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

VEGETATION (C)

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

Summary of Comments

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

Response

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

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

Summary of Comments

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

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

Response

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

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

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

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

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

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

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

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

Summary of Comment

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

Response

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

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

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

Summary of Comments

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

Response

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

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

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

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

Summary of Comments

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

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

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

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

Response

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

The Water Table Depth model, which was designed for the specific geomorphology of Mono Basin, and the lake level simulations, reflecting each alternative, were used together to estimate the extent of riparian habitat for each alternative. As the model indicates, a net loss of area capable of supporting riparian vegetation occurred over the diversion period because of stream incision (e.g., see Figure 3C-3

in the draft EIR). The lost area will remain occupied by xeric vegetation no matter what rate of riparian recovery transpires.

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

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

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

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

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

Summary of Comments

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

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

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

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

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

Response

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

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

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

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

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

FISHERIES (D)

D1. Prediversion Habitat Conditions and Fish Populations Are Improperly Characterized

Summary of Comments - Mono Basin Tributaries

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

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

Summary Response - Mono Basin Tributaries

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

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

Detailed Response - Mono Basin Tributaries

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

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

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

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

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

The SLC, primarily through Dr. Scott Stine, questioned numerous statements made in the draft EIR on prediversion habitat conditions or commented that the habitat descriptions were too general. The sources of information for the statements in question are generally cited in the draft EIR where the statements are made. Trihey & Associates compiled much of the information regarding the characteristics of Mono Lake tributaries, with Dr. Stine's input in many instances. Also, Dr. Stine's 1991 report (Mono Basin Auxiliary Report No. 1) was reviewed but not cited in the draft EIR. The draft EIR portrays a

reasonable characterization of Mono Lake tributaries based on the available information. More recent information, while more detailed, does not need to be incorporated in the draft EIR because it does not change the overall characterization of Mono Lake tributaries as presented in the draft EIR. Comments on the draft EIR by the SLC and Dr. Stine and testimony during the water rights hearing will be fully considered as SWRCB prepares the order.

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

Summary of Comments - Owens River Basin

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

Summary Response - Owens River Basin

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

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

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

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

Summary of Comments - Mono Basin Tributaries

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

Summary Response - Mono Basin Tributaries

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

Specific Response - Mono Basin Tributaries

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

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

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

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

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

Summary of Comments - Owens River Basin

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

Summary Response - Owens River Basin

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

Detailed Response - Owens River Basin

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

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

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

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

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

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

D3. Fisheries Models and Impact Analyses Are Inappropriate and Flawed

Summary of Comments

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

Summary Response

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

Detailed Response

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

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

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

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

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

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

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

major effects on fish populations, can fluctuate dramatically in spatial terms, in temporal terms, in magnitude, and in duration.

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

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

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

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

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

Summary of Comments

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

Summary Response

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

Detailed Response

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

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

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

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

Summary of Comments

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

Summary Response

The hearing record has established that high flows are critical for flushing sediments and restoring and maintaining channels. SWRCB agrees with all parties that high flows should not be viewed as significant effects in nearly all cases. Conclusions in the draft EIR on the significant adverse effects of high

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

Detailed Response

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

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

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

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

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

D6. Mitigation Measures for Significant Cumulative Impacts Are Not Appropriate

Summary of Comments - Mono Basin Tributaries

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

Summary Response - Mono Basin Tributaries

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

Detailed Response - Mono Basin Tributaries

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

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

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

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

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

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

Summary of Comments - Owens River Basin

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

Summary Response - Owens River Basin

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

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

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

Summary of Comments

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

Summary Response

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

Detailed Response

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

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

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

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

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

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

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

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

Summary of Comments

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

Summary Response

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

Detailed Response

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

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

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

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

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

AQUATIC PRODUCTIVITY (E)

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

Summary of Comments

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

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

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

Response

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

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

The results of Herbst's microcosm experiments were not directly incorporated in the alkali fly model because the early termination of the experiments introduced uncertainty into the results, such as the

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

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

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

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

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

Summary of Comments

One reviewer stated that it was unscientific to conclude that brine shrimp production for prediversion lake elevations was higher than production at the point of reference because the brine shrimp model was not run for lake elevations above 6,390 ft. The University of Santa Barbara researchers did not run their model for lake elevations above 6,390 feet because conditions, particularly salinity conditions,

for higher lake elevations were not adequately represented in the experiments and observations from which the data used to develop the model were obtained. Estimating conditions by extrapolating model results beyond the range of observations or measurements from which the model was developed is considered scientifically invalid.

Response

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

E3. Impact Assessment Criteria for Significance Are Arbitrary and Unrealistic

Summary of Comments

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

Response

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

The comment that a 10% change would rarely be detectable given the large natural variability is vague but presumably refers to statistical detectability. Statistical methods were not used for the impact

assessments because there was not enough information to do so. Nevertheless, in a long-term study, a 10% change in mean alkali fly production probably would be statistically detectable.

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

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

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

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

Summary of Comments

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

Response

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

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

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

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

E5. Relationship between LAAMP and DYRESM Models

Summary of Comments

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

Response

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

List of Acros

List of Refs

Table of Contents