10.0 IMPACTS ASSOCIATED WITH THE LORP AS A WHOLE

10.1 RECREATION

10.1.1 Existing Conditions

10.1.1.1 Existing Recreational Uses in the LORP Area

With minor exceptions, the public has mostly unrestricted access for recreational uses during the day on City of Los Angeles-owned land within the LORP planning area. Virtually all City-owned lands in the Eastern Sierra outside the towns, including those within the LORP area, are part of ranch leases. The City requires its ranch lessees to leave approximately 75 percent of their lands open to the public for recreational uses.

Fishing is the primary recreational use on the river. In Blackrock and other off-channel lakes and ponds, hunting, birding, and fishing are the primary recreational uses. Hunting and birding are the main activities in the Delta. Other recreational uses that occur in the project area include hiking, walking, sightseeing, running, bicycling, tubing, picnicking, horseback riding, OHV/4-wheeling, photography and wildlife appreciation.

With the exception of the Interagency Visitor Center located in Lone Pine, there are no existing facilities in the LORP area that specifically support recreational uses (e.g., camp grounds, sanitation facilities, regular trash collection services, interpretive centers, wildlife viewing areas, parking lots, etc.). Existing roads and trails within the project area are generally available to recreation users, but are primarily maintenance or access roads used by lessees and LADWP staff.

These descriptions of existing recreational uses are based on LADWP staff observations, and are considered the best currently available information. Other more quantitative information on recreation and the distribution of recreational uses is not available.

10.1.1.2 LADWP Policies for Recreational Uses of City-owned Lands in the Eastern Sierra

Official LADWP policies for recreational uses of City-owned lands in the Eastern Sierra are summarized below and published in brochures available at LADWP offices, the Interagency Visitor Center in Lone Pine, and on LADWP's website. While LADWP does not employ rangers or law enforcement officers, other LADWP staff (e.g., aqueduct and reservoir keepers) do patrol and monitor for violations of LADWP recreational use policies on City-owned lands within the Owens Valley. Since LADWP does not have any authority for law enforcement, LADWP staff cooperate with the Inyo County Sheriff's Department.

Camping and campfires are restricted to designated campgrounds, which are located outside the LORP area. Vehicular travel, including Off-Highway Vehicles (OHVs), All-Terrain Vehicles (ATVs), and Recreational Vehicles (RVs), is limited to existing roads and trails and away from residential areas. (Figure 2-24) show the existing roads in the LORP Area.) An interagency OHV Management Group, consisting of BLM, Forest Service, LADWP, and Inyo County, provides a means for member agencies to coordinate efforts to manage vehicle access within their respective lands in the Owens Valley. Hunting and fishing are allowed except in areas that are posted. All hunting and fishing activities are under the jurisdiction of the California Department of Fish and Game (CDFG) and subject to the Fish and Game Code.

10.1.1.3 Impacts from Existing Recreational Uses

Currently, quantitative information on the number of recreational users in the Owens Valley and their impacts is not collected. LADWP and Inyo County staff involved in construction, survey, and other field work as well as lessees report to LADWP when violations of recreational use policies are observed or high concentrations of recreational uses are noted. LADWP personnel also receive calls from recreational users themselves or local residents. Based on these information sources, current recreational usage of the LORP area is characterized by LADWP staff as light and low-impact; few recreationists are observed. Within the LORP area, the currently wetted reach of river and the off-river lakes and ponds receive higher recreational use than other areas due to the availability of fishing spots. LADWP personnel occasionally observe and receive complaints regarding camping and campfires outside of designated areas, vehicle traffic outside of existing roads, and illegal use of firearms. These complaints are not formally documented. Unauthorized artifact gathering (pot hunting) has also been noted by an area resident (Ecosystem Sciences, Technical Memorandum 6). To date, LADWP has received few reports of recreation-related problems in the dry reach of the river or the Delta Habitat Area. LADWP lands in the Owens Valley outside of the LORP area (e.g., Owens River north of the River Intake, Pleasant Valley Reservoir, Owens Gorge, Crowley Lake, and Haiwee Reservoir) experience higher recreational uses and therefore generate more frequent complaints involving recreation impacts.

10.1.2 Potential Impacts

10.1.2.1 Beneficial Impacts on Recreation

Upon initial implementation, the LORP does not include construction of specific new facilities to support new or expanded recreational uses (e.g., roads, trails, campgrounds, interpretive centers, sanitation facilities, parking lots, etc.). Similarly, the project does not include any actions to restrict existing recreational uses (e.g., fencing to restrict access, road closures, etc.). Existing access to the river and the off-river lakes and ponds will be maintained. New fencing proposed under the LORP Land Management Plan will be designed to accommodate existing public access to these areas (e.g., installation of cattle guard fence crossings, cross stream fencing that accommodates kayak and canoe navigation). **The LORP would result in an improvement of ecological conditions in the project area, which is expected to have beneficial effects on recreational uses and opportunities in the southern Owens Valley, as listed below (Class IV impact):**

- Increase in the warmwater game fishery in the river will improve the fishing experience and potentially attract more anglers to the area.
- The increased riparian cover along the river and portions of the Delta is expected to increase habitat, improve the aesthetics of the area, and make hiking, bird watching, and photography more enjoyable.
- The increase in the amount and variety of various aquatic, wetland, and riparian habitats along the river, at Blackrock Waterfowl Habitat Area and at the Delta Habitat Area, would increase bird use and variety, which would expand and improve the bird watching experience for amateurs and professionals.
- Increased vegetative cover and increased surface water areas would increase wildlife populations and therefore increase hunting opportunities.
- Increased flows in the river would increase the area suitable for kayaking, canoeing, and tubing.

10.1.2.2 Impacts of Increased Recreational Uses

Potential Adverse Impacts Associated with Increased Recreational Uses. The increase in recreational opportunities described above would likely attract a greater number of recreational users to the LORP area over existing conditions, although the magnitude of this increase is speculative. The increase in the number of recreational users is expected to occur gradually over many years as the ecological conditions in the project area are improved by the LORP and there is a greater interest in recreation.

An increase in the number of people engaged in outdoor recreation in the LORP area could result in the following adverse impacts:

- An increase in the number of vehicles in the LORP area could degrade existing dirt roads, causing an increase in erosion and some localized increase in fugitive dust related to driving on unpaved roads.
- An increase in visitors could cause more trampling of wetland and riparian vegetation due to vehicles parked near lakes and river access points, increased overland travel to by-pass potholes or impassable roads, informal trailblazing to reach fishing spots, increased foot traffic, and off-highway travel (particularly in the remote Delta area).
- An increase in visitors could increase the dispersion of some noxious weeds (e.g., perennial pepperweed and Russian knapweed), whose seeds can be transported by attaching to vehicles or people. Although the primary means of increased seed dispersion for these species under LORP is by water, the increase in the number of potential carriers may result in introduction of noxious weeds in previously unaffected locations, which would have adverse impacts on native vegetation (see Section 10.4.3).
- An increase in visitors could accelerate the spread of the New Zealand mud snail, an exotic mollusk, to the LORP area (see Section 10.4.3).
- An increase in visitors could increase the potential for inadvertent and incidental disturbances to sensitive species (possibly including threatened and endangered species), such as nesting birds and rare plants. (The exclosures proposed as a part of LORP would minimize potential impacts from recreational users on rare plants (see Section 2.8)).
- An increase in visitors could increase the potential for disturbance of recorded and unrecorded cultural resources (prehistoric and historic sites; traditional cultural properties) located within the LORP area. These disturbances may include unauthorized artifact collection, site vandalism, and damage to sites by OHV use in non-designated areas.
- An increase in visitors could increase the potential for disturbance of grazing practices and facilities (e.g., disturbance to fences and gates and harassment of livestock).
- An increase in visitors could decrease the quality of solitude at existing recreational sites (e.g., increased use of local fishing spots).

Recreation Management Approach under LORP. A goal of the LORP is the management of recreation that is sustainable and consistent with the primary project goal of habitat restoration. As part of the overall LORP adaptive management approach, LADWP will implement their existing recreation management strategies within the LORP area (see Section 2.9). While initial LORP implementation does not include construction of any specific facilities to restrict existing recreational uses (e.g., fencing to restrict access, road closures, etc.), recreational uses that disturb the environment or conflict with other uses may be prohibited and/or regulated to certain areas and/or times of the year.

Recreation Monitoring Under LORP. The LORP monitoring program will include surveillance for recreation impacts or the potential for such impacts in the LORP area (see Section 2.10). In addition, other monitoring and maintenance activities conducted as part of LORP will increase surveillance for potential recreation impacts. Both LADWP and Inyo County personnel will be routinely present in the field to collect water quality, hydrology, habitat and other types of information (see Section 2.10). Staff from both agencies will be instructed to report recreation impacts or recreation-related threats to resources that they observe, with the intent of recognizing and addressing problems before significant impacts occur (also see Mitigation Measures RC-1 and RC-2). Monitoring reports prepared for the project will document observed recreational activities and impacts.

Since LORP includes monitoring for recreation impacts and implementation of management strategies to address these impacts, **the potential impacts of future recreational uses on biological resources, grazing operations, cultural resources, existing recreational uses, and roadways are considered adverse, but not significant (Class III).** Mitigation Measures RC-1 and RC-2 would further reduce the magnitude of this impact. Mitigation Measure RC-1 commits LADWP to continue existing recreation management practices specifically within the LORP area. Under Mitigation Measure RC-2, LADWP and Inyo County personnel who are routinely in the field within the project area will be trained to recognize and report cultural resources.

10.1.3 Mitigation Measures

The potential impact of future recreational uses on biological resources, grazing operations, cultural resources, existing recreational uses and roadways is considered less than significant. To further reduce impacts, LADWP will implement the following mitigation measures:

RC-1 When LADWP and Inyo County personnel observe and/or receive complaints or concerns about negative impacts related to recreational activity, LADWP or Inyo County shall review the issue and investigate as necessary. For verified impacts or concerns for potential impacts related to recreation in the LORP area, LADWP and/or Inyo County shall implement recreation management strategies as relevant (see Section 2.9).

RC-2 LADWP shall conduct a training program for LADWP and Inyo County personnel working within the LORP area on identification and reporting of cultural resources or potential threats to cultural resources at LAWDP or Inyo County facilities in the Owens Valley. Personnel will be instructed on how to identify and report cultural resources encountered in the field, and will also receive an overview of the procedures that must be implemented should impacts or threats to cultural resources be documented. The training will be accomplished through either a multi-media (e.g., video) presentation or a seminar conducted by a professional archaeologist in consultation with local Tribes (as listed in Section 4.8.2) and other methods as deemed appropriate. As new personnel are hired or when training is updated, a refresher course will be provided. Visual aids such as photographs or sample artifacts, if available, will be used to familiarize LADWP and Inyo County personnel with cultural resources that may be present in the project area.

10.2 SOCIOECONOMICS

The LORP would not result in any adverse impacts to socioeconomic conditions in the Owens Valley. Instead, it is anticipated to improve economic conditions due to: (1) increased expenditures for local labor and materials for the construction of the pump station and long-term maintenance activities; and (2) an

increase in visitors due to improved recreational opportunities that will create a need for more outdoor recreation services and suppliers.

Land management actions proposed under LORP would restrict the acreage available and the timing of grazing by LADWP lessees. Upon initiation of these measures, more active management by both LADWP staff (related to water distribution, salt, fencing, monitoring, etc.) and by lessees (monitoring, herding/rotation) would be required. Optimization of the grazing practices may alter existing grazing patterns (increasing use on currently lightly used areas and the converse). However, improved vegetation management (utilization rates, seasonal restrictions, etc.) is expected to improve grazing over the long-term. Protection of rangeland integrity is expected to ensure the sustainability of grazing operations - an overall economic benefit for lessees.

10.3 PUBLIC HEALTH AND SAFETY

The main public health concern related to implementation of the LORP is creation of additional mosquito habitat and the resultant health effects on wildlife and human populations. Another public safety issue is the sudden increase and volume of river flows proposed under the project.

10.3.1 Existing Conditions

Under existing conditions, the upper reach of the Lower Owens River (approximately 30 miles from the River Intake to Mazourka Canyon Road) contains no flow most of the time and therefore has minimal mosquito breeding potential. The lower reach of the river (south of Mazourka Canyon Road) currently contains low flows with slow-moving water. In addition, tules and beaver dams create stagnant water conditions in this reach. Off-river lakes and ponds and the open water and wetland areas of the Delta Habitat Area are also existing mosquito habitat areas in the project area. In the Blackrock area, water releases to the Waggoner and Thibaut wetlands and artesian flow to the Winterton wetland create extensive mosquito habitat areas. In addition, mosquitoes (particularly the non-standing water species) breed in irrigated pastures in the Owens Valley.

10.3.1.1 Mosquito Life Cycle

Many mosquito species require standing water to breed and complete their life cycle, which takes about 7 days during warm weather. There are also other non-standing water species, whose eggs lay dormant in damp soil for many years and hatch when flooded by water. The life cycle of these non-standing water species can be less than 7 days. Although the standing water species pose the largest health risk, the non-standing water species feed in the daytime, rather than only at dawn and dusk, and can therefore be a major nuisance to humans (R.L. Hurd, pers. comm., August 2003). The mosquito season in the Owens Valley is from April to October (E. Poncet, pers. comm., September 2003).

10.3.1.2 Mosquito-borne Diseases of Concern

Uncontrolled populations of mosquitoes can result in nuisance and public health threats to communities and residents, and to people engaged in outdoor recreation. In California, there are several species of mosquitoes known to transmit diseases such as western equine encephalitis, St. Louis encephalitis, and malaria. Since the introduction of the West Nile virus into the Western Hemisphere in 1999, there has been rising public awareness of this mosquito-borne virus. To date, there has been one reported human case of West Nile virus in California (a positive laboratory test result) (CDC, 2003a and 2003b). West Nile virus has not been detected in the Owens Valley. However, federal, state, and Inyo County public health officials anticipate the eventual spread of West Nile virus to the Owens Valley by way of infected

birds that migrate to or through the valley. Mosquitoes that feed on infected birds become carriers of the disease and can transmit the disease to humans. The added public health threat posed by the potential occurrence of West Nile virus in the Owens Valley, including the LORP area, necessitates a heightened response to existing and new mosquito sources. St. Louis encephalitis and western equine encephalitis are also of concern, although there are no known cases of these mosquito-borne diseases in the Owens Valley (R.L. Hurd, pers. comm., May 2003).

In addition, mosquito-borne diseases can affect some wildlife and domestic animals (e.g., horses). For example, West Nile virus may have an adverse impact on wild birds. West Nile virus is known to cause deaths in many species of birds including those from the corvid family (crows, jays, magpies, and ravens) (CDC, 2003c). Based on a fact sheet prepared by the Nevada Department of Wildlife (2003), the virus affects different species and groups of birds differently. Once infected, some species of birds develop antibodies and show no clinical symptoms of the disease. Other species, particularly hawks, falcons, and owls, show symptoms of the disease, and if they survive, show chronic neurological dysfunction. Many corvids suffer acutely from the disease, and often do not survive the disease after infection. Bird mortality events can be an important indicator of the presence of West Nile virus. Among mammals, horses (including wild horses) have been affected by the disease across North America, and appear to be especially susceptible to the disease. However, vaccinations have been found to be effective in protecting domestic horses.

10.3.1.3 Owens Valley Mosquito Abatement Program

Mosquito control in the LORP area is under the jurisdiction of the Owens Valley Mosquito Abatement Program (OVMAP), which is a part of Inyo County Environmental Health Services.

Mosquito Control Methods Currently Used by OVMAP. OVMAP currently uses a combination of methods to prevent and control mosquitoes in the Owens Valley as described below. The Lower Owens River area is included in OVMAP's mosquito monitoring and control area.

Monitoring. Currently, OVMAP conducts mosquito monitoring between April and October. Technicians drive along a mapped route to monitor and detect mosquito breeding in areas determined to be at risk, and each site is visited every other week at minimum. Known mosquito breeding sources are sampled using the dip count method to determine the quantity of larvae. In addition, light traps set up throughout the Owens Valley (thirteen locations, mostly near population centers) are inspected once a week to monitor for adult mosquitoes (E. Poncet, pers. comm., August 2003). The light traps are used by OVMAP to determine the success of their control efforts and the need to increase treatment. Additionally, in 2003, OVMAP began a program to test blood samples from sentinel flocks of chickens for West Nile virus and other mosquito-borne diseases (R.L. Hurd, pers. comm., May 2003). As part of the West Nile virus monitoring, OVMAP installed encephalitis virus surveillance (EVS) traps in several locations in the valley. OVMAP collects the mosquitoes caught in the traps and tests them for the presence of West Nile virus and encephalitis.

OVMAP is also implementing a monitoring program for the Owens Lake Dust Mitigation Program, with funding from LADWP, which includes sampling of ponded areas for mosquito larvae and monitoring light traps for adult mosquitoes (R.L. Hurd, pers. comm., May 2003). According to monitoring by OVMAP, the Owens Lake Dust Mitigation Program so far has not been a significant mosquito breeding source (E. Poncet, pers. comm., August 2003). OVMAP expects that the extent of the mosquito impact at Owens Lake will not be known until after the 2004 and 2005 field seasons (E. Poncet, pers. comm., September 2003).

Biological Control. The mosquito fish, a predator of mosquito larvae, is a widely-used biological agent for mosquito control. OVMAP stocks mosquito fish in known standing water areas (including off-river lakes and ponds in the LORP area). Areas that do not have year-round ponding of water are re-stocked every spring. Insectivorous bats are another potential biological control method. OVMAP has installed bat houses on an experimental basis. While their effectiveness is unknown at this time, bat house installation is a possible control method that may be used in conjunction with mosquito fish and larvicides.

Currently, the use of the microbial larvicide, *Bacillus thuringiensis* var. *israelensis* (Bti), is the preferred method of mosquito larvae control by OVMAP. Bti is a bacterium that affects the larvae's digestive system, ultimately leading to death. Bti can be broadcast onto the water surface by a hand crew or by a herd seeder mounted on an ATV or a boat, depending on environmental conditions and site access. Bti is species-specific and does not pose risks to wildlife, non-target species, or the environment (EPA, 2002).

Adulticides. If control of adult mosquitoes becomes necessary, OVMAP uses chemical adulticides (pyrethrin or pyrethroid), which are applied by truck-mounted or aircraft-mounted sprayers near population centers (i.e., Lone Pine and Independence). While pyrethrin and pyrethroid adulticides are less deleterious to the environment than other alternatives (e.g., organophosphates), adulticides are not species specific and can have adverse effects on non-target insects (R.L. Hurd, pers. comm., August 2003). Therefore, adulticides are used only when other methods cannot sufficiently control mosquito populations.

Funding for OVMAP. OVMAP's primary source of funding is from a benefit assessment charged to parcels in the Owens Valley and collected annually with property taxes. The amount of the assessment depends on land use and property size. OVMAP has the authority to propose an increase in the benefit assessment on all of the parcels throughout its area in order to obtain additional funds for its program. However, any proposed increase must first be analyzed by a qualified engineer at OVMAP's expense and approved by the Inyo County Board of Supervisors. Then, under the provisions of Article 13D of the California Constitution, the increase must be approved by a majority vote of all of the property owners throughout the OVMAP area. As the landowner that would bear the greatest financial obligation under such an assessment, LADWP could prevent the levy of an assessment. Therefore, the process of increasing OVMAP's benefit assessment is time consuming, requiring a year or longer, and its success is uncertain.

In addition to the benefit assessment, OVMAP currently receives funding from LADWP to monitor and control mosquitoes for the Owens Lake Dust Mitigation Program (Section 12.3). However, use of this funding is restricted to the areas affected by the Dust Mitigation Program because the mosquito control at Owens Lake is a mitigation measure for that project adopted by the Great Basin Air Pollution Control District. The purpose of the mitigation is to minimize impacts to local residents from a potential increase in mosquitoes resulting from construction and operation of the dust control measures at the lake (GBUAPCD, 2003).

10.3.2 Potential Impacts

10.3.2.1 Potential for Mosquito Habitat Creation under LORP

The LORP will result in hundreds of acres of new open water and marsh areas that could serve as new mosquito breeding habitat along the river, at Blackrock, and at the Delta. Under LORP, management of off-river lakes and ponds will remain essentially the same as existing practices. Therefore, little or no change in mosquito breeding conditions is expected at the off-river lakes and ponds.

Lower Owens River. As described in Section 4.3.2, the width of the wetted reach of the river is expected to increase by up to 40 feet under the proposed maximum seasonal habitat flow releases. Once the 40-cfs baseflow is established, mosquito breeding conditions in the river would likely increase since some of the flow would infiltrate into adjacent oxbows, old river channels, and the floodplain, and create new areas of still or stagnant water. In addition to the baseflows, the seasonal habitat flows would spread water outside of the river channel and temporarily create areas of still or stagnant water in the floodplain. Additionally, the initial establishment of the baseflow and the release of seasonal habitat flows would flood damp soils within the floodplain, allowing emergence of non-standing water mosquito species.

Delta. The proposed baseflow to the Delta (6 to 9 cfs annual average) could increase mosquito breeding conditions in the Delta since the proposed baseflow will be higher than existing flow during the summer months (mosquito breeding season). In addition, Period 1 (March/April), Period 2 (June/July), and Period 3 (September) pulse flows (see Table 2-11) would be released during mosquito breeding season. Water from the pulse flow releases is anticipated to remain in the Delta for several weeks, resulting in increased mosquito habitat. The seasonal habitat flows (to be released in late spring/early summer) that bypass the pump station are anticipated to remain in the Delta for up to a few weeks (or months in some small depressions), also resulting in increased mosquito habitat.

Blackrock. The creation of large flooded areas in Blackrock Waterfowl Habitat Area may create the greatest potential for increased mosquito populations. Under LORP, approximately 500 acres (or less in less than average runoff years – See Sections 2.5.3 and 7.1.2) of the Blackrock area will be flooded at any given time. The Blackrock management units would be subject to periodic cycles of wetting and drying so that one to three management units would be wholly or partially flooded at any given time. As shown in Table 7-3, in the short-term, the proposed flooding regime in Blackrock is estimated to increase open water areas by approximately 500 acres, mostly by flooding existing vegetated wetland areas. Over the long-term, the open water areas in Blackrock will increase by 290 acres compared to existing conditions.

10.3.2.2 Potential Biological, Mechanical, and Flow Management Controls for Mosquitoes under LORP

To some extent, mosquito fish and other existing non-native fishes (e.g., bass fry) that feed on mosquito larvae are anticipated to serve as biological controls for reducing the magnitude of increase in mosquito populations associated with LORP. Mosquito fish currently exist in the Owens River system (including Blackrock Ditch) and are expected to colonize the Lower Owens River and the Blackrock area under LORP. In Blackrock, however, the proposed flooding and drying cycle may limit the abundance of mosquito fish. The number of insectivorous birds and bats present in the project area is also anticipated to increase as ecological conditions improve under LORP and may provide additional mosquito control. However, the extent of reduction in mosquitoes that may be achieved by these biological control mechanisms is unknown.

According to Ecosystem Sciences, LORP implementation will maintain and create suitable habitat for Owens pupfish in the river (see Section 2.3.11), the Delta Habitat Area (see Section 2.4.1), and in the off-river lakes and ponds (see Section 2.6.3). The potential for creating suitable habitat for Owens pupfish in the Blackrock Habitat Area is considered to be uncertain by Ecosystem Sciences but could become feasible in the future (see Sections 2.5.3 and 11.4.6). If substantial populations of pupfish were established within suitable areas of the LORP, they would provide an additional biological control for mosquitoes. While not proposed as part of the project, introduction of pupfish or creation of pupfish sanctuaries in the LORP area for ecosystem restoration and mosquito control purposes will be considered by LADWP and may be implemented in the future under the provisions of an Endangered Species Act Section 10(a) permit and Habitat Conservation Plan (HCP) (see Section 2.7).

In manmade and highly managed surface water bodies (e.g., sewage ponds, recharge basins, and constructed wetlands) mosquito breeding habitat can be minimized by removing emergent vegetation and through flow management (e.g., providing good circulation). Under LORP, vegetation removal for mosquito control is not feasible since it would conflict with the project goals of establishing wetland vegetation. Providing mechanical circulation is also not feasible under LORP because the potential mosquito habitat areas are extensive and dispersed (e.g., oxbows along the river). However, in Blackrock, the emergence of non-standing water species of mosquito may be minimized by flooding the units before March 15 or after November 1 to avoid the mosquito breeding season.

10.3.2.3 Impact Significance Related to Mosquitoes

An increase in mosquitoes resulting from the LORP that is confined to the river channel area, the Delta, and the Blackrock area, is considered to be a less than significant impact. The numbers of mosquitoes will increase when the currently dry areas of the river channel, the Delta, and Blackrock are wetted under the project, and are expected to be similar to currently-wetted areas in the LORP area, where mosquitoes are now present in abundance. Impacts to human visitors to these areas can be avoided if the visitors take protective measures, such as wearing mosquito repellant and covering exposed skin areas.

However, the substantial increase in potential mosquito breeding habitat described above in Section 10.3.2.1 could result in a noticeable increase in mosquitoes in areas where humans reside. In addition to impacts to human populations, an increase in mosquito populations could adversely affect birds and other wildlife and some domestic animals (e.g., horses) that are susceptible to mosquito-borne diseases (CDC, 2003c). **The potential increase in public health threat and public nuisance caused by an increase in mosquito populations due to the LORP would be significant, but mitigable (Class II).** This impact can be reduced by implementation of Mitigation Measure PS-1, which is a program for mosquito monitoring, control, and public education.

The intent of this mitigation measure is to minimize mosquito populations related to the project from reaching areas where humans reside. To determine whether mosquitoes resulting from the project are reaching nearby communities, OVMAP will monitor mosquito traps located between potential LORP mosquito sources and the communities of Aberdeen, Fort Independence, Independence, Lone Pine, Olancha, and Keeler. Monitoring efforts will take into consideration mosquito hatches related to weather patterns, irrigation activities, aqueduct flooding, and other events unrelated to LORP. OVMAP anticipates that if Mitigation Measure PS-1 is implemented as described in Section 10.3.3 and Appendix H, under routine LORP operating conditions, there should not be a noticeable increase in mosquitoes in areas where humans reside. However, even with the implementation of Mitigation Measure PS-1, some mosquitoes that exist because of the LORP may reach these populated areas. If one of these mosquitoes carries a disease, and the mosquito infects a human with the disease, the impact would clearly be significant to the infected human.

Secondary impacts related to the implementation of Mitigation Measure PS-1 are possible. First, application of adulticides could result in the loss of other insects in the affected area. To reduce this impact, OVMAP limits its use of adulticides to only treat mosquito populations that pose a public health threat or public nuisance in nearby communities. Second, OVMAP uses vehicles such as pick-up trucks and ATVs to access and treat mosquito sources. OVMAP staff members are trained to limit vehicle usage to avoid damaging riparian, wetland, and upland vegetation. In view of the protective measures practiced by OVMAP, the secondary impacts related to implementation of Mitigation Measure PS-1 are anticipated to be less than significant.

10.3.2.4 Safety Impacts Related to Flow Increases

Concerns have been raised regarding safety issues associated with a sudden increase in river flows under LORP (i.e., seasonal habitat flows). However, the seasonal habitat flows will be ramped up and down typically over 8 to 14 days, depending on the amount of seasonal habitat flow to be released that year, and will not be a sudden release of water. Furthermore, the gradient of the river is small (1 foot per mile on average), and the river has a meandering channel. Therefore, flow velocity of the baseflows and seasonal habitat flows will not create hazardous conditions for recreational users along the river. However, the depth of the water during seasonal habitat flow releases would be similar to existing conditions in the Owens River above the intake during winter flows, and may be too deep for wading. **Overall, the safety impacts related to flow increases under LORP would be less than significant (Class III).**

10.3.3 Mitigation Measure

PS-1 LADWP shall enter into an agreement with OVMAP to abate the potential increase in mosquitoes resulting from the LORP. Mitigation Measure PS-1 has three components:

- Pre-project and post-implementation surveillance, monitoring, and control (to be performed by OVMAP)
- Agency coordination and LORP management adjustments (to be performed by LADWP)
- Public education, program administration, and reporting (to be performed by OVMAP)

These components are described in greater detail in Appendix H. The agreement between LADWP and OVMAP will include the provisions in Appendix H. In addition, the agreement will describe the areas to be monitored and treated, the range of control methods to be used, and reporting requirements. As the impacts from mosquito production created by the LORP are better understood and as methods for mosquito control improve, LADWP and OVMAP may agree to modify the provisions of the scope of work, as long as LORP-related mosquito populations continue to be prevented from reaching nearby communities.

OVMAP estimates that the annual cost to fully implement Mitigation Measure PS-1 could be approximately $109,000, depending on the severity of the impact (L. Kirk, pers. comm., December 2003). This is considered an ongoing post-implementation cost that will continue for the life of the project. Post-implementation costs are to be shared equally by LADWP and the County as described in Section 2.2.2.2.

10.4 DELETERIOUS SPECIES

Deleterious Animal Species. Deleterious animal species of concern for the project area include New Zealand mud snails, beavers, and cowbirds. New Zealand mud snails are discussed below. Removal of beaver dams and beaver control under LORP are discussed in Section 2.3.7. Cowbirds are discussed in Section 11.4.5.

Noxious Weeds. Terms such as invasive weed or noxious weed are often used interchangeably to refer to unwanted, non-native plants that infest large areas or cause economic and ecological damage to an area. In this document, the term noxious weed is used broadly to mean any non-native plant species that is highly competitive, difficult to control, and destructive to native plants and habitats or agriculture.

The noxious weeds of primary concern related to implementation of the LORP are perennial pepperweed, Russian knapweed, and saltcedar due to their existing presence in the Owens Valley and the potential for

economic and ecological damage. Other noxious weeds are present in the Owens Valley, but are not discussed specifically since they do not pose the same level of ecological and economic threat as saltcedar, perennial pepperweed and Russian knapweed. A fourth invasive species, Russian olive, also occurs in the LORP area and is described below.

10.4.1 Existing Conditions

10.4.1.1 New Zealand Mud Snail

The New Zealand mud snail (*Potamopyrgus antipodarum*) is an exotic mollusk that has become a global pest. The New Zealand mud snail is about 0.25 inches in size and reproduces asexually. It can be found in various aquatic habitat types from mud-bottom ponds to clear rocky streams, and can tolerate a wide range of environmental conditions. It can survive passage through the digestive tracts of many fish species. The mud snail feeds on dead and dying plant and animal material, algae, and bacteria, and there is no known natural biological control agent that can reduce population numbers. Certain parasites have been known to infect this species and make it vulnerable to predation, but this control is lacking in North America. The snails are known to spread by attaching to people, animals, and equipment of recreational users such as boots, waders, and watercraft. These snails can rapidly become the most dominant species and displace native aquatic macroinvertebrates (CDFG, no date). There is concern that the species will impact game fish, although its overall ecological impacts are still under investigation.

Since the late 1980s, New Zealand mud snails have been found in various locations in the United States, including the Snake River in Idaho, the Madison River in Wyoming, throughout the Greater Yellowstone ecosystem, the Columbia River in Oregon, and the Yellowstone River in Montana. In 2000, this species was found in the upper Owens River in Long Valley, Mono County. They have also been found in Bishop Creek Canal. To date, New Zealand mud snails have not been found in the Lower Owens River.

10.4.1.2 Perennial Pepperweed

Perennial pepperweed (*Lepidium latifolium*) is an herb that grows up to 6 feet in height. It is a widespread, noxious weed in the western United States. Pepperweed flowers from May through September, producing abundant small seeds. It reproduces from both seed and creeping roots. Seeds and root fragments are readily carried by flowing water to new sites. Plants become established in vegetated areas, displacing native vegetation. Aboveground parts die each fall and winter, and new stems sprout from the basal rosette each spring. It typically occurs in moist areas and tolerates saline and alkaline conditions. Typical conditions include wetlands, riparian areas, roadsides, irrigation ditches, irrigated fields and pastures, and orchards. The plant forms dense monocultures, displacing native plants. It provides minimal wildlife benefit, as it does not generally provide foraging habitat for native birds or mammals; however, there is some use of pepperweed by insects. It is an aggressive weed that expands rapidly and is difficult to control.

Perennial pepperweed is well established in northern Owens Valley, and is becoming an increasing problem as it invades wetland areas and irrigated pastures in the northern portion of the Owens River watershed. Its current distribution in the LORP area includes: a few isolated areas of the dry river channel below the River Intake, south of Manzanar Reward Road on the eastern side of the river in the wetted reach, and in the area of Mazourka Canyon Road and the Aqueduct (G. Milovich, pers. comm., July, 2003). Pepperweed in Georges Ditch was successfully treated by LADWP in 2003. This area will continue to be monitored for at least 5 years. In addition, pepperweed was found on the east side of the river near the confluence with Gorges Ditch; this site was treated by LADWP in early 2004.

10.4.1.3 Russian Knapweed

Russian knapweed (*Centaurea repens*) is a creeping, herbaceous perennial native of Eurasia. It is a widely established noxious weed in the western United States, and colonizes cultivated fields, orchards, pastures, roadsides, and rangelands. The adult plant is about 3 feet tall. Plants exhibit allelopathic effects (produce biochemicals that inhibit the growth of other plants) and are aggressively competitive, facilitating rapid colonization and development of dense stands. Stems dieback after flowering in summer, and new shoots are generated in spring. Its primary method of reproduction is from vegetative propagation, and severed root pieces as small as 1 inch can generate new shoots. Plants flower between May and September and usually produce small quantities of viable seeds, which disperse passively near the parent plant or with the seed head. Seeds can remain viable for 2 to 3 years (CDFA, 2001). Seeds can also be carried by flowing water to new sites. Russian knapweed can invade and persist in numerous ecosystems, and has been found in saline, alkaline, low lying areas, but prefers deeper soils with more available moisture. The plants are toxic to horses when sufficient quantities are consumed. Under most circumstances livestock will avoid grazing Russian knapweed because of its bitter taste (CDFA, 2001).

Currently, populations of Russian knapweed are present in the Bishop area and along the western LORP boundary south of Independence (G. Milovich, pers. comm., July 2003). No known populations of Russian knapweed are present within the LORP area (G. Milovich, pers. comm., February 2004).

10.4.1.4 Saltcedar

Saltcedar (*Tamarix ramosissima*) is a non-native invasive plant that spreads rapidly in the Owens Valley where conditions are favorable for its establishment. It was introduced into the United States in the early 1800s as a windbreak and ornamental. Since that time, it has invaded most major drainage systems in the Southwest, including the Owens Valley. It colonizes moist areas that have been disturbed by land clearing, grading, or other disturbances that remove native plants. Once established, saltcedar is a very hardy plant that can withstand adverse soil and weather conditions. It displaces native plants as it grows in size and reproduces, creating dense stands of tall shrubs. Saltcedar is undesirable because it threatens native plant communities and the associated wildlife.

Several adaptive features contribute to the success of saltcedar as an invasive weed. The high water use by saltcedar often leads to reduced water availability for native plants. Saltcedar is a prolific seed producer; a single plant can produce over 500,000 seeds per year. The seeds are small and easily dispersed by wind. They are produced from April to October and remain viable for several weeks. Saltcedar is also capable of reproducing vegetatively, even when severely damaged. Saltcedar is very resilient to a wide variety of stress factors including fire, drought, flooding, and high salinity. In addition, saltcedar exudes salts from its leaves, suppressing germination of native vegetation.

Saltcedar generally provides poor or unsuitable habitat for most wildlife because neither the leaves nor flowers and seeds have any significant forage value. However, saltcedar does provide cover for some bird species, including roosting and nesting habitat. Saltcedar invasion has serious consequences on the structure and stability of native plant communities. It can result in the decline and elimination of native riparian woodlands, which in turn, adversely affects the abundance and variety of wildlife. A secondary effect of saltcedar invasion is the increased frequency of fire because the high plant density and thick litter layer of saltcedar contributes to a higher fuel load. Saltcedar has no economic value (e.g., grazing).

In general, saltcedar invades areas where native plant cover has been removed or disturbed, exposing soils to allow the germination of saltcedar seeds. The most common disturbances that lead to saltcedar invasion are associated with man-made disturbances, such as construction and land clearing. However, saltcedar can colonize barren or lightly vegetated areas that are disturbed by natural processes, such as

scouring by river flows, wind erosion, and small mammal activity. In these situations, the infestations are usually small and sparse.

Saltcedar occurs mainly in disturbed areas of the central and southern Owens Valley, including the LORP area. Approximately one-half of the saltcedar populations in the river channel and floodplain of the LORP have been treated and removed by the ongoing Inyo County Saltcedar Control Program (see Section 10.4.1.6). Along the currently dry reach of the Lower Owens River, dense stands of saltcedar previously occurred in the river channel and within the historical floodplain. These stands have all been removed by the Inyo County Saltcedar Control Program. Below the Five Culverts area where flow is present, saltcedar stands are less dense than in the dry reach, and are mostly limited to the riverbanks. Saltcedar is widespread within the Blackrock area, but there the plants form bushes rather than tall stands. In the Delta Habitat Area, saltcedar is present primarily along the east and west branches. Saltcedar in the Delta area is not present in dense stands as it has elsewhere in the Valley; however, many large trees are present.

10.4.1.5 Russian Olive

Russian olive *(Elaeagnus angustifolia)* is a non-native tree that has invaded portions of the wetted reach of the river channel, as well as the Blackrock Habitat Area and the Off-River Lakes and Ponds. Russian olive has also invaded native pastures within the LORP area. Like saltcedar, this plant was imported intentionally as an ornamental tree. It is a fast-growing tree of 10 to 25 feet in height, with 1- to 2-inch thorns on branches and trunks. Russian olive reproduces by seed, which is usually produced after trees are 4 to 5 years old. Seeds are ingested with the fruit by birds and small mammals and dispersed in their droppings. Seeds can remain viable for up to 3 years and are capable of germinating over a broad range of soil types. It can also resprout from the root crown (Bossard et al., 2000). While the fruit of the plant provides a source of food for wildlife, Russian olive habitats are less diverse than the native community they replace. When allowed to spread, Russian olive has the potential to become a serious weed problem (Whitson, et al., 1991).

10.4.1.6 Existing Noxious Weed Control Programs

There are several existing agencies and programs for control of noxious weeds in the Owens Valley, including the Inyo-Mono County Agricultural Commissioner's Office, the Eastern Sierra Weed Management Area, Inyo County Saltcedar Control Program, and LADWP activities.

Agricultural Commissioner and Eastern Sierra Weed Management Area. The California Department of Food and Agriculture (CDFA) designates ratings for exotic pest plants (Cal-IPC, 1999):

- "A" CDFA policies call for eradication, containment or entry refusal.
- "B" Includes species that are more widespread, and therefore more difficult to contain. Agency allows county Agricultural Commissioners to decide if local eradication or containment is warranted.
- "C" Includes weeds that are so widespread that CDFA does not endorse state or county-funded eradication or containment efforts except in nurseries or seed lots.
- "Q" Temporary "A" rating pending determination of a permanent rating.

These ratings reflect CDFA's view of the statewide importance of the pest, the likelihood that eradication or control efforts would be successful, and the present distribution of the pest within the state. The ratings are not laws, but are policy guidelines that indicate the most appropriate action to take against a pest

under general circumstances. Local conditions may dictate more stringent actions at the discretion of the county Agricultural Commissioners, and the rating may change as circumstances change (CDFA, 2004).

The Inyo-Mono County Agricultural Commissioner (Agricultural Commissioner) is the local enforcement agent for the CDFA and the Department of Pesticide Regulation. The Agricultural Commissioner manages agricultural programs and enforcement activities at the county level including weed control and pesticide use enforcement. In addition, the Agricultural Commissioner works with landowners and lessees to monitor and treat weeds that are considered a priority both in Inyo and Mono Counties.

The Agricultural Commissioner also facilitates the Eastern Sierra Weed Management Area (ESWMA), which is a group of agencies and organizations that coordinate efforts to control noxious weeds in a 2.5 million-acre area of Inyo and Mono Counties from Bridgeport to Little Lake. In accordance with a Memorandum of Understanding, ESWMA member organizations contribute personnel and equipment, and cooperate in procuring grants and aid. (A copy of the Memorandum is available at the Agricultural Commissioner's office.) In addition, ESWMA has a public outreach program, which educates the public on how to identify weeds and who to contact if they find them. ESWMA consists of the following organizations:

- Inyo-Mono County Agricultural Commissioner's Office
- Bureau of Land Management
- Natural Resource Conservation Service
- Inyo National Forest
- Toiyabe National Forest
- California Department of Food and Agriculture
- California Department of Forestry
- California Department of Transportation
- Inyo/Mono Resource Conservation District
- Inyo County Water Department
- Los Angeles Department of Water and Power
- Inyo/Mono Counties Cattlemen's Associations

Within the LORP area, ESWMA has contributed the following:

- Approximately $2,500 of grant funds to the Inyo County Saltcedar Control Program to purchase herbicide for the treatment of saltcedar in the dry reach of the river.
- Grant funds to support the treatment by the Agricultural Commissioner of perennial pepperweed within the LORP area.
- Approximately $200 of grant funds to the Inyo County Saltcedar Control Program to support the development of a training video, which was taped in the LORP area. The video is used to train saltcedar crews each year.

ESWMA's Strategic Management Plan (Appendix I) outlines the actions that ESWMA and its member organizations will take in order to control noxious weeds in Inyo and Mono Counties. The current plan was last revised in 2001, and ESWMA member organizations are in the process of reviewing and updating the document. The Strategic Management Plan includes a list of priority weed species, which was developed based on their economic and ecological impacts, CDFA's plant pest ratings, California Invasive Plant Council's (formerly known as the California Exotic Pest Plant Council) list of exotic pest plants, and historical occurrence and eradication efforts. The priority species are for the two counties as a whole; not all are equally problematic in all areas. Weed control activities are not limited to species on

the priority list, but the list is intended to help prioritize weed control projects and may be modified or amended as needed. The priority weed species listed in the ESWMA Strategic Management Plan include the following (order does not denote importance; CDFA's rating is indicated in parentheses):

- Canada thistle (*Cirsium arvense*) (B)
- Scotch thistle (*Onopordum acanthium ssp. acanthium*) (A)
- Yellow starthistle (*Centaurea solstitialis*) (C)
- Perennial pepperweed (*Lepidium latifolium*) (B)
- Russian knapweed (*Centaurea repens*) (B)
- Spotted knapweed (*Centaurea maculosa* Lam.) (A)
- Halogeton (*Halogeton glomeratus*) (A)
- Dalmatian toadflax (*Linaria genistifolia ssp. dalmatica*) (A)
- Camelthorn (*Alhagi pseudalhagi*) (A)
- Puncture vine (*Tribulus terrestris*) (C)
- Saltcedar (*Tamarix ramosissima*) (no CDFA rating)

While it is not listed in the existing Strategic Management Plan, hoary cress (*Cardaria draba)* is another weed species that occurs in the Owens Valley (CDFA B-rated species) and is treated by the Agricultural Commissioner.

Inyo County Saltcedar Control Program. The 1991 Inyo County/Los Angeles Long Term Water Agreement includes a program for saltcedar control on LADWP lands in the Owens Valley. Under Section II-XIV-A of the Agreement, LADWP provided to Inyo County payments of $350,000, $200,000 and $200,000 in 1997, 1998, and 1999, respectively. Under the same provision of the Agreement, LADWP has provided $50,000 a year (with adjustments for inflation) to the County since 2000 for annual maintenance and control efforts. These annual payments will continue unless the Inyo County Board of Supervisors and LADWP agree that the saltcedar control program is to be reduced in scale or terminated. With the funds provided by LADWP, the County initiated the Inyo County Saltcedar Control Program. Since 1997, the program's efforts have been focused on treating existing saltcedar within the Lower Owens River channel and the adjacent floodplain. Although the saltcedar control program is a separate project from LORP, continuation of the program's work within the LORP area will improve the overall success of the project.

The extent of the Inyo County Saltcedar Control Program as funded by LADWP under the Agreement has not been sufficient to control all of the saltcedar populations in the LORP area. Therefore, the County has sought and received grant funding for saltcedar control along the Lower Owens River channel in the amount of $740,000 from the California Department of Transportation and the California Wildlife Conservation Board (WCB). As of April 2004, these grants were fully expended. In February 2004, the WCB awarded a second grant to the County in the amount of $560,000 to continue the saltcedar control program along the Lower Owens River channel and floodplain. The County intends to seek additional funds to continue the saltcedar control program. As described in Mitigation Measure V-3 (see Section 10.4.4), LADWP has agreed to provide matching funding for LORP saltcedar control equal to the amount obtained by the County up to a total of $1.5 million (not to exceed $500,000 in any given year). This matching funding will be in addition to the funds provided by LADWP for saltcedar control under the Agreement. LADWP will commence providing funding by matching the $560,000 WCB grant. It should be noted that the WCB grant funds must be used for saltcedar control along the channel of the Lower Owens River. In contrast, the matching funds provided by LADWP can be used anywhere within the LORP area and can also be used to fund mitigation of saltcedar impacts. (Funds provided by LADWP under the Agreement may be used on LADWP land anywhere in the Owens Valley.) Thus, if the County

successfully obtains a total of $1.5 million (including the $560,000 WCB grant), there will be a total of $3 million available for LORP saltcedar control.

By April 2004, the Inyo County Saltcedar Control Program reached Mazourka Canyon Road on the Lower Owens River Channel, about 25 miles from the River Intake where saltcedar control efforts began. As funding allows, the saltcedar control program will continue treating existing saltcedar within in the LORP area according to the following order of priority:

- The river channel and floodplain from Mazourka Canyon Road to and including the Delta Habitat Area
- Portions of the LORP area at greatest risk of experiencing new saltcedar infestations caused by the project, including:
  - currently dry areas that will be wetted under LORP
  - areas with limited native vegetation cover
  - areas with greatest potential for revegetation to occur
- Currently wet areas such as the Off-River Lakes and Ponds and portions of the Blackrock Habitat Area
- Saltcedar populations that serve as seed sources for new saltcedar infestations

The saltcedar control program uses the cut stump treatment to treat adult plants. The program conducts annual follow-up treatments of previously treated saltcedar plants until the plants stop generating new sprouts. Where applied, saltcedar controls have been effective.

LADWP Activities. As a member organization of the ESWMA, LADWP currently spends $60,000 to $70,000 a year for noxious weed management efforts on its lands in the Owens Valley in addition to the funds provided to the Inyo County Saltcedar Control Program described above. LADWP's funds for noxious weed control are used as matching funds when ESWMA receives outside grants. LADWP has also conducted outreach programs to educate the lessees and the general public on identification and reporting of noxious weeds. LADWP has three staff members certified in treatment of noxious weeds, who conduct treatment in known weed infested areas mapped by the Agricultural Commissioner, monitor previously treated areas for resprouting, and respond to reports by lessees, LADWP field staff, and the general public. Lessees also carry out treatment of noxious weeds on their leases.

10.4.2 General Methods of Deleterious Species Prevention and Control

10.4.2.1 New Zealand Mud Snails

To date, no method of eradication for New Zealand mud snails has been successfully applied to large, open river systems (CDFG, 2003). Chemical control methods are currently not available since there are no pesticides that specifically target the species. The risk of new infestations can be reduced by informing anglers and other recreationists who enter infested waters to inspect and clean their equipment before moving to a new stream. Precautionary measures for anglers and other recreational users include: scrubbing and rinsing waders, boots, watercraft, and equipment before leaving the water (using hot water or drying will enhance this measure); disposing fish entrails in proper trash receptacles; and reporting to the Non-indigenous Aquatic Species Toll Free Hotline if this species is observed. LADWP currently has an agreement with CDFG, which allows CDFG to post informational signs on LADWP lands in areas of high human/recreational uses to help prevent the spread of these snails. LADWP and County staff also wash their equipment after working in infested areas.

10.4.2.2 Noxious Weeds

Management of noxious weeds requires a combination of preventative measures to reduce the introduction and spread of weeds, early detection of new infestations, and timely treatment. Noxious weed control measures that have been used in the Owens Valley are described below.

Prevention through Flow and Land Management

Concerns have been raised regarding the potential for deleterious species to colonize habitats in the LORP and prevent attainment of LORP goals. LADWP and Ecosystem Sciences have undertaken restoration projects in the Mono Basin, Long Valley (Hill, et al., 2002) and the Owens River Gorge (Hill and Platts, 1998). In several of these previous projects (e.g., Parker Creek, Walker Creek, Lee Vining Creek, Rush Creek, and Owens River Gorge), dry channels lacking healthy riparian systems were restored without incurring any significant exotic weed problems. The approach used in these projects was to apply a flow regime that mimics natural hydrology while applying grazing and recreational management strategies to minimize disturbance. The intent and actual results of this combined approach are to provide conditions that support establishment of native riparian species over exotics. This approach is the basis for the flow and land management actions proposed under the LORP and described in Section 2.0. Based on these past restoration experiences, it is anticipated that LORP's restoration approach will also favor establishment of native species and thus minimize new infestations of exotic species.

Early Detection

Early detection of noxious weeds enables timely treatment of weeds and prevents large-scale weed infestations that become costly to treat. Through existing public education, outreach and training in weed identification and reporting, local residents and visitors are asked to help locate previously unknown weed populations and supplement the monitoring efforts by formal weed management programs. ESWMA has developed and distributed a weed identification handbook, which includes photos and descriptions of weeds. ESWMA also conducts public outreach at various local events through use of informational booths, posters, brochures, and handouts (G. Milovich, pers. comm., May 2003). The Agricultural Commissioner's Office is conducting an ongoing mapping program to document the locations of known populations of noxious weeds in Inyo and Mono Counties. The Inyo County Saltcedar Control Program also conducts monitoring of previously treated saltcedar populations to identify and treat re-sprouting. Currently, if other noxious weeds are found during these surveys, the saltcedar control crew documents their locations and reports to the Agricultural Commissioner and LADWP.

Treatment

Treatment of noxious weeds requires species-appropriate methods and involves a combination of mechanical and chemical means. Current treatment methods are discussed below. If new effective methods become available in the future, they may be incorporated into the weed management program under LORP.

Perennial Pepperweed. The primary treatment method for perennial pepperweed is application of chemical herbicide such as Telar® (G. Milovich, pers. comm., May 2003). Plants may be removed by hand when infestations are limited in size and herbicide use is not appropriate (i.e., in the vicinity of open water or rare plants). No biological control agent is currently approved for perennial pepperweed. Many valuable crop species belong to the same family as perennial pepperweed; therefore, the impact of a prospective biological control organism on agricultural crops and other closely related native species must be established before its use will be allowed (Krueger, 1999).

Russian Knapweed. The primary treatment method for Russian knapweed is application of chemical herbicide such as Garlon 4®, Banvel, and 2,4-D (G. Milovich, pers. comm., January 2004). Plants may be removed by hand when infestations are limited in size and herbicide use is not appropriate (i.e., in the vicinity of open water or rare plants). Currently, there are no biological controls for Russian knapweed.

Saltcedar. Saltcedar treatment methods used in the Owens Valley include the following:

- Hand pulling of small plants
- Cut stump treatment (The plant is cut at the base, then Garlon 4®, a chemical herbicide, is applied to prevent re-sprouting.)
- Basal bark applications of herbicide (The lower portions of smaller plants are sprayed with Garlon 4®.)
- Foliar applications of herbicide
- Cutting and submerging the plants under water for extended periods, typically 2 weeks (The required duration of submersion depends on environmental conditions such as turbidity of the water, since availability of light promotes saltcedar re-sprouting.)

In addition, use of the Chinese tamarisk leaf-eating beetle, a natural insect predator to saltcedar, is currently being studied in the Owens Valley under the direction of U.S. Department of Agriculture.

Russian Olive. Treatment methods for Russian olive include hand-pulling of seedlings and sprouts and application of herbicides (e.g., glyphosates such as Roundup®) to cut stumps. The cut-stump method consists of cutting the stem close to the ground and painting a mixture of herbicide and vegetable oil to the stump within 15 minutes. In some cases, follow up treatment consisting of additional herbicide application is needed for a few years. LADWP has applied the cut-stump method to Russian olive populations in the Owens Valley. Goat grazing is another method that has been successfully applied in Idaho and New Mexico. Goats kill plant stems by removing the bark. The Agricultural Commissioner currently does not conduct treatment for Russian olive (G. Milovich, pers. comm., March 2004).

Treatment of Noxious Weeds in the Vicinity of Known Locations of Rare Plants. If noxious weeds are found during LADWP's annual rare plant surveys, the survey crew notifies LADWP and appropriate treatment is administered jointly by staff with expertise in identifying rare plants and staff qualified for noxious weed treatment. Noxious weed treatment in the vicinity of rare plants is conducted using a weed wipe (equipment designed to apply herbicides only to plants that come into contact with the applicator) or by hand, as necessary, to prevent any adverse effects of herbicide application on the rare plants. As described in Section 2.8.1.2, this existing practice will be continued under LORP.

10.4.3 Potential Impacts

The MOU includes the following goal: "Control of deleterious species whose presence within the Planning Area interferes with the achievement of the goals of the LORP. These control measures will be implemented jointly with other responsible agency programs."

10.4.3.1 New Zealand Mud Snail

With implementation of LORP, there is potential for the New Zealand mud snail to spread to the project area due to increased recreational uses and the hydrologic connection to the Owens River upstream of the

River Intake, where the snails currently exist. Continuation of existing CDFG outreach programs and precautions taken by LADWP and County staff as described in Section 10.4.2.1 are anticipated to slow the spread of New Zealand mud snail colonization throughout the river, but it is anticipated that the species will eventually be present in the Lower Owens River. Implementation of LORP may allow for colonization of New Zealand mud snails, but would not be the only cause of the colonization. **Hence, the potential introduction of the New Zealand mud snail into the Lower Owens River is considered an adverse, but not significant impact (Class III).** Implementation of Mitigation Measures V-4, V-5, and V-6 below would further reduce this impact.

10.4.3.2 Noxious Weeds other than Saltcedar

Russian Olive. Rewatering the Lower Owens River and supplying water to the Delta and to the Blackrock areas could potentially increase the distribution and abundance of Russian olive by distributing seeds from existing populations. It should be noted that Russian olive provides a source of food and habitat for wildlife and stabilizes channel banks. Unlike saltcedar, Russian olive allows for development of understory and therefore provides some structural diversity.

Perennial Pepperweed. Rewatering the Lower Owens River and supplying water to the Delta and to the Blackrock areas could potentially increase the distribution and abundance of perennial pepperweed by distributing seeds from upstream sources. The rewatering of the river would create new wetted channel areas (e.g., river channel and banks upstream of Mazourka Canyon Road). Once wetted, these areas would be susceptible to pepperweed infestation. The creation of new wetted areas in the Delta and in the Blackrock areas will make those areas susceptible to pepperweed infestation. The anticipated increase in recreation as a result of LORP implementation may also contribute to an increased risk of pepperweed infestation from seed dispersion by foot and vehicular traffic.

Russian Knapweed. Rewatering the Lower Owens River and supplying water to the Delta and to the Blackrock areas could potentially increase the distribution and abundance of Russian knapweed by distributing seeds from upstream sources. The anticipated increase in recreation as a result of LORP implementation may also contribute to an increased risk of Russian knapweed infestation from seed dispersion by foot and vehicular traffic.

As described above, **the potential increase in perennial pepperweed, Russian knapweed, and other noxious weeds would be deleterious to native habitat and is considered significant, but mitigable (Class II).** Implementation of Mitigation Measures V-1, V-2, and V-4 would control potential new infestations of perennial pepperweed, Russian knapweed, and other noxious weeds resulting from the LORP to less than significant levels.

The potential for noxious weed infestation is expected to be greatest in the initial years after LORP implementation when changes in environmental conditions are favorable to noxious weeds. If infestations of noxious weeds are controlled during the initial years, native species will be given the opportunity to establish in the rewetted areas. Once the native species have been established, the risk of noxious weed infestation is anticipated to stabilize. Based on experiences from past restoration projects implemented by LADWP (see Section 10.4.2.2), 7 years after LORP implementation is considered a reasonable estimate of the time frame during which concentrated monitoring and treatment program (to be implemented under Mitigation Measure V-2) is needed. After 7 years, if continuation of non-saltcedar noxious weed control is necessary, it will be a post implementation cost (Section 2.2.2.2).

10.4.3.3 Saltcedar

The rewatering of the river will create new wetted channel areas, including areas that are currently barren of riparian vegetation. For example, much of the river channel and banks upstream of Mazourka Canyon Road lack riparian vegetation due to the lack of flows in the river since 1913. Once wetted, these areas will be susceptible to saltcedar infestation from existing saltcedar populations within the LORP area. The proposed flooding of the Blackrock area will also potentially create additional areas for saltcedar colonization. Under LORP, the proposed baseflows to the Delta would result in increased flows during the summer (saltcedar growing season) over existing conditions, which would create areas susceptible to saltcedar colonization. The proposed pulse flows to the Delta and any seasonal habitat flows that bypass the pump station during the summer would also result in conditions that may be conducive to saltcedar infestation. An increase in saltcedar infestations in the LORP area would result in increased water consumption, and could also result in displacement of existing native riparian vegetation, which would have adverse impacts on the abundance and variety of wildlife. In addition, an increase in saltcedar within the LORP boundary would increase the seed source throughout the region, potentially resulting in increases in saltcedar outside the project area. In view of the extent of existing saltcedar populations within the LORP area that could serve as seed sources, the invasiveness and persistence of saltcedar, and the new areas that could be susceptible to saltcedar infestation as a result of LORP, **the potential increase in saltcedar resulting from the project is considered significant, but mitigable (Class II).**

Implementation of Mitigation Measures V-1, V-3, and V-4 below in combination with the WCB grant to the Inyo County Saltcedar Control Program (see Section 10.4.1.6) would control potential new saltcedar infestations resulting from the LORP to less than significant levels. From 1998 to June 2004, the Inyo County Saltcedar Control Program has been funded sufficiently to successfully control, treat, monitor, and maintain over one-half of the Lower Owens River channel and floodplain saltcedar populations. Based on this past experience, the potential for a significant increase in saltcedar is considered to be mitigable through the additional guaranteed funding of the Inyo County Saltcedar Control Program as itemized in Mitigation Measure V-3.

10.4.4 Mitigation Measures

V-1 **Implement Measures to Minimize New Infestations.** LADWP shall implement the following actions to minimize infestations of noxious weeds:

1. Construction and other disturbance of substrates will be minimized.
2. When possible, good water circulation will be provided in project wetlands to minimize accumulation of salts to prevent saltcedar infestation.
3. The use of fire for vegetation management will be minimized.
4. To the extent possible, LADWP will initiate flow releases and initiate dry phases within the Blackrock area between November 1 and March 15 (i.e., when saltcedar is not producing seed) to minimize the chance of invasion by saltcedar.
5. Construction equipment will be maintained "weed free" by washing and inspecting equipment used in weed-infested areas prior to moving to another site.
6. On-site fill materials for construction will be used to the extent possible. If off-site fill materials are necessary, they will be taken from borrow pits located in areas that are free of noxious weeds.

V-2 **Provide Funding to the Inyo-Mono County Agricultural Commissioner.** LADWP shall provide $50,000 per year to the Agricultural Commissioner to fund the monitoring and control of

new infestations of perennial pepperweed and other noxious weeds (excluding saltcedar) in the LORP project area for the first 7 years of LORP implementation. In addition, LADWP shall provide $150,000 per year for the first 7 years to the Agricultural Commissioner to fund the control of existing perennial pepperweed and other noxious weed populations outside of the LORP area that could serve as seed sources for the LORP area.

The Agricultural Commissioner will develop protocols for monitoring and controlling infestations based upon past experience and current literature. Based on the protocols, the Agricultural Commissioner will use the funds to identify and treat new infestations of noxious weeds within the LORP area in a timely manner, with priority given to the riparian areas. Existing infestations outside of the LORP area that could serve as seed sources for the LORP area will also be monitored and treated. A Memorandum of Understanding between the Agricultural Commissioner and LADWP will be entered into, and will outline the responsibilities of each agency under the protocols.

V-3 **Provide Funding to and Coordinate with the Inyo County Saltcedar Control Program.** In addition to LADWP's contribution to the existing Inyo County Saltcedar Control Program, LADWP will provide funding to Inyo County in order for the County's Saltcedar Control Program to implement the following measures (the measures described below are in addition to the activities that will be conducted as part of the continuation of the existing Inyo County Saltcedar Control Program described in Section 10.4.1.6.):

- **Monitoring and Treatment of New Saltcedar Infestations**

Protocols for monitoring and treating new saltcedar infestations in the project area will be developed and implemented by the Inyo County Saltcedar Control Program in cooperation with LADWP. The protocols will include, but not be limited to, the following:

1. Prioritization for monitoring and treatment of areas that are to undergo a change in hydrologic status and that do not have an established cover of native plants.
2. Provisions for treating new saltcedar infestations, including protocols for treating saltcedar near rare plant populations.
3. Provisions for annual pedestrian monitoring of project areas potentially subject to saltcedar infestations.
4. Provisions for annual follow-up treatments of previously treated saltcedar infestations.

- **Treatment of Saltcedar Seed Sources**

If the ongoing Inyo County Saltcedar Control Program is not able to achieve the priorities for the control of existing saltcedar populations in the LORP area identified in Section 10.4.1.6, the control of existing saltcedar populations will be completed as part of this mitigation measure.

- **Coordination**

In addition to the above, the program will include:

1. LADWP will provide to the Saltcedar Control Program reports and data compiled through the LORP monitoring program concerning flows and water levels related to the

river baseflow and seasonal habitat flows, releases to the Delta, and water levels at the Off-River Lakes and Ponds and in the Blackrock area.

2. LADWP will notify the Saltcedar Control Program of the timing and extent of annual seasonal habitat flows, increased flow releases to Blackrock units, pulse flows to the Delta, and other changes in land management that could cause a new infestation of saltcedar.
3. LADWP will provide to the Saltcedar Control Program work products relevant to saltcedar control that are prepared through the LORP monitoring program, such as maps, imagery, etc.

- **Funding**

LADWP will provide matching funds for LORP saltcedar control equal to the amount obtained by the County up to a total of $1.5 million as described in Section 10.4.1.6. LADWP will provide a guaranteed funding of $560,000.The intent of this mitigation measure is to suppress increases in saltcedar resulting from LORP implementation. If continuation of the LORP-focused saltcedar control program is required and the matching funds described above are exhausted, funding for the program will be an ongoing post-implementation cost (Section 2.2.2.2).

V-4 **Conduct Training Program for LADWP Personnel and Lessees.** LADWP shall conduct a training program for LADWP and Inyo County personnel, lessees, and their employees working within the LORP area on identification and reporting of noxious weeds, including saltcedar, and New Zealand mud snails. The training will be conducted at LADWP or Inyo County facilities in the Owens Valley. The Eastern Sierra Weed Management Area Noxious Weed Identification Handbook will be provided to program participants. The instruction will detail how to accurately describe their locations to aid in verification and timely response and identify the agencies to which sightings of the species should be reported. As new personnel are hired or when training is updated, a refresher course will be provided. In addition, photos of relevant deleterious species will be posted in the assembly rooms of appropriate LADWP and Inyo County facilities.

V-5 **Coordinate with CDFG to Implement Public Outreach Program for Preventing the Spread of New Zealand Mud Snails.** Upon the implementation of the LORP, LADWP, in coordination with the California Department of Fish and Game, shall expand the existing public outreach program for preventing the spread of New Zealand mud snails to cover the LORP area. LADWP will post information signs instructing the public on how to identify New Zealand mud snails and notifying recreational users to take precautionary measures to prevent the spread of New Zealand mud snails. The signs will be posted at key access points to the LORP area, such as Mazourka Canyon Road, Manzanar Reward Road, the pump station, and the Delta. The precautionary measures that will be described on the signs include: scrubbing and rinsing waders, boots, watercraft, and equipment before leaving the water (using hot water or drying will enhance this measure); disposing of fish entrails in proper trash receptacles; and reporting to the Non-indigenous Aquatic Species Toll Free Hotline if this species is observed.

V-6 **Implement Measures to Prevent Spread of New Zealand Mud Snails during Project Construction and Maintenance.** During project construction and maintenance, LADWP and the County will completely dry construction equipment between use in water infested with New Zealand mud snails and non-infested water. If this is not feasible, the equipment will be steam cleaned before being used in non-infested water.

10.5 WATER SUPPLY IMPACT

10.5.1 Water Requirements and Losses Associated with the LORP

The water requirements to implement the LORP are described below, including the amount of water released to the river; the amount retrieved by the pump station; and the amount lost due to channel losses and evapotranspiration along the river, at Blackrock, and at the Delta. A summary of the water requirements and losses associated with the LORP is presented in Table 10-5.

There will be no significant change in the average annual amount of water provided for irrigation and stockwater needs on LADWP leases in the LORP project area; therefore, these uses are not addressed as an impact to LADWP's water supply.

Channel Losses Associated with Releases to the River

Loss rates along the Lower Owens River were estimated by Inyo County (Jackson, 1994b) based on several different methodologies. The primary method relied upon the observed losses during the experimental flows to the lower river in 1993. Releases to the river were made from the River Intake from July 6 to August 12, 1993 to gather data to analyze alternative flow regimes for the LORP. Releases ranged up to 155 cfs and reached the Delta.

During the 1993 field experiment, releases from the River Intake were supplemented by releases from Blackrock, Independence, Locust, Georges, and Alabama spillgates. Eight metered sections with staff gauges were established along the river from the intake to Keeler Bridge. Flows of 20, 40, and 80 cfs were established for sufficient time to collect flow, fisheries, and water quality data along each reach. The flow data from this study provided a basis for several estimates of channel loss and evapotranspiration along the river.

The first method consisted of calculating channel loss (herein defined to include loss to alluvial aquifer and evapotranspiration) based on instantaneous stream flow measurements. Based on this method, the mean channel loss along the river under moderate flows (i.e., 40 cfs) was estimated to be 0.79 cfs per mile, with a range of 0.49 to 1.53 cfs per mile. The second method utilized the streamflow data throughout the entire 1993 experiment in which flows varied greatly. Based on this method, the mean channel loss along the river was estimated to be 1.3 cfs per mile, with a range of 0.15 to 3.68 cfs per mile.

Both of the above methodologies are based on transient losses during the experimental releases, and therefore, do not represent steady-state conditions. In addition, they do not take into account the increased evapotranspiration expected to occur along the river as new riparian vegetation increases.

Jackson (1994b) also estimated evapotranspiration losses along the river by estimating average evapotranspiration of existing riparian vegetation types located along the river, multiplied by the area of the vegetation adjacent to the river. Based on this method, the evapotranspiration rate along the river under current conditions is about 0.2 cfs per mile. This method does not include channel losses to deeper aquifers or lateral groundwater movement, nor does it take into account the increased evapotranspiration expected to occur along the river as new riparian vegetation increases.

Jackson (1994b) estimated channel losses between the spillgates and the river to be about 1.0 cfs per mile based on streamflow observations by LADWP. He also estimated the losses from the reach between Keeler Bridge and the pump station, which was not gauged during the 1993 experimental releases, to be 0.31 cfs. Inyo County has indicated in recent discussions that this loss rate is probably an underestimate (Randy Jackson, pers. comm., 10/1/01).

Jackson (1994b) provided an estimate of total channel losses along the river under the initial 40-cfs flows of 36,341 acre-feet per year, of which 8,100 acre-feet would be due to spillgate channel losses. The estimated losses along the river of 28,241 acre-feet per year would represent an average loss of 0.63 cfs over the 61.6-mile long project reach.

Channel losses are likely to be less than those observed in 1993 once the alluvial aquifers along the river and spillgate channels have been filled. However, the evapotranspiration rates may be higher than estimated using existing vegetation types as riparian vegetation cover increases over time. Typical channel losses in arid regions along water conveyance channels are about 1 cfs per mile.

Based on the above information and previous estimations of channel losses, for the purpose of this analysis it is estimated that channel losses during the initial rewatering (years 1 and 2 or longer) would be about 1 cfs per mile. Inyo County believes that this value is a reasonable estimation of initial channel losses along the river (Randy Jackson, pers. comm., 10-01-01). Using this value, the estimated annual channel loss during the initial years would be 44,600 acre-feet per year (see Table 10-2). In addition, channel losses along the spillgate channels would be about 8,100 acre-feet per year, based on the assumption that four spillgates would be used for the initial rewatering to mitigate water quality and fish impacts. Hence, there will be an annual loss of up to 52,700 acre-feet in the river and spillgate channels during the initial years.

Channel losses after the initial years are expected to be reduced as flood plain aquifers are filled. However, evapotranspiration will likely increase due to a greater coverage of riparian and wetland vegetation along the river. Jackson (1994b) estimates evapotranspiration along the river from current riparian vegetation is 8,119 acre-feet per year. Based on a water usage factor of 5 feet per year for riparian vegetation, this estimate translates into a 217-foot wide riparian vegetation corridor along the river. Rewatering the river is expected to increase riparian vegetation productivity and areal extent. As a conservative approach, it is estimated that the channel losses, consisting primarily of evapotranspiration, during steady state conditions along the river would be twice the calculated evapotranspiration of current vegetation – that is, about 16,000 acre-feet per year. This loss represents a loss rate of 0.35 cfs per mile, about one-third the rate estimated for initial rewatering.

Channel losses along spillgates would be less than under the initial watering years, as spillgates would only be used infrequently for maintaining river baseflows. It is assumed that channel losses along spillgate channels would be reduced by 50 percent to 4,000 acre-feet per year. Based on these conservative considerations, the total average annual channel losses due to baseflows once steady state conditions exist could be about 19,600 acre-feet per year (see Table 10-1).

TABLE 10-1
AMOUNT OF WATER RELEASED AND CHANNEL LOSSES
DURING SEASONAL HABITAT FLOWS

Day	Flow (cfs)	Seasonal Flows (cfs) Above 40 cfs Baseflows	Quantity Released (acre-feet) Above the 40 cfs Baseflows	Flow (cfs) above 40 cfs that Reaches Pump Stn with 1 cfs/mi Loss Rate	Quantity (acre-feet) Reaching Pump Stn with 1 cfs/mi Loss Rate	Channel Losses (acre-feet) at 1 cfs/mi Loss Rate
1	50	10	20			20
2	63	23	46			46
3	79	39	77			77
4	99	59	117			117
5	124	84	166	22	44	122
6	155	115	228	53	106	122
7	200	160	317	98	195	122
8	160	120	238	58	116	122
9	128	88	174	26	52	122
10	102	62	123			123
11	82	42	83			83
12	66	26	51			51
13	53	13	26			26
14	40	0	0			0
Total =			1,665		513	1,152

1 cfs per day = approximately 1.98 acre-feet per day. The seasonal habitat flows will vary from year to year depending upon runoff. The average annual peak release rate is estimated at 150 cfs (see Section 2.3.5.3). The maximum peak release rate is 200 cfs.

Seasonal habitat flows of up to 200 cfs may undergo higher channel losses than baseflows because: (1) flows across the floodplain may encounter depressions where water could be detained, resulting in higher percolation than in the channel; and (2) flows across the floodplain may encounter more dewatered storage conditions in the alluvium compared to the channel banks. No empirical data on channel losses during high flows are available. However, in the absence of such data, the estimated channel loss rate during seasonal habitat flows is estimated to be the same as channel losses during initial rewatering – 1 cfs per mile. The actual annual loss due to seasonal habitat flows will vary depending upon the maximum flow required based on the forecasted runoff in the valley.

The amount of water released from the River Intake during a seasonal habitat flow release regime of 200 cfs is estimated to be 1,665 acre-feet, as shown below in Table 10-1. Based on a channel loss rate of 1 cfs per mile (see Table 10-1), the total channel losses over the 61.6 miles of the river would be about 1,152 acre-feet. As a result, only 513 acre-feet would reach the pump station (see Table 10-2).

TABLE 10-2
ESTIMATES OF CHANNEL LOSSES DURING INITIAL FLOWS, BASEFLOWS, AND SEASONAL FLOWS

	Reasonable Estimate of Average Annual Losses (acre-feet)	Estimated Loss Rate (cfs per mile)
Initial Rewatering (Years 1 and 2)		
Channel losses* along the river as 40-cfs baseflows are established**	44,600	1.0
Channel losses in spillgate channels for flows to support 40-cfs baseflows	8,100	1.0
Total =	52,700	
Steady State Conditions		
Channel losses along river during 40-cfs baseflows along river***	15,600	0.35
Channel losses in spillgate channels	4,000	<1.0
Total =	19,600	
Channel losses during 200-cfs seasonal habitat flows (see Table 10-1)	1,152	1.0

*Channel loss includes bank and bed percolation into alluvial aquifers and evapotranspiration. 1 cfs/yr = 724 acre-feet/yr. ** River intake to pump station, 61.6 miles. Loss calculated as 61.6 cfs losses over the entire river over a 1-year period multiplied by 724 acre-feet. *** Loss calculated as 21.5 cfs losses over the entire river over a 1-year period multiplied by 724 acre-feet.

Water Supply Losses Due to Flows Bypassed to the Delta

The pump station will bypass an annual average of 6 to 9 cfs to the Delta. An estimate of the water bypassed to the Delta assuming the constant release of the initial baseflow of 5.3 cfs and the release of four pulse flows is provided below in Table 10-3.

As described above, seasonal habitat flows released from the River Intake would be subject to channel losses. An estimate of the flows that would reach the pump station based on a 200-cfs seasonal habitat release is provided in Table 10-1. This analysis shows that seasonal habitat flows above the 40-cfs baseflow would only occur for 5 days, and would total 513 acre-feet. The maximum flow at the pump station would be 98 cfs. Up to 50 cfs of the seasonal habitat flows reaching the pump station would be captured and diverted to the Aqueduct and or to the Owens Lake Dust Mitigation Project, as described in Section 2.4.3 and shown in Table 6-9.

TABLE 10-3
SUMMARY OF PROPOSED PULSE AND BASE FLOWS TO THE DELTA

		Duration (days)	cfs/day	acre-feet/ period
1	Period 1	10	25	496
2	Period 2	10	20	397
3	Period 3	10	25	496
4	Period 4	5	30	298
5	Total =	35		1,687
6	Total Baseflows =	330	5.3	3,463
Total annual water requirements (sum of Lines 5 and 6) and equivalent average annual flow (calculated based total pulse flow and baseflow quantities divided by 365 days)		365	7.1	5,150

* This table does not include seasonal habitat flows that could reach the Delta. 1 cfs per day = approximately 1.98 acre-feet per day. If the 5.3 cfs baseflow assumed in this table is increased so that the annual release of baseflow and pulse flow totals 9 cfs, the annual release to the Delta would increase to approximately 6,500 acre-feet per year.

Water Requirements to Maintain Off-River Lakes and Ponds

LADWP flow records from 1990 to 2002 show the volume of water needed to maintain the off-river lakes and ponds (e.g., Thibaut Ponds, Upper and Lower Twin Lakes, Goose Lake, and Billy Lake). These records indicate the following. The average annual volume of water from the Thibaut spillgates to maintain Thibaut Pond is 1,141 acre-feet per year. The average annual volume of water released from spillgates along the Blackrock ditch to maintain Upper and Lower Twin Lakes is 885 acre-feet per year. The average annual volume of water released from the Waggoner spillgate to maintain Goose Lake is 2,234 acre-feet per year. This number also includes water that currently spreads in the Waggoner Unit of the Blackrock Waterfowl Area. The average annual volume of water released from the Independence spillgate is 1,060 acre-feet per year to maintain Billy Lake. This equates to 5,320 acre-feet released per year to maintain off-river lakes and ponds associated with the LORP, including the current supply to the Waggoner Unit.

Under the proposed program for off-river lakes and ponds, the amount of water provided to Goose Lake may be greater than under existing conditions due to the need to create flows in the channels downstream of Goose Lake that will connect to the river. There will be an inflow and outflow from these lakes sufficient to sustain the artificial corridor below the lake, but the lake elevations will remain unchanged from current conditions. There are insufficient data to estimate the additional flows required to reach the river, and associated channel losses downstream of Goose Lake.

Billy Lake is supported by water conveyed from the Aqueduct through the Independence Spillgate and existing ditch that extends from the spillgate to the lake. Under the proposed program for off-river lakes and ponds, the amount of water provided to Billy Lake would remain the same as under current conditions.

Based on the above information, an estimate of the average annual water requirements to maintain off-river lakes and ponds in accordance with the MOU goals and proposed management approach (see Section 2.6) is provided below in Table 10-4. Water currently used to maintain the lakes and ponds is not

retrieved by LADWP and returned to the Los Angeles Aqueduct. Water used for off-river lakes and ponds under the LORP would also not be retrieved by LADWP. Some of the water used to maintain Goose Lake will reach the river under LORP to create fish corridors. Hence, some of this water would contribute to the baseflows in the river and would be retrieved by LADWP at the pump station. The estimates of water requirements to maintain the off-river lakes and ponds shown in Table 10-4 do not include water that would reach the river. Instead, they represent water losses from the Los Angeles Aqueduct system.

TABLE 10-4
ESTIMATE OF WATER REQUIREMENTS TO MAINTAIN OFF-RIVER LAKES AND PONDS

Lake or Pond	Long-term Annual Average, acre-feet per year	Notes
Thibaut Ponds	1,141	Same as current water requirements
Upper and Lower Twin Lakes	885	Same as current water requirements
Goose Lake*	2,234	Same as current water requirements
Billy Lake	1,060	Same as current water requirements
Total =	5,320	

Source: LADWP Hydrographic Records 1990- 2002. * Includes water consumed in Waggoner Unit under existing Blackrock management; does not include water that will be conveyed to the river via the Goose Lake Return ditch to provide continuity to the river under the LORP.

Water Requirements for Blackrock Waterfowl Habitat Area

Under the project, an annual average of 500 acres will be flooded in the Blackrock Habitat Area in average and above average runoff years. Ecosystem Sciences has estimated the net change in open water and vegetated wetlands that would occur in the Blackrock area over the long term in response to the first two flooding and drying cycles – there would be an increase of 290 acres of open water and a loss of 83 acres of vegetated wetlands (see Table 7-3). Hence, there would be a net increase in new wetland/water habitat of 207 acres. Based on an average water consumption of 5 acre-feet per year per acre, the total net water consumption to implement the flooding regime at Blackrock is about 1,035 acre-feet per year. This estimate represents an average annual value; year-to-year water demands could vary substantially based on flooding goals and runoff conditions.

Summary of LORP Water Requirements

The estimated total water requirements for the LORP, during the initial years of rewatering, and once the river reaches steady state conditions, are summarized in Table 10-5. These water requirements represent consumptive losses due to: (1) channel losses along the river; (2) evapotranspiration from new river vegetation, off-river lakes and ponds, and Blackrock Waterfowl Habitat Area wetlands; and (3) bypass flows and releases to the Delta Habitat Area. The long-term annual average water demand, over existing water demands in the LORP project area, is estimated to be about 16,294 acre-feet per year.

TABLE 10-5
WATER REQUIREMENTS OF THE LORP

LORP Element	Initial Years	Steady State Conditions	
	Total LORP Consumptive Use (acre-feet per year)	Total LORP Consumptive Use (acre-feet per year)	Total LORP Net New Consumption (acre-feet per year)
Channel losses during baseflows and pulse flows along the river	52,700	19,600	8,100*
Channel losses during seasonal habitat flows	1,152	1,152	1,152
Off-River Lakes and Ponds	5,320	5,320	0
Blackrock Waterfowl Habitat Area	2,500	2,500	1,035
Flows bypassed to the Delta Habitat Area from baseflows and pulse flows	5,150	5,150	5,150
Flows bypassed to the Delta Habitat Area from seasonal habitat flows**	857	857	857
Total =	67,679	34,579	16,294

Source: LADWP and Ecosystem Sciences. * Since 1990, LADWP has made releases to the river from the Independence, Locust, and George's spillgates to provide up to 10 cfs in the lower reaches of the river for riparian habitat and fish purposes. These releases (called "Early LORP Releases") have been a precursor to the full LORP. These releases will be replaced with the planned releases at the River Intake. They have averaged about 11,500 acre-feet per year (see text below). ** Assumes that a maximum seasonal habitat flow (200 cfs at peak) will be released every year and a channel loss of 0.35 cfs/mile would occur. The seasonal habitat flows will vary from year to year depending upon runoff (see Section 2.3.5.3). Under a higher channel loss assumption of 1 cfs/mile, flows bypassed to the Delta during seasonal habitat flows would be 358 acre-feet (See Tables 6-9 and 6-10).

Water for the LORP will be derived from river diversions. Groundwater pumped above the River Intake is conveyed to the river prior to entering the Los Angeles Aqueduct. In addition, groundwater pumped from areas south of the River Intake is delivered directly to the Aqueduct. Therefore, part of the water to be supplied to the LORP via the River Intake and the Aqueduct spillgates will be pumped groundwater in origin. However, as described in Section 2.1.5, LORP does not include installation of new wells or increases in groundwater pumping in the Owens Valley (aside from new or replacement stockwater wells with no substantial increase in groundwater pumping over exiting conditions; see Section 2.8.1.2). Existing groundwater pumping by LADWP in the Owens Valley will continue as allowed under the Inyo County/Los Angeles Long Term Water Agreement.

10.5.2 Summary of LADWP's Exports for Municipal Water Supply

LADWP supplies water to the City of Los Angeles for municipal and industrial uses. There are three primary water sources: (1) Los Angeles Aqueduct, exporting water from the Mono Basin, Long Valley, and Owens Valley; (2) local groundwater in the Los Angeles Basin; and (3) water purchased from the Metropolitan Water District. In addition, reclaimed water is another source that is becoming more important over time.

The Los Angeles Aqueduct has provided about half of the City's water supply in the past 10 years (see Table 10-6). The average annual delivery of water from the Los Angeles Aqueduct from 1991-2001 was 319,948 acre-feet. The total average annual delivery of municipal water supply to the City of Los Angeles is about 617,000 acre-feet per year.

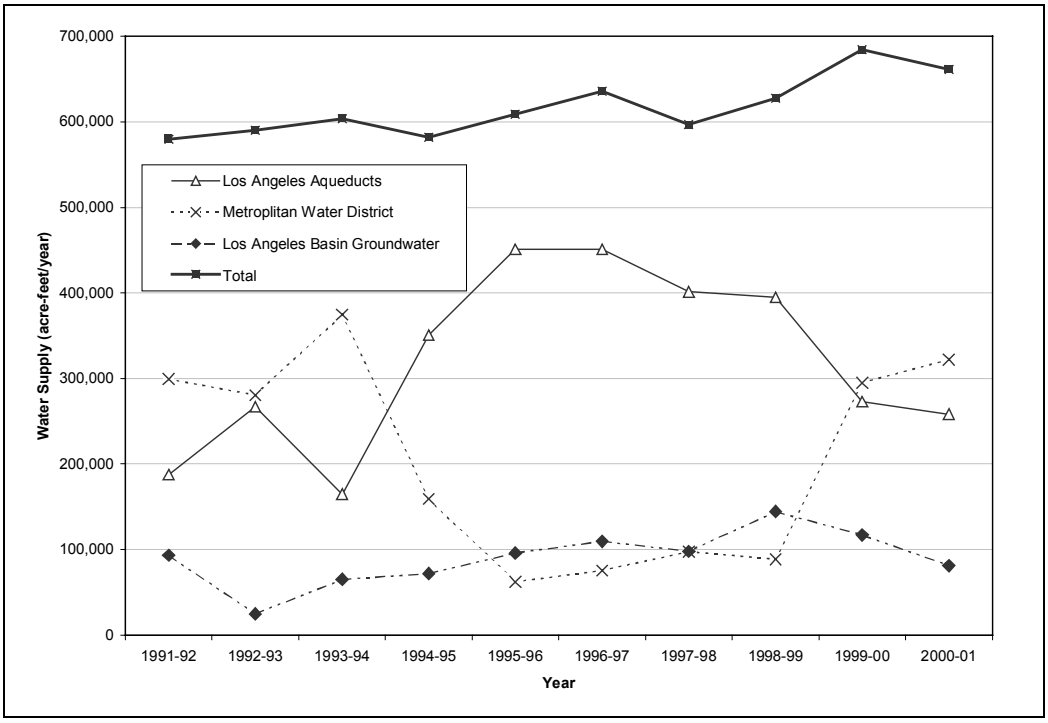
As shown in Table 10-6 and Chart 10-1, the amount of water supplied by the Los Angeles Aqueduct varies considerably from year to year, with annual fluctuations substantially exceeding 16,000 acre-feet. (During the 10-year period between 1991-92 and 2000-01, the average difference between years was approximately 73,500 acre-feet.) Therefore, the reduction in the amount supplied via the LAA resulting from LORP implementation is within LADWP's existing operational flexibility, and can be accommodated by augmenting supplies with Metropolitan purchases and Los Angeles Basin groundwater.

TABLE 10-6
SUMMARY OF LADWP WATER SUPPLIES

Year	Acre-feet per Year			
	Los Angeles Aqueduct	Metropolitan Water District Purchases	Los Angeles Basin Groundwater	Total
1991-92	187,447	299,213	93,210	579,870
1992-93	267,007	280,409	24,556	589,972
1993-94	164,632	374,443	64,919	603,994
1994-95	350,957	159,084	71,755	581,796
1995-96	450,917	62,011	95,808	608,736
1996-97	451,048	75,226	109,458	635,732
1997-98	401,482	97,490	97,716	596,688
1998-99	394,891	88,504	144,144	627,539
1999-00	272,932	294,664	116,832	684,428
2000-01	258,162	322,063	81,087	661,312
Average =	319,948	205,311	91,749	617,007

Source: LADWP.

CHART 10-1
SUMMARY OF LADWP WATER SUPPLIES



In the 2000 Urban Water Management Plan (Plan), LADWP projected the long-term average annual deliveries from the Los Angeles Aqueduct for the next twenty years to be 321,000 acre-feet per year, and that the water requirements of the LORP would be approximately 16,000 acre-feet per year more than the water that has been supplied by LADWP to the "Early LORP" (see Table 10-7). In the Plan, LADWP concluded that even with the need to supply 16,000 acre-feet to the LORP, adequate water supplies are available to serve the essential needs of the City of Los Angeles for the next 20 years. However, LADWP may need to supplement supplies during dry years through short-term water purchases on the water market to compensate for shortages in LADWP's current supplies. LADWP is continuing to secure other reliable sources of water, such as long-term water marketing and desalination. LADWP is also fully committed to increasing reclaimed water supplies and water conservation efforts.

LADWP's water uses in the Owens Valley from 1991-2001 are summarized in Table 10-7. Water for in-valley uses is derived from surface water diversions and local groundwater pumping. The average annual water demands for in-valley uses are not expected to change with the implementation of the LORP, with the exception of increased water use for the LORP. The water uses for the "Early LORP" listed in Table 10-7 consist of releases from Independence, Locust, and Georges spillgates to provide up to 10 cfs in the lower reaches of the river for riparian habitat and fish purposes, and to supply off-river lakes and ponds. These releases have been made since 1987 as a precursor to the full LORP. These releases will be replaced with the planned LORP releases at the River Intake.

TABLE 10-7
SUMMARY OF CURRENT LADWP IN-VALLEY WATER DEMANDS

	Acre-feet Per Year					
	Irrigation	Stockwater	E/M Projects*	Recreation	"Early LORP"**	Total
1991-92	39,501	14,756	9,453	8,767	11,064	83,541
1992-93	37,131	17,285	9,088	7,725	9,269	80,498
1993-94	47,798	17,218	13,480	8,676	5,830	93,002
1994-95	37,784	17,178	9,174	8,116	11,638	83,890
1995-96	57,721	20,919	11,307	12,479	11,636	114,062
1996-97	46,267	19,724	10,918	9,439	13,031	99,379
1997-98	47,013	16,395	8,539	8,022	13,069	93,038
1998-99	45,445	13,654	8,480	8,691	11,192	87,462
1999-00	49,308	14,446	8,479	7,470	15,973	95,676
2000-01	49,327	13,442	8,692	7,263	12,090	90,814
Average =	45,730	16,502	9,761	8,665	11,479	92,136

Source: LADWP Table 2 - Runoff Year Water Uses Owens Valley 1991-2001.
*E/M = Enhancement/mitigation projects identified in Table 5-2 of the 1990 EIR on the Inyo County/Los Angeles Long Term Water Agreement. These numbers do not include releases made to the "Early LORP."
**Releases made to the lower river since 1991 representing an early implementation of long-term LORP

10.5.3 Impacts on Exports from Owens Valley

The average annual water consumption associated with the LORP, during steady state conditions, is estimated to be about 34,579 acre-feet per year. This water requirement represents a net increase of about 16,294 acre-feet per year over existing water uses in the valley that currently maintain elements of the LORP, including off-river lakes and ponds; wetlands and pasture in the Blackrock Waterfowl Area; and wetlands along the lower reach of the river. This amount of water is slightly less than the LORP water consumption projected by LADWP (i.e., 16,000 acre-feet per year) in its water supply projections for 2020. Hence, the proposed project would not cause a reduction in the amount of water planned to be available for export from the Owens Valley for municipal uses in the Los Angeles Basin, and therefore, would not have an impact on water supply for municipal users.

10.6 ENERGY

The power requirement of the 50-cfs pump station is 2,115 kW when operated at 50-cfs. It will require one 34.5kV, 3-phase 5MVA transformer. The service requirement will be met from a 2000A bus, 4160V service. In order to meet this power demand an upgrade was made to the capacity of Cottonwood Power Plant. The original transformer was a 12MVA. Because of damage to this unit and the foreseen increased demand, the transformer was replaced with a 30MVA unit. Also, a circuit breaker positioner was added which will enable power to be directed to both the Owens Lake Dust Mitigation Program and the pump station. Cottonwood Power Plant will deliver 34.5kV power via a new power line from Cottonwood to the pump station.

Supplying power to the pump station will not require new releases of water at the Cottonwood Power Plant. The new power would be supplied by using unused hydraulic capacity and existing generators at the plant.

10.7 GROWTH INDUCING EFFECTS, INCLUDING INDIRECT IMPACTS

Section 15126.2(d) of the CEQA Guidelines states that an EIR should discuss "…the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Growth can be induced in a number of ways, including through the elimination of obstacles to growth, or through the stimulation of economic activity within the region.

The implementation of the LORP does not involve construction of new homes or businesses and does not include construction of new, potentially growth-inducing, infrastructure such as highways or potable water or wastewater systems. The project is not expected to cause an increase in population in the Owens Valley or to adversely affect the transportation system in the valley. As explained in Section 10.1, the implementation of the LORP will likely result in increased recreational use in the LORP area, but this increase is not expected to cause significant adverse impacts.

10.8 IMPACTS DUE TO FUNDING SHORTFALLS

In the Draft EIR/EIS, the potential increases in saltcedar and mosquito populations from implementation of LORP were considered potentially significant impacts that could not be fully mitigated due to funding shortfalls. Since distribution of the Draft EIR/EIS, funding commitments have been made to address impacts related to these two topics. Therefore, the Final EIR/EIS does not identify any impacts deemed to be significant due to funding shortfalls.