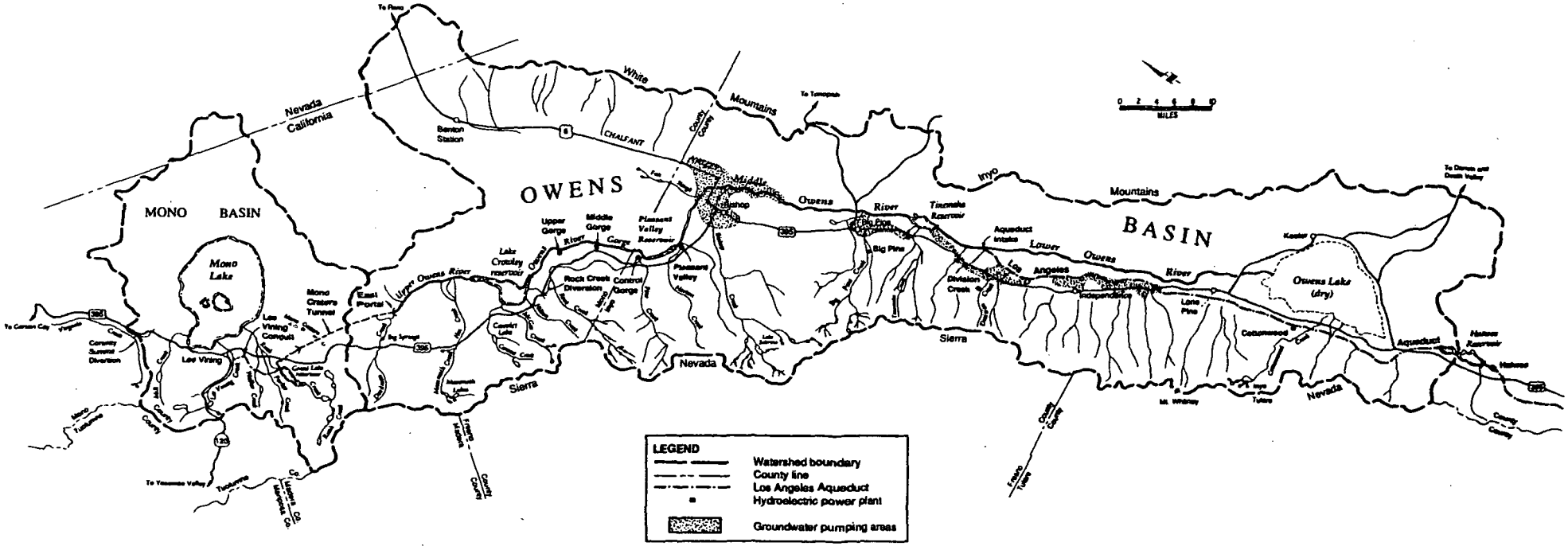


Figure 1-4.
Upper Owens River

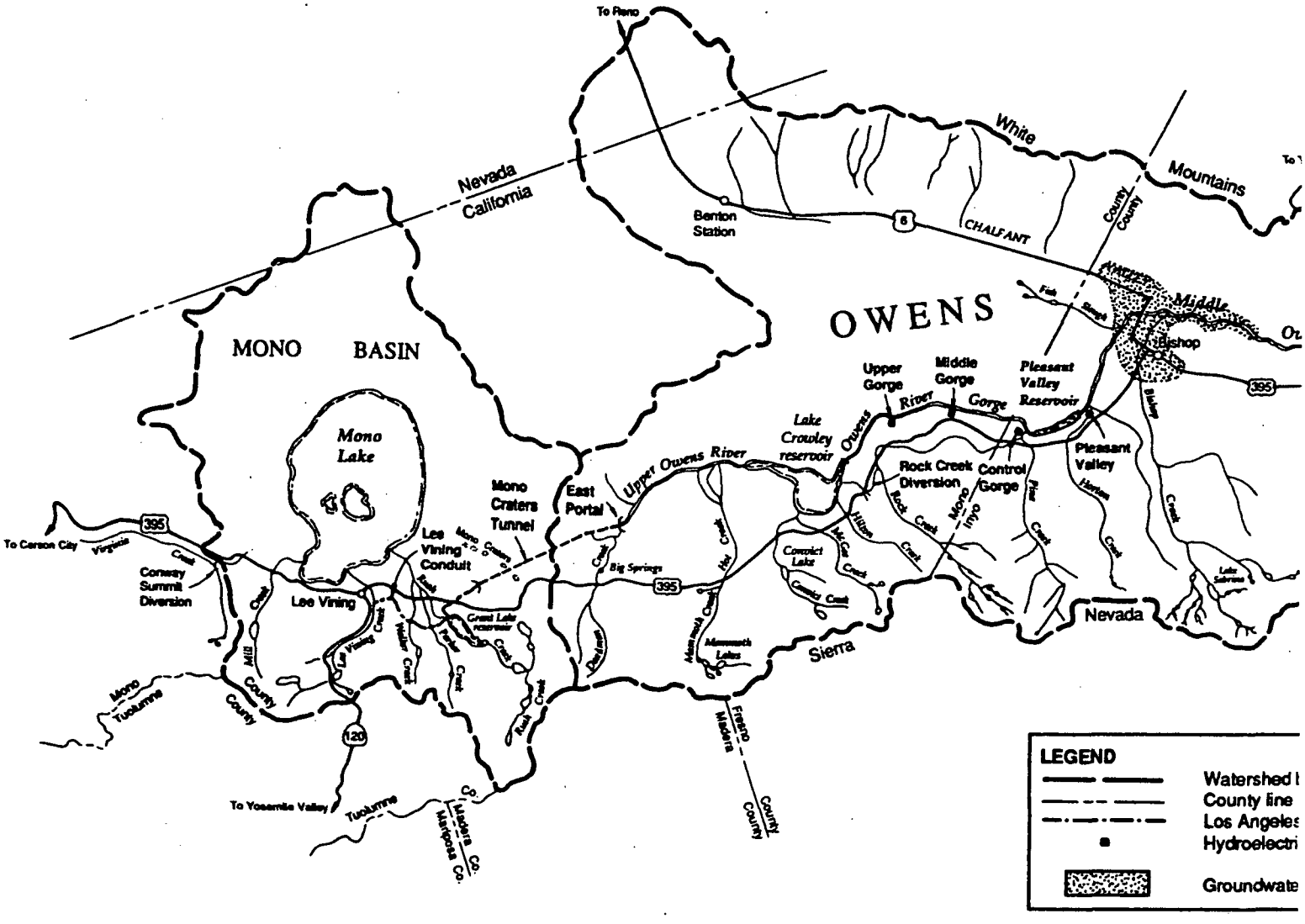
MONO BASIN EIR
Prepared by Jones & Stokes Associates

Figure 1-5.
Los Angeles Aqueduct Sys
in Mono and Owens Basins



Note: The four groundwater pumping areas depicted on this map represent approximately 175 pump-equipped LADWP wells. There are three additional wells within the town of Lone Pine that are not depicted on this map.

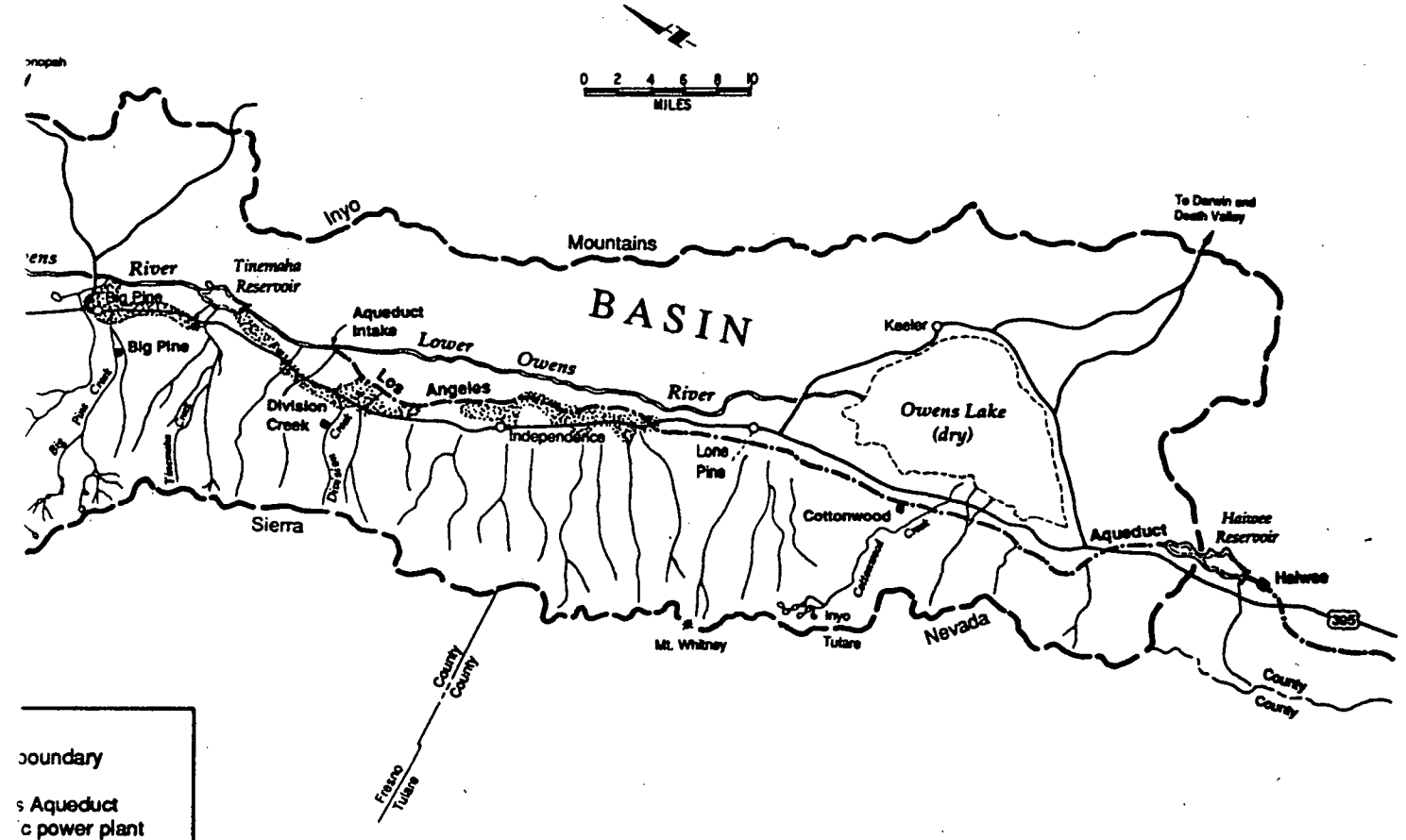
Sources: Adapted from DWR 1960 and LADWP 1990



Note: The four groundwater pun
on this map represent approxima
LADWP wells. There are three a
town of Lone Pine that are not d

Sources: Adapted from DWR 1960 and LADWP 1990

Figure 1-5.
Los Angeles Aqueduct System in Mono and Owens Basins



oundary
s Aqueduct
c power plant
r pumping areas

nping areas depicted
ately 175 pump-equipped
additional wells within the
epicted on this map.

MONO BASIN EIR

Prepared by Jones & Stokes Associates

Long Valley Dam separates the Upper Owens River from the Owens River gorge, which has cut through the volcanic tuff tablelands that mark the boundary of the Long Valley caldera. Tinemaha Dam is located on a bedrock outcropping that constricts the Owens Valley groundwater basin just south of Big Pine. The intake to the LA Aqueduct is located downstream of Tinemaha Dam. The lower portion of the Owens River basin contains several creeks that originally flowed directly into Owens Lake but were diverted into the LA Aqueduct between Tinemaha and Haiwee reservoirs.

Estimated runoff for the Owens River basin is shown in Figure 3A-9. (Runoff for Round Valley, located between Long Valley and Bishop, is included with Long Valley runoff.) The average Mono Basin runoff (from the four diverted creeks) is 124 TAF/yr; the average Long Valley and Round Valley runoff is 177 TAF/yr; and the remainder of the Owens River basin runoff is 239 TAF/yr. The total average Mono-Owens runoff is about 540 TAF/yr.

Upper Owens River

The Owens River originates at Big Springs, located downstream of the confluence of Glass and Deadman Creeks and upstream of the East Portal of Mono Craters Tunnel. Below East Portal, the river meanders for several miles across valley-bottom alluvial pasturelands and enters Lake Crowley reservoir. Prediversion streamflows are addressed in detail in Chapter 3C, "Vegetation".

Because of significant geothermal activity, several large hot springs are located in the basin. The largest is Hot Springs, located along Hot Creek. The average annual discharge from Hot Springs (and the cool springs at Hot Creek Hatchery located upstream) of about 30 TAF/yr (41.5 cfs) flows directly into the Owens River just above Lake Crowley reservoir.

Significant diversions are made from the Owens River and Hot Creek for irrigation of LADWP and private grazing pasturelands. LADWP records indicate that an average of 20 TAF/yr are diverted for irrigation of its lands. This represents significantly more than the actual evapotranspiration losses, however. Excess diverted water returns to the Owens River or recharges the groundwater flowing to Lake Crowley reservoir. In the prediversion period, these irrigation withdrawals probably caused virtual dewatering of some reaches of the Upper Owens River during the driest years unless irrigated acreages were reduced, based on an assessment of current irrigation demands. (See "Summary Comparison of Hydrologic Effects of the Alternatives".)

Watersheds Downstream of the Upper Owens River

From Lake Crowley reservoir to the aqueduct intake at Haiwee Reservoir, many watersheds and groundwater withdrawals contribute water to the Owens River and the water export system. Runoff from these watersheds, sustainable groundwater withdrawals in the Bishop area, and basin uses are described in Appendix T.

Grant Lake Reservoir and Outlet Facilities

Grant Lake reservoir had been enlarged to provide maximum storage of about 48 TAF as part of the LA Aqueduct extension to Mono Basin. The outlet from the Grant Lake reservoir is a conduit with a capacity of approximately 395 cfs. This outlet supplies the West Portal of the Mono Craters Tunnel and is used to release water through Mono Gate #1 to Rush Creek below Grant Lake reservoir. A canal conveys water from Mono Gate #1 to the original Rush Creek channel. The A-Ditch and B-Ditch irrigation and spreading diversion points are located on the canal just upstream from Rush Creek.

During high runoff periods, excess runoff has been released over the Grant Lake reservoir spillway directly into Rush Creek. A spill ditch near the West Portal has also been used occasionally to release excess water into Pumice Valley. During high runoff periods (e.g., 1967), diversions from Lee Vining Creek to Grant Lake reservoir sometimes continued, causing large spills over the Grant Lake reservoir spillway.

Lee Vining Conduit

The Lee Vining conduit connects the Lee Vining Creek diversion dam to the Grant Lake reservoir. The conduit crosses Walker and Parker Creeks, with diversion structures located on these creeks. Walker and Parker Creek flows are diverted into the conduit, released for irrigation diversions downstream of the conduit, or spilled down their channels during heavy runoff periods.

A small diversion structure was operated at south Parker Creek for many years during the diversion period but was closed recently because LADWP does not have appropriative water rights for this creek. The Lee Vining conduit has a capacity of approximately 300 cfs at Lee Vining Creek, with slightly higher capacity below Walker Creek (325 cfs) and Parker Creek (350 cfs). The Lee Vining conduit ends in Grant Lake reservoir, across from the outlet facility near the dam.

Owens Valley Diversions and Uses during the Diversion Period

Although the Owens River basin runoff hydrology for both the prediversion and point-of-reference conditions are considered to be characterized by the historical 1940-1989 streamflow records, the two reference conditions differ in the amount of diversions for local uses and export to Los Angeles, and in the amount of groundwater pumping. These historical use and export patterns were caused by variable hydrologic conditions and the increasing demands for water supply to the city, as well as modifications to the LA Aqueduct facilities during the period, including the extension of the aqueduct to Mono Basin.

trations of all mineral parameters are low enough to result in excellent drinking water quality.

The quality of water from Grant Lake reservoir outlet, monitored by LADWP for selected parameters since 1934, results from a mixture of the four tributary streams that constitute Mono Basin's export. Table 3B-4 provides a summary of LADWP and SWRCB contractor data collected at Grant Lake outlet. The 1991 SWRCB contractor data generally conform to the LADWP historical data, suggesting that runoff quality has remained unchanged.

The low mineral content of the Mono Lake tributaries contrasts with geothermal springs and groundwater sources in the Owens River basin. Table 3B-5 gives the average mineral quality for Grant Lake reservoir outlet and each of the other major sources of water for the LA Aqueduct system.

Nutrients, Organics, and Metals. Mono Lake tributary streams are very low in nitrogen and phosphorus. Chlorophyll *a* values in Grant Lake reservoir ranged from 0.9 to 13.3 μg/l, with an average of 5.8 μg/l, indicating an oligotrophic (low in nutrients and therefore low biological productivity), high-altitude reservoir. Trace element concentrations were frequently undetectable or very low in Grant Lake reservoir outlet.

Sediment Quality. SWRCB's contractor sampled sediment at four locations in Grant Lake reservoir during July 1991, and laboratory analyses are presented in the water quality auxiliary report. Mineral and metal sediment concentrations were generally higher at the outlet than at the other sampling locations, but all were well within normal background ranges.

Water Quality Conditions in the Owens River Basin

Upper Owens River Sources

Geothermal activity strongly influences water quality in the Upper Owens River basin upstream of Lake Crowley reservoir. Visible geothermal activity consists of hot springs, fumaroles, and thermally altered rock centered primarily around Hot Creek, Little Hot Creek, Casa Diablo Hot Springs, Whitmore Hot Springs, and the Alkali Lakes (California Department of Water Resources 1967). These phenomena are associated with past volcanism, which has recently shown signs of renewal in the area.

East Portal. Exports from Mono Basin emerge from the Mono Crater Tunnel at East Portal and flow into the Upper Owens River. Water quality in the East Portal is influenced by a nearly constant tunnel inflow of mineralized groundwater, referred to as "tunnel make" by LADWP. Its mineral character dominates the quality of East Portal when exports from Mono Basin are low.

East Portal conductivity is strongly correlated with flow, as shown in Figure 3B-2. Measured conductivity at East Portal has ranged from 75 to 450 microsiemens per centimeter (μS/cm), but in 1991, when no exports occurred, conductivity remained high at about 408-433 μS/cm. (A microsiemen is a standard unit of electrical conductivity across 1 centimeter of water.) The dilution of highly mineralized tunnel make with Mono Basin export flows can be described mathematically and used to predict impacts of alternative export rates. Similar relations are observed at other locations where a runoff source is diluting a geothermal or groundwater baseflow. Tunnel water quality is summarized in Table 3B-5; as shown, nutrient, organics, and metal concentrations are generally low.

Owens River above East Portal (Big Springs). Big Springs is a relatively constant groundwater spring that provides baseflow for the Upper Owens River. Deadman Creek, Glass Creek, and other tributaries provide additional runoff from snowmelt. The average annual flow for Big Springs is approximately 50 cfs, based on historical LADWP flow data.

Conductivity at Big Springs (measured during the 1991 sampling program) is about half that of the East Portal tunnel inflow water, but several times that of the exports (Table 3B-5).

Arsenic and fluoride are accurate indicators of geothermal sources. Arsenic concentrations in Big Springs increase directly with EC. Fluoride concentrations in Big Springs and the tunnel inflow water are similar and higher than from other sources. Arsenic and fluoride concentrations are much higher than those measured at Grant Lake reservoir outlet and indicate some geothermal influence at Big Springs.

Historical and 1991 nitrate concentrations in Big Springs are very low, and phosphate concentrations in Big Springs are relatively high. Concentrations of metals other than arsenic are generally less than detection limits.

Hot Creek below Hot Springs. Hot Springs, the major geothermal spring in the Upper Owens Valley, discharges into Hot Creek about 2 miles below DFG's Hot Creek Fish Hatchery. Above Hot Creek Fish Hatchery, the creek is known as Mammoth Creek. Hot Creek water quality is poor and therefore exerts a considerable influence on downstream water quality, although conductivity is only somewhat higher than that of the tunnel inflow water (Table 3B-5).

Minerals. High conductivity values in Hot Creek indicate the strong geothermal influence from Hot Springs. Conductivities generally range from about 500 to 700 μS/cm, except when spring runoff from Mammoth Creek dilutes geothermal sources (U.S. Geological Survey 1984). Flows are well correlated with conductivity (Figure 3B-3), reflecting the relatively constant source of dissolved salts from Hot Springs.

The concentrations of all minerals increase with conductivity. Calcium and magnesium concentrations are relatively low, with 12 mg/l and 5.5 mg/l mean values, respectively (Table 3B-4). Hot Creek contains moderate to high concentrations of geothermal trace

Upper Owens River

Geomorphology and Vegetation Distribution

The Upper Owens River is divided for analysis purposes into three discrete reaches reflecting landform, geology, soil, and vegetation differences. The uppermost "Portal" reach extends from the East Portal (river mile 20.5) east to the upper end of Long Valley (river mile 17) at the confluence with McLaughlin Creek. The "Middle" reach extends from McLaughlin Creek to the confluence with Hot Creek at river mile 7.5. The lowermost "Hot Creek" reach extends from the Hot Creek confluence to Lake Crowley reservoir.

Portal Reach. The Portal reach is confined. The south edge of the canyon is delimited by narrow colluvial aprons at the base of a basalt bluff. Groundwater springs and seeps from the base of the basalt bluff. The northern edge is defined by bedrock hills and alluvial fans of the Bald Mountains. The river along this reach meanders across a relatively narrow floodplain. Low and high floodplain terraces distinguish marsh and meadow habitats from dry meadow and Great Basin scrub. Willow scrub is spotty along this reach and is mostly restricted to low terraces, except at disturbed sites below the East Portal and along the basalt bluff springline.

Middle Reach. In the Middle reach, the stream flows through recent alluvium at the upper end of Long Valley. Although ancient lakebed deposits have eroded from this area, the soils are both saline and alkaline. The flat-bottomed valley is from 0.5 to 1 mile wide and contains low terraces with marsh and wet meadow habitat and high terraces with dry and alkali meadows. Along this reach, water from the Owens River is diverted into either two or three parallel channels that distribute water across the floodplain. Shallow groundwater and saline-alkali soil lead to efflorescent crust formation at some sites along this reach.

Hot Creek Reach. In the Hot Creek reach, the stream flows over recent alluvium and past remnants of the ancient lakebed that form high terraces in the lower portion of Long Valley (Bailey 1989). The 3- to 4-mile-wide valley is traversed by numerous meandering river channels and diversion ditches. Hot Creek enters from the west in three main canals; the southern channel is diverted into several irrigation ditches that interconnect across the valley bottom before joining the Owens River. Soils are highly saline and alkali, strongly affecting the vegetation composition of wetlands. Efflorescent crusts also form along this reach.

Hydrologic and Hydraulic Conditions

Near the beginning of Mono Basin exports, channel sinuosity of the Upper Owens River ranged from 1.57 to 2.09 along diversion-augmented reaches, and was 1.75 along the unagumented reach from Alpers Ranch downstream to the East Portal, as measured on 1944

Rush Creek. Fish populations in Rush Creek were maintained through natural reproduction and hatchery plantings. No definitive account exists of how many fish were planted in Rush Creek and who planted them. The Rainbow Club of Bishop, an outdoor sportsmen's organization, helped stock Rush Creek beginning in the early 1920s.

An egg-collecting station was constructed in lower Rush Creek in 1925 and operated through 1953. Eggs were collected from each adult brown trout during the fall spawning migration. The destination of the fertilized eggs is uncertain; however, most eggs probably were shipped to the Mt. Whitney Hatchery (Vestal pers. comm.).

The Fern Creek Hatchery, located midway between Silver and Grant Lakes along the June Lake Loop, produced approximately 1 million fish per year (1928-1942), and some of these fish were planted into Rush Creek (Leitriz 1970).

Parker and Walker Creeks. Information on fishery management for Parker and Walker Creeks before 1940 is not available. Management practices probably consisted of planting hatchery-reared trout, which was the common practice throughout the region.

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Grant Lake

Habitat. Information on preconstruction lake habitat was not found. In the late 1930s, however, LADWP increased Grant Lake's size and capacity by constructing the Grant Lake Dam and Mono Craters Tunnel. The surface area of Grant Lake was increased from 150 to 1,094 acres, and the capacity was increased to 47,525 af (Sada 1977). In addition, a second inlet stream to the lake was created with the construction of the Lee Vining conduit, which delivers water diverted from Lee Vining, Parker, and Walker Creeks.

Fish Populations. Grant Lake contained no post-Pleistocene native fishes (Hubbs and Miller 1948) until trout were introduced around 1880 (Vestal 1954). Little information has been published on the early fishery of Grant Lake, but Grant Lake probably contained species similar to those planted throughout Mono Basin in the late 1800s and early 1900s as reported by Vestal (1954). Smith and Needham (1935) determined that Lahontan cutthroat and brown trout were present in the lake. Information on the occurrence of nongame fish species in Grant Lake before 1940 was not found.

Management. Information is limited regarding Grant Lake fishery management before 1941. Management practices probably consisted of planting hatchery-reared trout to maintain trout populations and offset increasing fishing pressure.

Owens River Basin

Habitat. Habitat conditions in the Owens River before 1940 are not well documented. Conditions in 1940 probably were similar to prehistoric habitat conditions, although water diversions in the early 1900s significantly altered natural flows in the Lower Owens

River below the Los Angeles Aqueduct intake enough to alter water surface elevations of Owens Lake. Tributaries in the Owens River basin usually were productive; Smith and Needham (1935) described Hot Creek as one of the richest trout streams they had ever encountered.

Upper Owens River. Limited information on Upper Owens River habitat conditions before 1941 indicates that the channel and streamflows near the present location of East Portal provided excellent trout habitat (Chapter 3J, "Recreation Resources"). Early settlers of the Owens River basin diverted water for irrigation, and streamflows probably were reduced seasonally in certain areas. Grazing also was known to occur in the area before 1941.

Lake Crowley Reservoir. Lake Crowley reservoir did not exist in 1940; Long Valley dam was completed in 1941. No information on preimpoundment fish habitat was available.

Owens River Gorge. Beginning in 1952, the Owens River gorge below Lake Crowley reservoir was substantially dewatered because of diversion of water by LADWP for hydroelectric power generation. The issue of flows in the Owens River gorge is the subject of a lawsuit filed in 1991 by Mono County against LADWP and the SWRCB. The parties are attempting to resolve the issues raised in the suit through settlement negotiations.

Middle Owens River. Flows in the Middle Owens River were nearly unimpaired before 1941. Habitat conditions in 1940 probably approached prehistoric habitat conditions except for grazing-related impacts and water diversions.

Lower Owens River. Habitat conditions in the Lower Owens River before LADWP diversions began in 1913 probably resembled prehistoric conditions except for changes associated with grazing and local agricultural diversions. After the diversion of the Lower Owens River at the Los Angeles Aqueduct intake structure in 1913, Lower Owens River flows below the intake were eliminated except during exceptionally wet years. Habitat conditions in the Lower Owens River were altered significantly below the Los Angeles Aqueduct intake as a result of LADWP diversions.

Pleasant Valley, Tinemaha, and Haiwee Reservoirs. Haiwee and Tinemaha Reservoirs were filled in 1913 and 1929, respectively, and provided warmwater lentic (lake) habitat. Owens River habitat conditions at the Tinemaha Reservoir site before reservoir filling probably resembled prehistoric conditions except for grazing-related changes. River flow was unimpaired along the entire reach of the Owens River above the aqueduct intake until the construction of Tinemaha Reservoir. Approximately 2 miles of Owens River habitat became inundated after dam closure.

Haiwee Reservoir, constructed in 1913 south of Lake Owens, is an offsite storage facility but does store water diverted from the Owens River. Water is diverted into the Los Angeles Aqueduct from the Owens River at the aqueduct intake structure and is conveyed to Haiwee Reservoir.

Pleasant Valley Reservoir did not exist in 1940; dam construction was completed in 1955.

Los Angeles Aqueduct and Irrigation Canals. The Los Angeles Aqueduct, constructed between 1908 and 1913, is an artificial channel designed and operated to convey water diverted from the Owens River. The aqueduct not only provided warmwater fish habitat in the channel but also was responsible for habitat losses in the Lower Owens River as described above. Irrigation canals provided intermittent fish habitat.

Fish Populations. Native Owens sucker, Owens tui chub, Owens pupfish, and Owens speckled dace comprised the Owens River fish community before exotic game and nongame species were introduced, flows regulated, and habitat extensively altered. By the 1930s, however, introductions of exotic species in Owens River basin had resulted in self-sustaining populations of brown trout, largemouth bass, catfish (brown bullhead), and carp in the Owens River (Smith and Needham 1935). These introduced species coexisted and competed with the native fish fauna.

Upper Owens River. In 1940, fish populations of the Upper Owens River probably consisted of native Owens sucker, tui chub, and speckled dace (Moyle 1976) and introduced brown, rainbow, cutthroat, and brook trout (Smith and Needham 1935). Owens suckers were collected by Smith and Needham during surveys of Convict Lake, indicating that suckers also may have been present in headwater streams. Tui chub were not collected during surveys of the Upper Owens River, but definitive information on the species' presence could not be found.

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Middle Owens River. The primary game species in the Middle Owens River were brown trout (wild and planted) and planted rainbow trout. Also present in 1940 were self-sustaining but limited populations of largemouth bass and brown bullhead.

Native Owens tui chub and Owens speckled dace populations in the Middle Owens River apparently had declined by 1940 but were still present in the main river where somewhat stable populations of Owens sucker still occurred. Records of Owens pupfish do not exist from this period, but small populations persisted in isolated springs within the Owens Valley. Carp were abundant in the sluggish reaches of the valley floor.

Lower Owens River. Limited information exists concerning when the first nonnative species were introduced into the Lower Owens River. Introductions probably occurred before 1941 because native populations were known to be declining by this time. As introduced species and water diversions increased, native species largely were displaced by introduced species. By 1940, fish populations in the Lower Owens River above the LA Aqueduct probably were similar to those identified for the Middle Owens River. Below the LA Aqueduct, the Lower Owens River was generally dry with extremely limited, if any, fish populations.

Pleasant Valley, Tinemaha, and Haiwee Reservoirs. Game and nongame species similar to those present in the Middle and Lower Owens River likely occurred in

- excavating 20 existing instream pools in Walker Creek, and
- replacing the culvert on Walker Creek at the old county road.

Grant Lake

Habitat. Grant Lake inflows are provided by Rush and Lee Vining Creeks with smaller contributions from Parker and Walker Creeks. Despite diversions and controls on these inflows, Rush Creek and the Lee Vining conduit have flow regimes similar to natural conditions and are characterized by high flows in late spring and low flows in winter. Lake surface elevations are affected by LADWP demands, and low elevations occur in fall and winter and higher elevations during late spring runoff. As a result, Grant Lake reservoir exhibits vertical fluctuations of up to 30 feet in water surface elevations.

Most lake-dwelling brown trout spawn in Rush Creek above the point of slack water but within the lake inundation zone. When spring-time lake elevations are higher than the previous fall elevations, brown trout redds become inundated by the lake and mortality of eggs and recently hatched fry occurs. Some brown trout have been observed migrating up the Lee Vining conduit during spawning season, although these fish probably do not spawn successfully (Sada 1977).

Fish Populations. Little information has been published on Grant Lake fishery resources. Besides supporting a wild (self-sustaining) population of brown trout, Grant Lake may contain smaller populations of rainbow and eastern brook trout; DFG planted surplus brook trout and regularly planted many catchable-sized rainbow trout in Rush Creek above Grant Lake in the late 1970s to supplement angler catches (Pister pers. comm. in Sada 1977). DFG sampling in Rush Creek above Grant Lake from 1985 through 1986, however, revealed only brown and rainbow trout.

Several species of nongame fish have been introduced into, and reportedly occur, in the Grant Lake watershed. These species include the Owens sucker, threespined stickleback, and a hybridized form of tui chub (*Gila bicolor* ssp. *snyderi x* ssp. *pectinifer*). (Sada 1977.) Information on the occurrences of these species in Grant Lake is not available although some or all of these species may occur in the lake.

Management. Information on current fishery management for Grant Lake is not available. DFG hatchery records (California Department of Fish and Game [n.d.]) indicate that catchable-sized and broodstock rainbow, fingerling Lahontan cutthroat, and subcatchable-sized brown trout have been planted in Grant Lake. Catchable-sized rainbow trout are currently planted in Grant Lake; fingerling Lahontan cutthroat and subcatchable-sized brown trout are planted when available.

Owens River Basin

Overview

Habitat. Interbasin water conveyance in the Owens River, diversions, and impoundments (e.g., Lake Crowley reservoir, Pleasant Valley Reservoir, Tinemaha Reservoir, and Haiwee Reservoir) have been developed to meet downstream water demands and have significantly altered the natural flows in the Owens River. Diversion of the Lower Owens River (at the Los Angeles Aqueduct [LA Aqueduct]) dewaters approximately 100 miles of river habitat, including Owens Lake. Likewise, flow in the Owens River gorge below Lake Crowley reservoir was eliminated from 1940 to 1991 because of water diversions for power production. These diversions have significantly reduced or eliminated fish habitat and populations in these river segments. Flows in the Middle and Lower Owens River are regulated by Pleasant Valley Reservoir and Tinemaha Reservoir, respectively. Lake Crowley reservoir, the largest of the impoundments, inundates approximately 12 miles of Owens River habitat but provides a highly productive reservoir environment for trout.

Past and present practices of grazing and vegetation removal along many eastern Sierra Nevada streams have degraded riparian habitats and accelerated bank erosion. These degraded conditions are particularly evident on the Upper, Middle, and Lower Owens River. Combined with the effects of flow regulation, these impacts have resulted in a reduction in fish habitat quantity and quality compared to prehistoric conditions.

Fish Populations. Moyle (1976) indicates that 14 game (all introduced) and seven nongame species (three introduced and four native) exist in the Owens River basin (Table 3D-2). During 1983 surveys of 29 streams within the basin, brown trout were the numerically dominant game species, followed by brook, golden, rainbow, and cutthroat trout (Deinstadt et al. 1985). Of the nongame species, Owens sucker occupied the greatest number of sampled sections, followed by Owens tui chub, threespine stickleback, common carp, brown bullhead, largemouth bass, and bluegill. Nongame and warmwater game fish species largely are confined to the Middle and Lower Owens River, including Lake Crowley reservoir and Tinemaha Reservoir. Owens pupfish and speckled dace are no longer dominant species in major habitats of the Owens River. Nongame fish populations, except the Owens sucker, have been declining throughout their range as a result of the complex interactions between habitat alterations (e.g., water diversions, water impoundments, modified flow patterns, grazing) and competition from introduced species.

All four of the endemic fish species in the basin are recognized as special-status species: Owens sucker, Owens tui chub, Owens pupfish, and Owens speckled dace. Except for the Owens sucker, these species have experienced major declines in their historical ranges and abundances.

The Owens sucker is recognized as a state species of special concern. In general, species with this designation have declined in abundance and still occupy much of their natural range, but management is needed to prevent them from becoming threatened

(Moyle et al. 1989). Owens sucker populations occur throughout the Owens Valley, including Lake Crowley reservoir, the Owens River gorge below Lake Crowley reservoir, and the Middle Owens River.

The Owens tui chub is listed as endangered by the state and USFWS. An endangered species designation means the species is in danger of extinction throughout all or a significant portion of its range. A major factor contributing to the Owens tui chub's endangered status is hybridization with the Lahontan tui chub, which probably was introduced into Lake Crowley reservoir and rapidly spread throughout the lower segments of the Owens River system. Pure populations of Owens tui chub are restricted to five isolated locations: the Hot Creek headsprings, the Owens River gorge downstream of Lake Crowley reservoir, springs and seeps along the west shore of Owens Lake, the Owens Valley Native Fish Sanctuary, and little Hot Creek. (McEwan 1990.) None of the pure populations are found in habitats that would be affected by the EIR alternatives.

Owens pupfish also is a federal- and state-listed endangered species. Owens pupfish once were present in the Owens River system from Fish Slough and its springs to Lone Pine. The species now occurs only in Warm Springs near Lone Pine and in the Owens Valley Native Fish Sanctuary (Moyle 1976). These habitats would not be affected by the EIR alternatives.

Owens speckled dace is designated a state species of special concern. Once common throughout the Owens River basin, Owens speckled dace now are known from a few springs and creeks in Long Valley and several small tributaries and irrigation ditches in the Owens Valley near Bishop, California. These habitats would not be affected by the EIR alternatives.

Management. Most of the streams and lakes in the Owens River basin are heavily fished throughout the typical fishing season (May through October). In response to fishing pressure, DFG stocks most of these streams and lakes with rainbow, brown, eastern brook, and Lahontan cutthroat trout. Most of the trout planted are catchable size, but fingerling-, subcatchable-, and catchable-sized, and trophy-sized fish also are stocked. Trout populations are maintained by natural reproduction, intensive stocking, or both.

Generally, fishing regulations in Mono Basin apply to the Owens River basin. Special regulations apply to certain other lakes and streams, including Lake Crowley reservoir and its tributaries and the Owens River between Pleasant Valley Dam and Five Bridges Road. (California Department of Fish and Game 1992c.)

DFG manages the 16-mile-long section of the Middle Owens River from Pleasant Valley Dam to Five Bridges Road as a component of the Wild Trout Program. Wild brown trout is the management species, and no trout are planted in this section of the Owens River. The fishing season is open all year, but the daily bag limit is two trout. Other streams in the region, including lower Rush Creek, also are managed for wild trout and are not planted with hatchery trout. Fish populations in streams managed as wild trout fisheries

are maintained by a combination of natural reproduction and immigration from upstream or downstream areas.

In part of the agreement between the City of Los Angeles and the California Fish and Game Commission, the city granted the commission permanent use of the Hot Creek Hatchery site and contributed $25,000 toward construction of the hatchery in lieu of constructing fishways at Grant Lake and Long Valley Dams in 1940 (Leitritz 1970). Today, hatchery production is carried out at several DFG hatchery facilities in the Owens River basin, including Hot Creek, Fish Springs, and Mt. Whitney-Black Rock Hatcheries. Hot Creek Hatchery produces about 75% of all hatchery-planted fish in Inyo and Mono Counties.

Upper Owens River

Instream Flows. The Upper Owens River meanders through Long Valley for over 20 miles from Big Springs to its terminus at Lake Crowley reservoir (Figure 3D-3). The river is supplied by springs and snowmelt runoff, and by its major tributary, Hot Creek. Upper Owens River flows were augmented by water diversions from Mono Basin by LADWP beginning in 1941. Diversion flows from Mono Basin increased the annual average Upper Owens River flows by nearly 100 cfs, or approximately 120%, with substantial flow increases occurring in every month. Average annual flows for 1941-1989, as measured above and below East Portal, were 58 cfs and 168 cfs, respectively. Flows downstream of East Portal are subsequently modified by ungaged diversions for bypassing flow around portions of the main river or for irrigating adjacent pastures; however, the dominating characteristic of Upper Owens River flows remains the LADWP exports from Mono Basin. The resulting flows in the Upper Owens River have altered channel locations, current velocities, stream widths, streambanks, water temperatures, and sediment transport and sediment deposition. (EBASCO Environmental et al. 1993.)

These flow augmentations to the Upper Owens River were essentially the point-of-reference conditions in August 1989, with some reductions in the flows because of court-ordered instream flow requirements in Rush and Lee Vining Creeks that otherwise would have been exported into the Owens basin.

Instream flows in the Upper Owens River have been modified since August 1989 by additional court-ordered flows in Mono Basin. In 1990, the court ordered increased stream-flows for Mono Basin tributaries downstream of LADWP's conduit. In 1991, LADWP was ordered by the court to maintain Mono Lake at 6,377 feet before diverting water from Mono Basin to the Upper Owens River. As a result of these orders and the absence of surplus waters because of the 1987-1992 drought, Upper Owens River flows have been at natural rates since 1991, although flows were augmented in October 1991 for the purpose of conducting an instream flow study. (EBASCO Environmental et al. 1993.)

Habitat. From East Portal to Lake Crowley reservoir (Figure 3D-3), the Upper Owens River is characterized by multiple channels and a sand and gravel bed. The river

geomorphology can generally be defined as an interconnecting network of low-gradient, relatively deep and narrow, straight to sinuous channels with stable banks composed of fine-grained sediment and vegetation (Smith and Smith 1980 in EBASCO Environmental et al. 1993). Flood channels flank the sinuous main channel and have formed from historical overbank floods, which have increased in frequency and duration since Mono Basin exports began in 1941. Channel length and meander bends also have been reduced since 1944 by 3.6 miles of river channel, with most of this loss upstream of Hot Creek and attributed primarily to the Mono Basin exports. Despite geomorphic changes, adequate flushing flows exist in the Upper Owens River regardless of hydrologic condition or Mono Basin exports. (EBASCO Environmental et al. 1993.)

Woody riparian vegetation occurs sporadically along the Upper Owens River and is dominated by willows and a variety of herbaceous species. The upper portions of the Upper Owens River contain most of the riparian vegetation, and the lowermost sections contain little or no woody riparian vegetation. Historical accounts indicate that riparian vegetation was also lacking in 1925. Aquatic macrophytes also provide important cover and macro-invertebrate habitat in the Upper Owens River (EBASCO Environmental et al. 1993).

Water exports from Mono Basin into the Upper Owens River have eroded and widened the channel below the East Portal discharge. Fluctuations in Lake Crowley reservoir storage have periodically exposed or inundated the lowest portion of the Upper Owens River channel. Irrigation diversions have reduced flows along various reaches of the main channel. Livestock grazing has occurred all along the Upper Owens River and has reduced vegetative cover, compacted soils, and eroded streambanks. Streambank erosion and concomitant loss of streamside vegetation can affect fish populations by reducing undercut bank cover and availability of terrestrial insects. Livestock grazing enclosures constructed along portions of the Upper Owens River have increased herbaceous species diversity, density, and height within the enclosures, illustrating the adverse effects of grazing practices. (EBASCO Environmental et al. 1993.)

The Upper Owens River comprises three segments with differing hydrology, geomorphology, and land use practices (Figure 3D-3). Segment 1 extends from East Portal to the most downstream major water diversion and is characterized by bypass channels or diversions of varying capacity and less than 20% shaded riverine conditions. Segment 2 extends to the Hot Creek confluence and is characterized by lower mean flows, an absence of major diversions, and less than 20% shaded riverine conditions. Segment 3 extends to Lake Crowley reservoir and is characterized by decreased pool habitats, higher average flows than other reaches due to the contribution of Hot Creek, and no shaded riverine conditions. Glides and runs provide the greatest habitat types in each segment, followed by riffles, and then pools. Only four pools were defined in Segment 3 in 1990. (EBASCO Environmental et al. 1993.)

Arsenic concentrations are relatively high near Benton Crossing because of Hot Creek and a nearby active geothermal area, and impacts on fish may be occurring. Effects from elevated arsenic concentrations should be considered tentative, however, until further data are developed. (EBASCO Environmental et al. 1993.)

Fish Populations. Native fish species of the Upper Owens River include Owens tui chub and Owens sucker (Moyle 1976). The Owens tui chub was observed only in Hot Creek recently, while the Owens sucker was observed in Hot Creek and in the Upper Owens River. Three introduced species are known to occur in the Upper Owens River: brown trout, rainbow trout, and threespine stickleback. (Deinstadt et al. 1986 in EBASCO Environmental et al. 1993.) Lahontan cutthroat trout probably inhabit the Upper Owens River because they were planted there during 1987 and 1989 (Pickard pers. comm.). Fish planting practices in Lake Crowley reservoir also affect fish populations in the Upper Owens River. (EBASCO Environmental et al. 1993.)

Brown and rainbow trout density estimates were highest in Segment 1 and lowest in Segment 3 during 1990 sampling. Mean brown trout biomass estimates were 249, 53, and 22 pounds per acre in Segments 1, 2, and 3, respectively. Mean rainbow trout biomass estimates were 97, 38, and 49 pounds per acre in Segments 1, 2, and 3, respectively. Total trout biomass estimates of 346, 91, and 71 pounds per acre for Segments 1, 2, and 3, respectively, are comparable to or higher than estimates for the Upper Owens River in previous studies and for other Sierra Nevada streams. Gerstung (1973 in EBASCO Environmental et al. 1993) reported a mean biomass of 41 pounds per acre for 278 northern Sierra Nevada stream sections and a mean biomass of 37 pounds per acre for 65 south Sierra Nevada stream sections. A mean of 73 pounds per acre was estimated for 73 selected streams in the Sierra Forest Ecoregion (Platts and McHenry 1988 in EBASCO Environmental et al. 1993).

Catchable trout populations are larger in the Upper Owens River than estimated for other Sierra Nevada streams; brown and rainbow trout up to 18-20 inches in length are present in the fishery. Trout growth rates and condition generally exceed average values reported for other Sierra Nevada streams. Aquatic macroinvertebrate populations are relatively large and diverse, and food production does not appear to be a limiting factor to trout production. The Upper Owens River, therefore, contains large trout populations and maintains an excellent fishery, particularly in Segment 1. (EBASCO Environmental et al. 1993.) The excellent fishery is maintained in part by controlled access and catch-and-release regulations on private land.

Major migrating periods of brown and rainbow trout from Lake Crowley reservoir into the Upper Owens River occur primarily in October and November for fall-run brown trout and March through May for the spring-run rainbow trout (Milliron pers. comm.). Fall-run rainbow trout make up a much smaller spawning run in late summer and fall. No instream barriers exist from just below East Portal downstream, and successful upstream migration can be achieved at low lake levels with river discharges exceeding 20 cfs (EBASCO Environmental et al. 1993). Consequently, Lake Crowley reservoir trout have spawning habitat available to them throughout the Upper Owens River under a range of hydrologic conditions.

Management. DFG routinely plants catchable- and subcatchable-sized rainbow trout in the Upper Owens River (Pickard pers. comm.) During 1985-1987 and 1989-1991, an average of 221,206 rainbow trout were planted annually in the Upper Owens River near

Appendix T. Hydrologic Characteristics of the Owens River Basin below the Upper Owens River

The hydrology of Mono Basin is described in detail in Chapter 3A. This appendix describes the Owens River basin hydrology that is indirectly affected by Mono Basin exports.

Lake Crowley Reservoir Watershed Runoff

The watershed of Lake Crowley reservoir includes the Upper Owens River and several tributary creeks (Figure 1-1). Mammoth Creek joins Hot Creek near the Hot Creek Hatchery, upstream of Hot Springs. Convict and McGee Creeks join just upstream of Lake Crowley reservoir. Hilton and Crooked Creeks flow directly into Lake Crowley reservoir. Excess streamflow from Rock Creek can be diverted to Lake Crowley reservoir.

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Because of significant geothermal activity, several large hot springs have formed in the basin. The largest is Hot Springs, located along Hot Creek. The average annual discharge from Hot Springs (and the cool springs at Hot Creek Hatchery located upstream) of about 30 TAF/yr (41.5 cfs) flows directly into Hot Creek, which joins the Owens River just above Lake Crowley reservoir.

Significant diversions are made from the Owens River and Hot Creek for irrigation of LADWP and private grazing pasturelands. LADWP records indicate that an average of 20 TAF/yr are diverted for irrigation of its lands. This represents significantly more than the actual evapotranspiration losses, however. Excess diverted water returns to the Owens River or recharges the groundwater flowing to Lake Crowley reservoir. LADWP records suggest that unaccounted gains that may include irrigation return flows upstream of Lake Crowley reservoir average 39 TAF/yr.

The LADWP station at Long Valley Dam (elevation 6,700 feet) measures average rainfall of about 10 inches, and a station at Lake Mary measures 28.8 inches. Snowpack water content on April 1 ranges from 20 to 42 inches in the surrounding watersheds at elevations of 8,300-9,500 feet and shows the increase in snowpack with elevation on the east side of the Sierra Nevada.

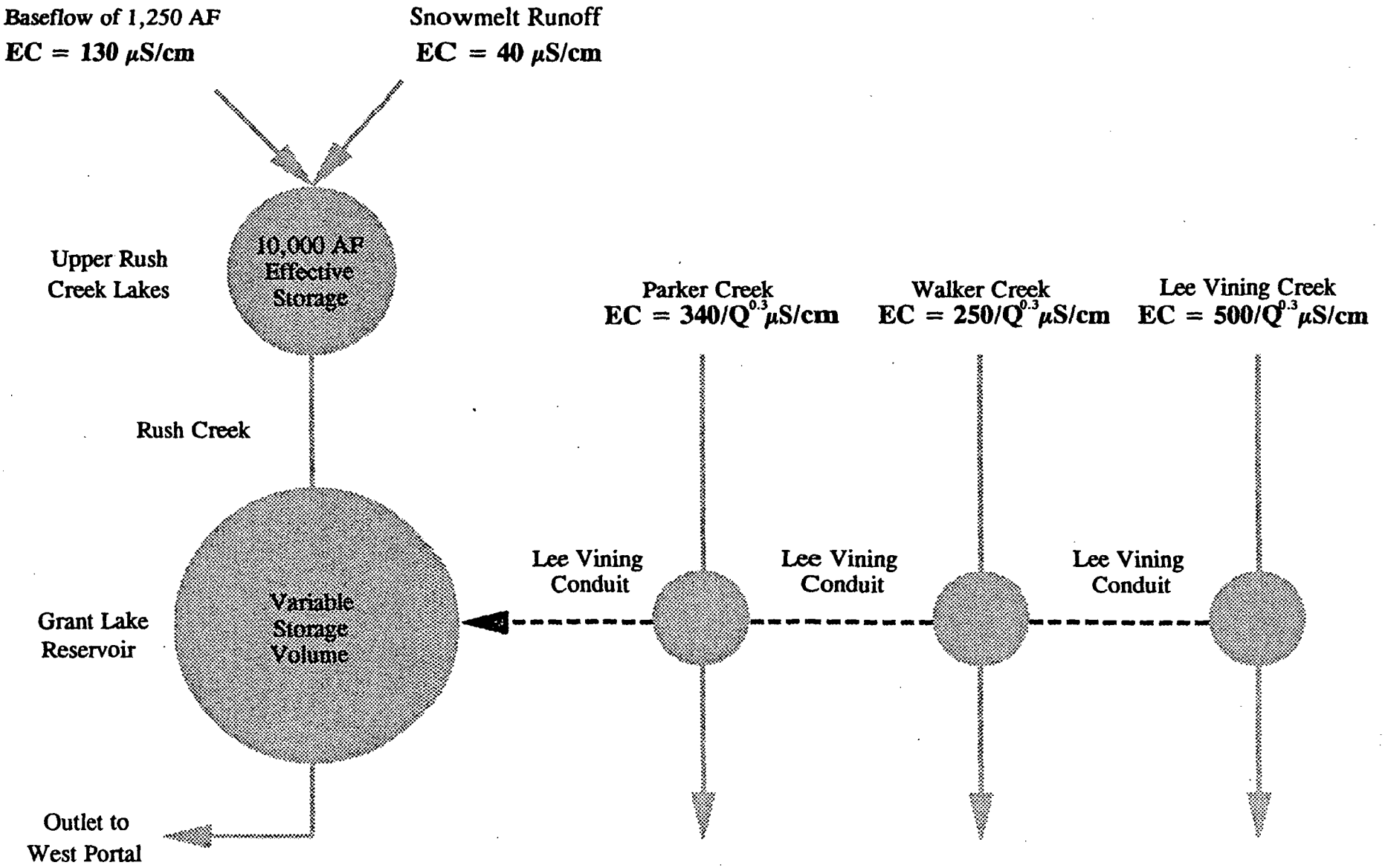
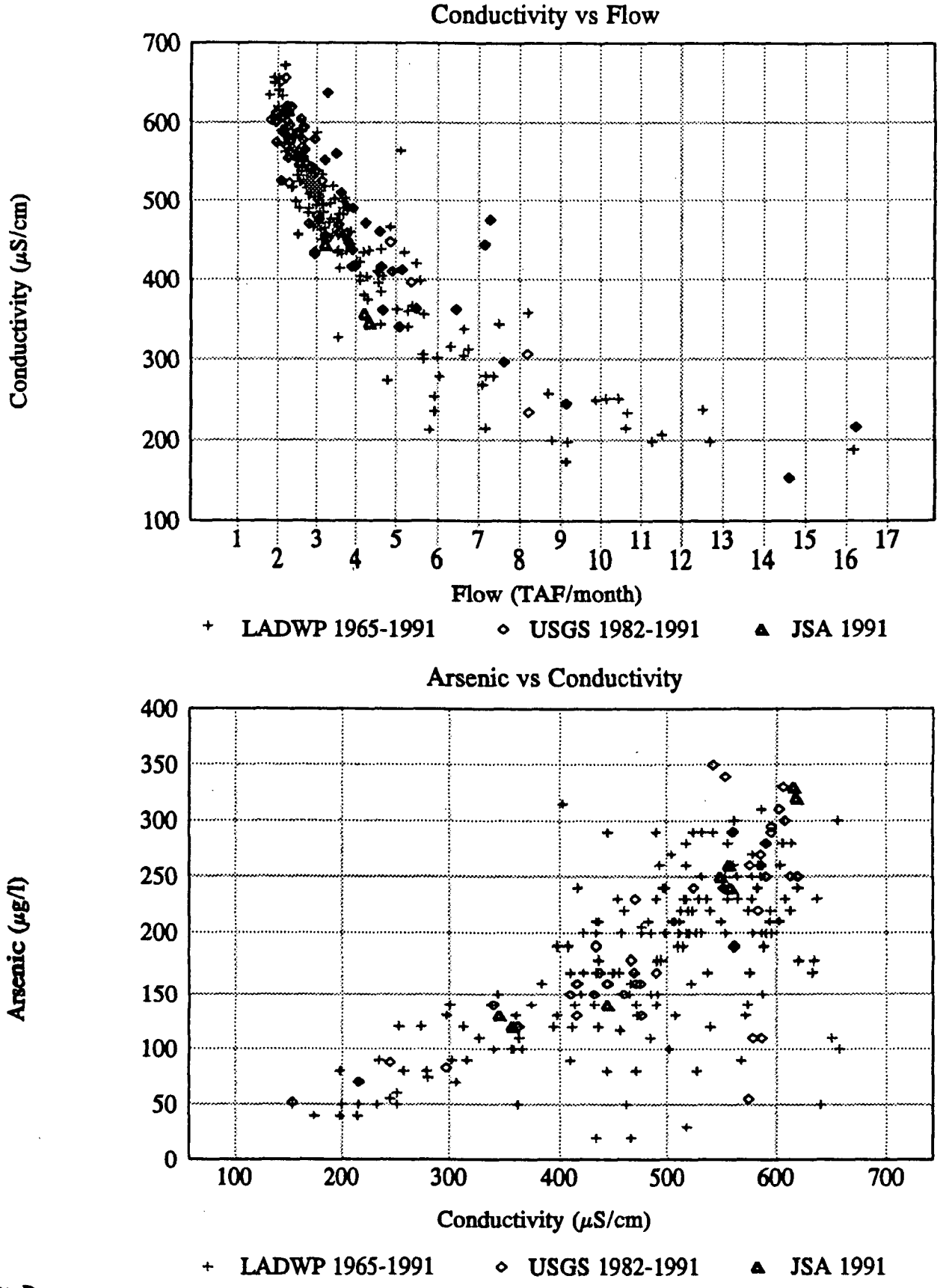


Figure K-3.
Grant Lake Module



Note: Data collected from 1965 to 1991.

Figure K-1.
Relationships between Flow, Conductivity, and Arsenic at Hot Creek

Table K-1. Ratios of Constituents of Concern to Conductivity

Module and Location	Constituent of Concern: Chloride (mg/l)	Arsenic (μg/l)	Fluoride (mg/l)	Phosphate (mg/l)
Grant WQ				
Lee Vining Creek	0.02	0.02	0.0004	0.001
Walker Creek	0.02	0.02	0.001	0.0005
Parker Creek	0.01	0.02	0.001	0.001
Rush Creek	0.03	0.04	0.001	0.0002
Mono tunnel make	0.04	0.06	0.0015	0.002
Long WQ				
East Portal	0.016	0.032	0.001	0.001
Big Springs	0.048	0.08	0.002	0.003
Mammoth Creek	0.01	0.12	0.0013	0.001
Hot Creek Springs	0.2	0.35	0.04	0.0004
Convict Creek	0.01	0.07	0.001	0.0001
McGee Creek	0.009	0.09	0.001	0.0001
Hilton Creek	0.024	0.26	0.0027	0.0006
Crooked Creek	0.008	0.05	0.002	0.0007
Rock Creek	0.025	0.16	0.003	0.0005
Long Gains	0.11	0.22	0.0045	0.0004
LA Aqueduct WQ				
Owens River runoff				
Above Tinemaha Reservoir	0.08	0.002	0.001	0.0004
Below Tinemaha Reservoir	0.01	0.0009	0.001	0.0001
Owens River groundwater				
Above Tinemaha Reservoir	0.10	0.12	0.003	0.0002
Below Tinemaha Reservoir	0.02	0.05	0.0015	0.00001

Grant Lake Reservoir Module

The first module is called Grant-WQ. This module calculates the four tributary conductivity loads, Grant Lake reservoir outlet conductivity, and the resulting East Portal conductivity. A conceptual diagram of the Grant-WQ module is presented in Figure K-3.

The conductivity of Rush Creek inflow to Grant Lake reservoir is a function of dilution and mixing of Rush Creek surface runoff with a higher conductivity base flow (Figure K-3). The conductivity and flow volume values for base flow and runoff were estimated based on historical Grant Lake reservoir conductivity data. The Rush Creek conductivity load is the sum of the base flow and runoff loads divided by the Rush Creek flow. An estimated mixing volume of 10,000 af for the upper Rush Creek lakes was required to simulate the observed pattern increasing conductivity during low-flow periods.

Conductivity loads for Lee Vining, Parker, and Walker Creeks are calculated using constant flow regression equations and historical flow data. Details of the regression equations and their calibration are discussed below. The calculation of Grant Lake reservoir outlet conductivity is adjusted for storage and dilution by dividing the initial conductivity load plus the inflowing tributary conductivity load minus the outflowing load by the end of month Grant Lake reservoir storage volume.

East Portal conductivity is calculated using West Portal flows, the estimated Grant Lake reservoir outlet conductivity, and an estimated constant "tunnel make" flow and conductivity of 1,000 af/month and 425 μS/cm, respectively. Tunnel make is the groundwater inflow to the Mono Craters Tunnel. When there are no exports from Mono Basin, the East Portal flow is estimated as 1,000 af/month with an EC value of 425 μS/cm.

Long Valley Module

The second module, known as Long-WQ, incorporates all Lake Crowley reservoir inflows, including the Owens River above East Portal, five tributaries, Rock Creek diversions, and East Portal flows calculated in the Grant-WQ module. The Owens River above East Portal (Big Springs) and the five tributary conductivity loads are calculated using regression equations and historical flows. A conceptual diagram of the Long-WQ module is presented in Figure K-4.

Because gains and losses are significant between the tributary streamflow gages and Lake Crowley reservoir, the effects of gains and losses must be accounted for. The measured tributary inflows are compared with Lake Crowley reservoir inflow estimated from the outflow and storage charge. Sometimes the sum of measured tributary inflow is different than estimated inflow to the reservoir. If Lake Crowley reservoir inflow is less than tributary flows, the difference is assumed to be irrigation diversions and evapotranspiration losses. If reservoir inflow is greater than tributary flows, the difference is assumed to be local runoff. When measured Lake Crowley reservoir inflow is less than total tributary inflow, the total estimated tributary load is assumed to enter the reservoir. When measured

Table F-2. Hierarchical Vegetation Classification of the Tributary Streams, Mono Lake Shoreline, and Upper Owens River

Formation	Subformation	Series	Dominant Species
Forest	Riparian forest	Conifer-hardwood forest	
		Cottonwood-willow forest	
		Aspen forest	
	Upland forest	Jeffrey pine forest	
		Pinyon pine forest	
Scrub	Riparian and wetland scrub	Willow scrub	*Salix* spp. (e.g., *S. lasiolepis, S. exiguia, S. laevigata*)
		Mixed riparian scrub	*Salix* spp. (often *S. exigua*) and *Shepardia argentea, rosa woodsii*
	Great Basin scrub	Sagebrush scrub	*Artemisia tridentata, Chrysothyamnus nauseousus* subsp. *albicaulis, Prunus andersonii*
		Bitterbrush scrub	*Purshia tridentata*
		Rabbitbrush scrub	*Chrysothamnus nauseuosus* subsp. *albicaulis*
		Greasewood scrub	*Sarcobatus vermiculatus, Chrysothamnus nauseuosus* subsp. *consimilis*
Herbaceous	Marsh	Tule marsh	*Scirpus acutas*
		Cattail marsh	*Typha latifolia*
		Threesquare marsh	*Scirpus pungens*
		Mixed marsh	*Scirpus pungens, Eleodaris macrostachya, Juneus cooperi, Carex*
	Wet meadow	Mixed wet meadow	*Carex* spp., *Juncus cooperi, J. nevadensis, Senecio triangularis, Castillija exilis*
		Pasture wet meadow	*Poaprofensis, P. nevadensis, Juncus balfieus, Carex praegracilis, Taraxacum officinale*
	Dry meadow	Saltgrass dry meadow	*Distidilis spicata*
		Baltic rush dry meadow	*Junas balticus*
		Nevada bulrush dry meadow	*Scirpus nevordensis*
		Mixed dry meadow	*Distichlis spicata, Juncus balticus, Scirpus nevadensis, Carex douglasii*
	Alkali wet meadow	Saltgrass alkali meadow	*Distichlis spicata*
		Grassy alkali meadow	*Distichlis spicata, Por nevadensis, Muhlenbergia asperifolia, Hoodeum jabatum*
		Nevada bulrush alkali meadow	*Scirpus nevadensis*
		Mixed alkali meadow	*Distichlis spicata, Scirpus nevadensis, Hordeum jubatum, Haplopappus lanceolatus, Puccinellis nuttalliana*
	Forb	Mixed dry forb	*Solsoa depressa, Eriogonum vimineum, Mentzelia dispersa, Psathyrotes annua*
		Bassia forb	*Bossia hyssipifolia, Solsda depressa*
		Water cress	
		Mixed wet forb	

Appendix T. Hydrologic Characteristics of the Owens River Basin below the Upper Owens River

The hydrology of Mono Basin is described in detail in Chapter 3A. This appendix describes the Owens River basin hydrology that is indirectly affected by Mono Basin exports.

Lake Crowley Reservoir Watershed Runoff

The watershed of Lake Crowley reservoir includes the Upper Owens River and several tributary creeks (Figure 1-1). Mammoth Creek joins Hot Creek near the Hot Creek Hatchery, upstream of Hot Springs. Convict and McGee Creeks join just upstream of Lake Crowley reservoir. Hilton and Crooked Creeks flow directly into Lake Crowley reservoir. Excess streamflow from Rock Creek can be diverted to Lake Crowley reservoir.

The average annual runoff from Lake Crowley reservoir watershed (Long Valley) is about 118 thousand acre-feet per year (TAF/yr), not including the Hot Creek Hatchery and Hot Springs flow of 30 TAF/yr and the Mono Tunnel groundwater flow of 12 TAF/yr.

Because of significant geothermal activity, several large hot springs have formed in the basin. The largest is Hot Springs, located along Hot Creek. The average annual discharge from Hot Springs (and the cool springs at Hot Creek Hatchery located upstream) of about 30 TAF/yr (41.5 cfs) flows directly into Hot Creek, which joins the Owens River just above Lake Crowley reservoir.

Significant diversions are made from the Owens River and Hot Creek for irrigation of LADWP and private grazing pasturelands. LADWP records indicate that an average of 20 TAF/yr are diverted for irrigation of its lands. This represents significantly more than the actual evapotranspiration losses, however. Excess diverted water returns to the Owens River or recharges the groundwater flowing to Lake Crowley reservoir. LADWP records suggest that unaccounted gains that may include irrigation return flows upstream of Lake Crowley reservoir average 39 TAF/yr.

The LADWP station at Long Valley Dam (elevation 6,700 feet) measures average rainfall of about 10 inches, and a station at Lake Mary measures 28.8 inches. Snowpack water content on April 1 ranges from 20 to 42 inches in the surrounding watersheds at elevations of 8,300-9,500 feet and shows the increase in snowpack with elevation on the east side of the Sierra Nevada.

Evaporative losses at Lake Crowley reservoir are estimated from observations at an evaporation pan station located at Long Valley Dam, where records are kept only for ice-free months of the year. The average monthly evaporations for the land and lake pans are given in Table 3A-4.

Round Valley Runoff

The major Owens River tributaries in Round Valley are Rock, Pine, and Horton Creeks. The combined runoff from these creeks is approximately 66 TAF/yr. Birchim Canyon springs, located on Rock Creek just upstream of its confluence with the Owens River, has a long-term annual flow volume of about 17 TAF/yr. This spring discharge is not included in the runoff measurements used by LADWP to index water-year types.

Snow course measurements are available from three stations in Round Valley. Rock Creek 3 (elevation 10,000 feet) has an average April 1 water content of 15 inches. Rock Creek 2 (elevation 9,050 feet) has an average water depth of 10.4 inches, and Rock Creek 1 (elevation 8,700 feet) has an average water depth of 7.4 inches. These measurements illustrate the decrease in snowpack with decreasing elevation. Rainfall at Rock Creek averages 17.1 inches per year. Several other rainfall and snow course measurement stations are listed in Table 3A-2.

Major diversions are made from Rock, Pine, and Horton Creeks for irrigated pasturelands in Round Valley. LADWP records for 1970-1989 were used to estimate a total irrigation diversion of approximately 9 TAF/yr. Pine Creek joins Rock Creek at the bottom of Round Valley and flows through Birchim Canyon to the Owens River. Some of Horton Creek's runoff is diverted by Southern California Edison (SCE) to Bishop Creek for hydropower generation.

Middle Owens River Runoff

The Middle Owens River is the segment between Pleasant Valley Reservoir and the Los Angeles Aqueduct (LA Aqueduct) intake downstream of Tinemaha Reservoir. Because river diversions and groundwater pumping for irrigated pastureland and recreational uses are made in three distinct areas (Laws, Bishop, and Big Pine), these in-basin water use areas are considered separately in the Los Angeles Aqueduct Monthly Program (LAAMP) operations model.

Laws Area Runoff

Laws area runoff is the sum of several small creeks that flow out of the White Mountains, with an average annual volume of less than 4 TAF. Two White Mountain rainfall stations average 13.1 and 18.8

inches per year (Table 3A-2). Very little of the water actually flows into the Owens River, as most is diverted for irrigation use or infiltrates to groundwater. Fish Slough is a wetland and stream located in the Laws area with a relatively constant flow of approximately 6 TAF/yr.

Laws area irrigation diversions from the Owens River are made from upper and lower McNally canals in normal and wet years. Irrigation requirements of approximately 5 TAF/yr are satisfied with groundwater pumping in dry years. The McNally canals are used to divert Owens River flow for spreading to allow groundwater recharge in the Laws area during wet years. The combined capacity of the canals is approximately 100 cubic feet per second (cfs), allowing about 6,000 acre-feet (af) of spreading per month of available excess flow. LADWP records indicate that the unaccounted-for losses in the Laws area total 5 TAF/yr. These surface water losses presumably infiltrate and recharge groundwater.

Groundwater pumping in the Laws area is often greater than the irrigation requirements. The wellfield capacity is limited by the Long-Term Groundwater Management Plan for the Owens Valley and Inyo County (Inyo County and City of Los Angeles 1990) to approximately 38 TAF/yr, including several "enhancement and mitigation" wells that pump water to be used at other locations within the Owens Valley. The excess pumping is conveyed in the McNally canals to Laws Ditch, which flows into the Owens River just north of the town of Bishop.

Bishop Area Runoff

Bishop area runoff averages 82 TAF/yr and is dominated by runoff from Bishop Creek (69 TAF/yr). Seasonal storage by SCE for hydropower generation occurs in Lake Sabrina, with a maximum storage capacity of about 20 TAF. Diversions are made from Horton, McGee, and Birch Creeks. Several SCE hydropower plants are located along Bishop Creek. The releases from the lowest hydropower plant, which include diversions from several nearby creeks, average 80.5 TAF/yr. Bishop Creek splits into several distributaries as it flows across the alluvial fan deposits and through the town of Bishop toward the Owens River.

Artesian groundwater wells along the Owens River discharge approximately 4.5 TAF/yr into the Owens River in the Bishop area. These wells were drilled by LADWP during the 1920s to supplement Owens River flows. They essentially discharge the excess groundwater recharge from Bishop Creek. Additional inflow of groundwater seepage occurs along the Middle Owens River, but a net loss of streamflow in the Owens River between the towns of Bishop and Big Pine is caused by evapotranspiration and infiltration of streamflow to groundwater.

Bishop area irrigation diversions from the Owens River are made just downstream of Horton Creek into the Bishop Canal. The canal capacity is approximately 80 cfs, and average annual diversions are about 25 TAF/yr. Diversions are greater in dry years (30 TAF/yr) and less in wet years (15 TAF/yr) when Bishop Creek runoff supplies more of the Bishop area irrigation requirements. Irrigation diversions are made from a network of canals and drains that connect with Bishop Creek. The major return for excess

runoff or unused canal diversions is the A-drain, located several miles south of the town of Bishop, just downstream from the Big Pine canal diversion from the Owens River. LADWP records indicate that the unaccounted-for losses in the Bishop area total about 23 TAF/yr. These losses presumably recharge the groundwater.

Groundwater pumping in the Bishop area is limited to irrigation requirements within the Bishop area, according to the Bishop Cone Settlement Agreement. The wellfield capacity is approximately 20 TAF/yr, although annual pumping is limited to 12 TAF/yr (Inyo County and City of Los Angeles 1990).

Irrigation requirements in the Bishop area are approximately 21 TAF/yr, with an additional recreation and wildlife use of 4.5 TAF/yr, and uses of 3.25 TAF/yr on Indian lands. All these uses are seasonal, with peak usage in summer.

Precipitation averages 16.8 inches per year at Lake Sabrina (elevation 9,065 feet) but only 5.7 inches per year at Bishop (elevation 4,108 feet). Bishop Pass (elevation 11,200 feet) has an average April 1 snow pack water content of 33.2 inches (Table 3A-2).

Big Pine Area Runoff

Big Pine area runoff totals approximately 52 TAF/yr. Most of this is from Big Pine Creek. LADWP operates a hydropower plant on Big Pine Creek. Tinemaha Creek flows directly into Tinemaha Reservoir. The runoff from these creeks is natural; no seasonal storage facilities are located upstream.

Big Pine canal diverts water from the Owens River to supply water for irrigation and recreation (including water for use on Indian lands) in the Big Pine area, and to allow spreading for groundwater recharge. The total requirement for irrigation and recreational use is approximately 15 TAF/yr. The canal capacity for spreading is about 4.5 TAF per month (75 cfs). LADWP records indicate that unaccounted-for losses in the Big Pine area total about 20 TAF/yr, including Tinemaha Reservoir evaporation.

Fish Springs Hatchery, located south of the town of Big Pine, was originally supplied by natural springflow. As groundwater pumping for irrigation and export was increased, however, the natural springflow was reduced. The hatchery supply was augmented by two wells that now supply most of the water (24 TAF/yr) for the hatchery. Once used in the hatchery, the water flows down the Fish Springs canal to the Owens River just upstream of Tinemaha Reservoir.

The combination of releases and storage changes at Tinemaha Reservoir provides a complete record of Owens River streamflow there. The net losses along the Middle Owens River between Pleasant Valley and Tinemaha Reservoirs is estimated at approximately 37 TAF/yr.

The total wellfield capacity in the Big Pine area is approximately 42 TAF/yr. Most of the water is used for the hatchery supply and so is not lost to evapotranspiration. The excess pumping and return from the Big Pine canal and Big Pine Creek diversions flow to the Owens River in the Fish Springs canal.

Rainfall at Tinemaha Reservoir is 6.6 inches per year. Rainfall at Big Pine Power Plant has averaged 9.0 inches per year. Snow course measurements made in the Big Pine Creek watershed range from 15.2 to 22.7 inches (Table 3A-2).

Tinemaha Reservoir

Tinemaha Reservoir was constructed by LADWP to provide short-term regulation of Owens River flows, to allow the maximum amount of flow to be diverted into the LA Aqueduct. The maximum storage is approximately 16 TAF, although earthquake safety concerns have limited the usable storage to 10 TAF in recent years. The monthly pattern of evaporation of Tinemaha Reservoir is given in Table 3A-4.

Releases from Tinemaha Reservoir are usually diverted into the LA Aqueduct intake at Aberdeen, but excess water occasionally flows down the Owens River channel toward Owens Lake, south of Lone Pine.

Tinemaha-to-Haiwee Area Runoff

The remainder of the Owens Valley runoff occurs in the segment of the basin between Tinemaha Reservoir and Haiwee Reservoir. The LA Aqueduct intake from the Owens River is located just downstream of Tinemaha Reservoir near Aberdeen. Runoff from several eastern Sierra Nevada creeks, from Taboose Creek in the north to Haiwee Creek in the south, are intercepted by the LA Aqueduct. Lone Pine Creek drains the eastern slopes of Mount Whitney. LADWP has hydropower plants that divert water from Division Creek and Cottonwood Creek. The combined runoff from these creeks is about 105 TAF/yr. Springs and artesian wells along the aqueduct supply additional flow during wet periods but are limited in dry years.

Diversions from the creeks and releases from the aqueduct total approximately 23 TAF/yr, including water for Indian lands and recreation and enhancement uses. Some returns from irrigation west of the aqueduct may be captured by the aqueduct or groundwater pumping, but releases and returns from uses east of the aqueduct flow toward Owens Lake and are not returned to the LA Aqueduct.

Groundwater pumping occurs in several wellfields between Tinemaha and Haiwee Reservoirs, with a total annual limit of about 100 TAF/yr (Inyo County and City of Los Angeles 1990). Most of this groundwater is pumped directly into the LA Aqueduct for export to Los Angeles. The Black Rock

Hatchery is supplied by groundwater pumping. Pumping is lowest during the runoff period in wet years and increases in fall and winter to help maintain a constant water supply for the aqueduct.

Spreading of excess Tinemaha-to-Haiwee runoff is used to recharge groundwater for later pumping into the aqueduct. The spreading capacity in the Tinemaha-to-Haiwee area is about 20 TAF per month (335 cfs) and is accomplished with diversions from several of the creeks over the alluvial fans at the base of the mountains west of the aqueduct. During periods of excess runoff, operational spills must also be made east of the aqueduct toward Owens Lake. In most cases the creek runoff bypasses the aqueduct diversions. At other times releases are made from the aqueduct. LADWP estimates that unaccounted-for losses in the Tinemaha-to-Haiwee segment of the Owens River basin average 32.5 TAF/yr.

Haiwee Reservoir

Located south of Owens Lake, North and South Haiwee Reservoirs provide a combined storage volume of 60 TAF. Dam earthquake safety concerns have limited the usable storage to 15 TAF in recent years. Releases from Haiwee Reservoir flow down the LA Aqueduct conduits to Los Angeles. A series of power plants is located along the aqueduct conduits (see Chapter 3M, "Power Generation", for a description of these aqueduct power plants).

Rainfall, measured at South Haiwee Reservoir (elevation 3,825 feet), averages 6.5 inches per year (Table 3A-2). The monthly evaporation rates are given in Table 3A-4.

Other Los Angeles Aqueduct Facilities

Bouquet Reservoir is located west of Palmdale in the Sierra Madre Mountains north of San Fernando. The reservoir provides storage for short-term regulation and for emergency supply should something interrupt the aqueduct between it and Haiwee Reservoir (the San Andreas fault crosses the LA Aqueduct north of Bouquet Reservoir). The aqueduct terminates at the Van Norman Reservoir in the northern San Fernando Valley. The LA Aqueduct filtration plant is now located just north of the Van Norman Reservoir.

These aqueduct facilities south of Haiwee Reservoir are not considered in the aqueduct operations model. The hydrologic effects of the EIR alternatives are traced only to the Haiwee Reservoir exports to Los Angeles.

CITATIONS

Printed Reference

Inyo County and City of Los Angeles. 1990. Green book for the long-term groundwater management plan for the Owens Valley and Inyo County. June. Inyo County and Los Angeles, CA.

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Significant diversions are made from the Owens River and Hot Creek for irrigation of LADWP and private grazing pasturelands. LADWP records indicate that an average of 20 TAF/yr are diverted for irrigation of its lands. This represents significantly more than the actual evapotranspiration losses, however. Excess diverted water returns to the Owens River or recharges the groundwater flowing to Lake Crowley reservoir. LADWP records suggest that unaccounted gains that may include irrigation return flows upstream of Lake Crowley reservoir average 39 TAF/yr.

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Artesian groundwater wells along the Owens River discharge approximately 4.5 TAF/yr into the Owens River in the Bishop area. These wells were drilled by LADWP during the 1920s to supplement Owens River flows. They essentially discharge the excess groundwater recharge from Bishop Creek. Additional inflow of groundwater seepage occurs along the Middle Owens River, but a net loss of streamflow in the Owens River between the towns of Bishop and Big Pine is caused by evapotranspiration and infiltration of streamflow to groundwater.

Bishop area irrigation diversions from the Owens River are made just downstream of Horton Creek into the Bishop Canal. The canal capacity is approximately 80 cfs, and average annual diversions are about 25 TAF/yr. Diversions are greater in dry years (30 TAF/yr) and less in wet years (15 TAF/yr) when Bishop Creek runoff supplies more of the Bishop area irrigation requirements. Irrigation diversions are made from a network of canals and drains that connect with Bishop Creek. The major return for excess

runoff or unused canal diversions is the A-drain, located several miles south of the town of Bishop, just downstream from the Big Pine canal diversion from the Owens River. LADWP records indicate that the unaccounted-for losses in the Bishop area total about 23 TAF/yr. These losses presumably recharge the groundwater.

Groundwater pumping in the Bishop area is limited to irrigation requirements within the Bishop area, according to the Bishop Cone Settlement Agreement. The wellfield capacity is approximately 20 TAF/yr, although annual pumping is limited to 12 TAF/yr (Inyo County and City of Los Angeles 1990).

Irrigation requirements in the Bishop area are approximately 21 TAF/yr, with an additional recreation and wildlife use of 4.5 TAF/yr, and uses of 3.25 TAF/yr on Indian lands. All these uses are seasonal, with peak usage in summer.

Precipitation averages 16.8 inches per year at Lake Sabrina (elevation 9,065 feet) but only 5.7 inches per year at Bishop (elevation 4,108 feet). Bishop Pass (elevation 11,200 feet) has an average April 1 snow pack water content of 33.2 inches (Table 3A-2).

Big Pine Area Runoff

Big Pine area runoff totals approximately 52 TAF/yr. Most of this is from Big Pine Creek. LADWP operates a hydropower plant on Big Pine Creek. Tinemaha Creek flows directly into Tinemaha Reservoir. The runoff from these creeks is natural; no seasonal storage facilities are located upstream.

Big Pine canal diverts water from the Owens River to supply water for irrigation and recreation (including water for use on Indian lands) in the Big Pine area, and to allow spreading for groundwater recharge. The total requirement for irrigation and recreational use is approximately 15 TAF/yr. The canal capacity for spreading is about 4.5 TAF per month (75 cfs). LADWP records indicate that unaccounted-for losses in the Big Pine area total about 20 TAF/yr, including Tinemaha Reservoir evaporation.

Fish Springs Hatchery, located south of the town of Big Pine, was originally supplied by natural springflow. As groundwater pumping for irrigation and export was increased, however, the natural springflow was reduced. The hatchery supply was augmented by two wells that now supply most of the water (24 TAF/yr) for the hatchery. Once used in the hatchery, the water flows down the Fish Springs canal to the Owens River just upstream of Tinemaha Reservoir.

The combination of releases and storage changes at Tinemaha Reservoir provides a complete record of Owens River streamflow there. The net losses along the Middle Owens River between Pleasant Valley and Tinemaha Reservoirs is estimated at approximately 37 TAF/yr.

The total wellfield capacity in the Big Pine area is approximately 42 TAF/yr. Most of the water is used for the hatchery supply and so is not lost to evapotranspiration. The excess pumping and return from the Big Pine canal and Big Pine Creek diversions flow to the Owens River in the Fish Springs canal.

Rainfall at Tinemaha Reservoir is 6.6 inches per year. Rainfall at Big Pine Power Plant has averaged 9.0 inches per year. Snow course measurements made in the Big Pine Creek watershed range from 15.2 to 22.7 inches (Table 3A-2).

Tinemaha Reservoir

Tinemaha Reservoir was constructed by LADWP to provide short-term regulation of Owens River flows, to allow the maximum amount of flow to be diverted into the LA Aqueduct. The maximum storage is approximately 16 TAF, although earthquake safety concerns have limited the usable storage to 10 TAF in recent years. The monthly pattern of evaporation of Tinemaha Reservoir is given in Table 3A-4.

Releases from Tinemaha Reservoir are usually diverted into the LA Aqueduct intake at Aberdeen, but excess water occasionally flows down the Owens River channel toward Owens Lake, south of Lone Pine.

Tinemaha-to-Haiwee Area Runoff

The remainder of the Owens Valley runoff occurs in the segment of the basin between Tinemaha Reservoir and Haiwee Reservoir. The LA Aqueduct intake from the Owens River is located just downstream of Tinemaha Reservoir near Aberdeen. Runoff from several eastern Sierra Nevada creeks, from Taboose Creek in the north to Haiwee Creek in the south, are intercepted by the LA Aqueduct. Lone Pine Creek drains the eastern slopes of Mount Whitney. LADWP has hydropower plants that divert water from Division Creek and Cottonwood Creek. The combined runoff from these creeks is about 105 TAF/yr. Springs and artesian wells along the aqueduct supply additional flow during wet periods but are limited in dry years.

Diversions from the creeks and releases from the aqueduct total approximately 23 TAF/yr, including water for Indian lands and recreation and enhancement uses. Some returns from irrigation west of the aqueduct may be captured by the aqueduct or groundwater pumping, but releases and returns from uses east of the aqueduct flow toward Owens Lake and are not returned to the LA Aqueduct.

Groundwater pumping occurs in several wellfields between Tinemaha and Haiwee Reservoirs, with a total annual limit of about 100 TAF/yr (Inyo County and City of Los Angeles 1990). Most of this groundwater is pumped directly into the LA Aqueduct for export to Los Angeles. The Black Rock

Hatchery is supplied by groundwater pumping. Pumping is lowest during the runoff period in wet years and increases in fall and winter to help maintain a constant water supply for the aqueduct.

Spreading of excess Tinemaha-to-Haiwee runoff is used to recharge groundwater for later pumping into the aqueduct. The spreading capacity in the Tinemaha-to-Haiwee area is about 20 TAF per month (335 cfs) and is accomplished with diversions from several of the creeks over the alluvial fans at the base of the mountains west of the aqueduct. During periods of excess runoff, operational spills must also be made east of the aqueduct toward Owens Lake. In most cases the creek runoff bypasses the aqueduct diversions. At other times releases are made from the aqueduct. LADWP estimates that unaccounted-for losses in the Tinemaha-to-Haiwee segment of the Owens River basin average 32.5 TAF/yr.

Haiwee Reservoir

Located south of Owens Lake, North and South Haiwee Reservoirs provide a combined storage volume of 60 TAF. Dam earthquake safety concerns have limited the usable storage to 15 TAF in recent years. Releases from Haiwee Reservoir flow down the LA Aqueduct conduits to Los Angeles. A series of power plants is located along the aqueduct conduits (see Chapter 3M, "Power Generation", for a description of these aqueduct power plants).

Rainfall, measured at South Haiwee Reservoir (elevation 3,825 feet), averages 6.5 inches per year (Table 3A-2). The monthly evaporation rates are given in Table 3A-4.

Other Los Angeles Aqueduct Facilities

Bouquet Reservoir is located west of Palmdale in the Sierra Madre Mountains north of San Fernando. The reservoir provides storage for short-term regulation and for emergency supply should something interrupt the aqueduct between it and Haiwee Reservoir (the San Andreas fault crosses the LA Aqueduct north of Bouquet Reservoir). The aqueduct terminates at the Van Norman Reservoir in the northern San Fernando Valley. The LA Aqueduct filtration plant is now located just north of the Van Norman Reservoir.

These aqueduct facilities south of Haiwee Reservoir are not considered in the aqueduct operations model. The hydrologic effects of the EIR alternatives are traced only to the Haiwee Reservoir exports to Los Angeles.

CITATIONS

Printed Reference

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Mono Lake Agreement to End 50 Years of Damage

■ **Water:** The proposal to restore Mill Creek was not included, however, in the measures approved by the California State Water Resources Board. The milestone agreement calls for the restoration of stream systems damaged by 50 years of water diversions.

Mammoth Lakes R-H 10 Jul 98

By JED REITMAN
REVIEW-HERALD STAFF WRITER

Mono Lake waterfowl habitat and riparian tributaries will finally realize a triumphant State-mandated resotoration. The question now is, which tributaries will get the most flow?

In the beginning of the battle to save Mono Lake there were no factions in the all-out water war against L.A. Now, with the protection of the lake secured, there are differing opinions on the roads to restoration. In other words, the Mono Lake Committee is seeing competition as to who speaks with the most authority on Mono Lake. Although the general goals and interests are the same, the People for Mono Basin Preservation have concerns which do not match those of the Mono Lake Committee.

In the recent draft order issued by the California State Water Resources Control Board, stream and waterfowl habitat restoration are the two main issues. According to the Mono Lake Committee and the People for Mono Basin Preservation, there is discrepancy as to which streams should receive more water. Waterfowl habitats depend on the route water takes to reach the lake.

The two creeks at issue are those which flow from Lundy Canyon; Mill Creek and Wilson Creek. Mill Creek runs directly to Mono Lake, Wilson Creek was diverted over 100 years ago to offer irrigation to the Conway Ranch, DeChambeau Ranch and others in the north basin.

The Mono Lake Committee proposed that Mill Creek take precedence in waterfowl habitat restoration efforts. The proposal emphasizes a return to the most natural circumstances, such as those which existed prior to European settlement.

According to a press release issued by The People for Mono Basin Preservation, "The PMBP and many local residents vehemently objected to the proposed dewatering of Wilson Creek calling it 'restoration by destruction'."

The Water Board agreed with the PMBP and local opposition to the Mono Lake Committee proposal.

According to Katie Maloney-Bellomo of the PMBP, the "more balanced solution" to waterfowl restoration would be to utilize flows through Wilson Creek to the County Ponds and DeChambeau Ponds. Apparently, these are more suitable as waterfowl habitat restoration sites. With support from the BLM, the Los Angeles DWP has been ordered to switch their restoration efforts to those sites in lieu of Mill Creek.

Terry Russi of the BLM said that, "BLM provided the State Water Board with evidence of the biological condition of Wilson Creek, that's our

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duty."

Maloney-Bellomo emphasized that the Board's decision was a "community based accomplishment." The decision struck down a $3.6 million dollar foundation to restore Mill Creek, which would have been overseen by the Mono Lake Committee in partnership with the Department of Fish and Game, the U.S. Forest Service, the State Lands Commission and the National Audubon Society.

According to Maloney-Bellomo, the main contention between the Mono Lake Committee proposal and the PMBP's concerns was that the Mono Lake Committee proposal did not sufficiently address the waterfowl restoration issue.

"We're certainly disappointed that the Water Board didn't approve further analysis of the Mill Creek proposal," said Heidi Hopkins, the Mono Lake Committee's policy director in the Mono Basin. "But we're not surprised, given the community concerns."

"While there are parts of the ecosystem that will never recover, the restoration plans approved by the Water Board will help undo the damage," explained Hopkins.

"The Water Board took a narrower approach than we'd hoped for on waterfowl habitat," said Frances Spivy-Weber, Executive Director of the Mono Lake Committee, "but we're committed to seeing the habitat restored and will work with the framework they've created."

The Water Board's restoration order takes another step toward resolving a long and contentious battle to balance the water needs of Los Angeles with the public trust values in the Mono Basin. The order is the second part of the Water Board's landmark 1994 decision on Mono Lake, which revised the water diversion licenses of the LADWP to partially restore the lake to its former level and return water to the streams. This decision recognized that DWP diversions, which lowered the lake by up to 50 feet, had seriously harmed Mono Lake's public trust values. During 50 years of diversions, Mono Lake had shrunk to half its former size, its tributary streams were dessicated, and its populations of migrating waterfowl plummeted to 1% of their former size.