3.0 Affected Environment, Environmental Consequences, and Compensation Measures

Chapter 3 includes baseline information for each resource potentially affected by the Proposed Action, as well as a discussion of environmental consequences of the No-Action Alternative and alternatives. Compensation measures are identified as needed for impacts.

Reclamation has determined that implementation of the Proposed Action would result in no significant impacts to energy/public utilities. The Proposed Action would operate using gravity flow and would not require large amounts of electricity. Only occasional use of energy for operation of the inlet and outlet facilities would be required. The Proposed Action would not eliminate or displace power producing facilities. Potential changes in flows through the AAC and associated power plants were examined for potential to decrease or otherwise impair hydroelectric power generation. This analysis found that the Proposed Action could result in some reduction in overall power production due to minor changes in how water is routed through the AAC and its hydroelectric stations to facilitate delivery of water to the Drop 2 Reservoir. However, due to the relatively small volume of water that would be stored and released from the reservoir each year in relation to the normal annual diversion of water to the AAC, changes in power production would not be significant.

This page intentionally left blank.

3.1 Hydrology/Water Quality

This chapter discusses the potential change in water management, flows and groundwater in the Limitrophe, and water quality associated with implementation of the Proposed Action and alternatives. Sources of information for this section include surface water and groundwater studies performed for the EA (provided in Appendices C and D) and the *Lower Colorado River Multi-Species Conservation Program* (2004). The Drop 2 Reservoir site, inlet canal, and outlet canal alignments contain no desert washes, rivers, streams, or lakes. There is some scattered wetland vegetation to the west of the Drop 2 powerplant, associated with seepage from the AAC, but otherwise the Project site has limited hydrologic features. Given the limited potential for local hydrologic impacts this section focuses on potential regional impacts, such as water management and hydrology of the Lower Colorado River System.

3.1.1 Affected Environment

3.1.1.1 Regulatory Environment

Reclamation is the lead agency for this EA and will coordinate environmental review, permitting, and construction activities with local and state authorities. The following Federal regulations are applicable to hydrologic resources potentially affected by the Proposed Action:

- *Executive Order (EO) 11988, Floodplain Management, May 24, 1977.* This EO requires avoiding or minimizing harm associated with the occupancy or modification of a floodplain. The Proposed Action does not involve occupancy or modification of a floodplain.
- *The Law of the River.* Lower Colorado River operations are determined by various laws, treaties, and court decisions collectively referred to as The Law of the River. The Law of the River encompasses discretionary and nondiscretionary actions by Reclamation, acting for the Secretary of the Interior as watermaster, related to its operation and maintenance of the Lower Colorado River.
- *The US-Mexican Water Treaty of 1944.* Under Article 10(a) of the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande — Treaty between the United States of America and Mexico dated February 3, 1944, Mexico is entitled to an annual amount of 1.5 maf of Colorado River water. Under Article 10(b) of the US-Mexico Water Treaty of 1944, Mexico may schedule up to an additional 0.2 maf when "there exists a surplus of waters of the Colorado River in excess of the amount necessary to satisfy uses in the United States." However "Mexico shall acquire no right beyond that provided by this subparagraph by the use of the waters of the Colorado River system, for any purpose whatsoever, in excess of 1,500,000 af (1,850,234,000 cubic meters) annually." In the event of extraordinary drought or serious accident to the irrigation system in the US, thereby making it difficult for the US to deliver the guaranteed quantity of 1,500,000 af, the water allotted to Mexico will be reduced in the same proportion as consumptive uses in the US are reduced. Per Minute 242 of the 1944 Water Treaty, the US must deliver water to Mexico at the NIB with a flow weighted average annual salinity concentration no greater than 115 parts per million (ppm) (equivalent to 115 milligrams

per liter [mg/L]) +/- 30 ppm (30 mg/L) over the flow weighted average annual salinity concentration of the river at Imperial Dam (LCR MSCP 2004).

- *Clean Water Act and Executive Order 11990.* The Federal Water Pollution Control Act and subsequent amendments, collectively known as the Clean Water Act (CWA) (33 USC § 1251 et seq.), were enacted by Congress to restore and maintain the chemical, physical, and biological integrity of US waters. The Project area has limited hydrologic features and no jurisdictional wetlands as defined under the Clean Water Act. As described in Chapter 2, grading, construction, and desilting operations for the Proposed Action would be conducted in accordance with provisions of the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit No. 99-08-DWQ), to control discharges of storm water during construction. The Construction General Permit requires the development and implementation of a SWPPP, which includes erosion related BMPs, such as construction of sediment traps (e.g., hay bales, silt fences, straw wattles) and temporary desilting basins.

3.1.1.2 Water Management

The LCR system includes Hoover, Davis, Parker, Headgate Rock, Palo Verde Diversion, Imperial, and Laguna dams (see Figure 1-2). Reclamation manages the water resources of the Colorado River, and operates the LCR system to control floods, regulate the flow of the River, deliver stored water for beneficial uses in the US, improve navigation, and generate electrical energy. In its management of the river, Reclamation considers diversions schedules, trends in the water orders, drainage return flows, current and projected weather forecasts, downstream river losses or gains, and the current and projected status of storage at Senator Wash Reservoir, behind Imperial Dam, and behind Laguna Dam. As described in section 1.3.1, Reclamation's management of the LCR is hindered by the limited storage capacity below Parker Dam, and this limitation can result in "non-storable" water. By definition, non-storable water represents Colorado River water that cannot be captured or put to beneficial use in the US at the time that it is in excess of US water demands. See also Table 1-1.

3.1.1.2.1 Operations in the All-American Canal At Imperial Dam, water is diverted into the AAC for deliveries to IID, CVWD, Reclamation's Yuma Project facilities, and the City of Yuma (LCR MSCP 2004). Three desilting basins remove the sediment from the river's water before it enters the AAC. Between Drop 1 and Drop 2 the AAC capacity is about 7,700 cfs, and between Drop 2 and Drop 3 the AAC capacity is about 7,400 cfs. Hydroelectric power is generated at five separate "drops" located along the AAC as well as the turnout to the Yuma Main Canal (Siphon Drop) and the bypass channel between the AAC and the Colorado River (Pilot Knob Hydroplant) (IID 2006).

Portions of the canal are unlined, resulting in substantial losses to seepage. IID plans to undertake the construction necessary to line 23 miles of the AAC from west of Pilot Knob to Drop 3 (IID 2006). The new section of the canal will result in the conservation of 67,700 afy of Colorado River water currently lost to seepage. The new section of lined canal will be constructed parallel to the existing canal alignment using conventional construction methods and will permit the current unlined section of the canal to remain in service and to provide normal water deliveries during construction.

3.1.1.2.2 Operations of the Coachella Canal The Coachella Turnout from the AAC will be modified as part of the Project. CVWD receives Colorado River water from the Coachella Canal. The Coachella Canal begins at a turnout on the AAC just upstream of Drop 1, and terminates at Lake Cahuilla near La Quinta in the Coachella Valley. The canal has a capacity of approximately 1,300 cfs (Reclamation and CVWD 2001).

3.1.1.2.3 Mexico Deliveries and Diversions Under normal operations, deliveries to Mexico at the NIB are composed of drainage return flows that occur downstream of Imperial Dam, diversions at Imperial Dam specifically for delivery to Mexico, and, as discussed earlier, water inadvertently delivered to Mexico in excess of Treaty obligations ("non-storable" water).

3.1.1.3 Existing Flows

Flow in the Colorado River is highly variable, affected by scheduled releases for agricultural and urban uses, river losses, and unscheduled flows, as well as inflows such as agricultural returns, rainfall and runoff from tributaries (LCR MSCP 2004).

Flows below Parker Dam result primarily from releases from Lake Havasu. Since 1980, annual releases from Parker Dam have ranged from a low of 5.5 maf to a high of 20.5 maf. Within a given month, daily releases can vary by more than 11,000 cfs. Since 1980, within any given non-flood year, flows through Parker Dam on a daily basis have ranged from approximately 1,500 cfs (with a minimum of 30 cfs during an emergency situation) to approximately 19,500 cfs.

3.1.1.4 Flows within the Limitrophe

Within the Limitrophe (that portion of the Colorado River from the NIB to the SIB) Mexico operates Morelos Diversion Dam. Morelos Diversion Dam is the primary diversion point of Colorado River water delivered to Mexico under the US-Mexican Water Treaty of 1944. The waters of the Colorado River, once delivered to Mexico, as agreed upon in the 1944 Water Treaty, are under the exclusive jurisdiction of Mexico. Reclamation does not have control of Colorado River water once it reaches Morelos Dam. The 1944 Water Treaty contains no requirements relating to Mexico's use of that water. Morelos Diversion Dam provides water for the Mexican canals, leaving little water flowing to the river downstream of the dam. Currently, water can flow past Morelos Diversion Dam under three circumstances; (1) Morelos Dam gate leakage (LCR MSCP 2004); (2) as a result of over deliveries by the US that Mexico is unable to divert at Morelos Diversion Dam; and (3) during flood flows on either the Gila River or along the mainstem Colorado River. Flows arriving at Morelos Dam normally range from about 750 to over 3,000 cfs during the year, but have exceeded 40,000 cfs in some flood events (LCR MSCP 2004). As part of its normal water order Mexico typically diverts between 900–5,500 cfs at Morelos Dam (LCR MSCP 2004). During those times that Mexico's water order is below 5,500 cfs, they can divert water arriving at Morelos Diversion Dam above their water order. Statistical analysis was performed on historic (1974 through 2004) surface water flows that arrived at Morelos Dam, that were diverted by Mexico, and that ultimately flowed past Morelos Dam. The data used for the statistical analysis is based on gage data for the Colorado River at NIB, reported flow for the Cooper Wasteway, and reported Mexico diversions at the Alamo Canal /Morelos Dam (see Figure 3.1-1). The statistical analysis was performed including flood flows and then excluding flood flows for comparison.

Results of the statistical analysis demonstrate that flows arriving at Morelos Dam are diverted by Mexico, leaving smaller flows to pass Morelos. Regardless of whether flood flows are counted in the analysis, the majority of flows passing Morelos represent a small fraction of the flows that reach Morelos. In addition to flows that may pass Morelos Dam (from gate leakage, over deliveries, flood flows), water may enter the Limitrophe at the 11-Mile Wasteway located at River Mile (RM) 18.8 and at the 21-Mile Wasteway located at RM 4.6 (see Figure 3.1-1), from irrigation return flows from Mexico, and groundwater inflow from both the US and Mexico. On average the 11-Mile Wasteway contributes approximately 4 cfs and the 21-Mile Wasteway contributes approximately 1.3 cfs (Reclamation 2006b).

3.1.1.5 Groundwater in Limitrophe

Figure 3.1-2 shows observed and estimated groundwater elevation curves (depth to groundwater) in the Limitrophe. The Limitrophe can be characterized in three segments, a "gaining reach" from Morelos Dam downstream to approximately RM 16.8, a "losing reach" from RM 16.8 to RM 5.8, and a losing reach where the river transitions from perennial to intermittent from below RM 5.8 to RM 0 (see Appendix D). In the "gaining" reach, surface water stage is typically below the groundwater table and groundwater seeps into the river and augments surface flows; in the "losing" reaches the river stage is typically above the groundwater table and surface water typically seeps from the river into the groundwater aquifer.

3.1.1.6 Water Quality

Because the Proposed Action will reduce river flows below Hoover Dam it could affect salinity. Additional factors influencing salinity levels include regional geology, salinity levels in tributaries and other inflow sources, drainage from irrigation system return flows, municipal discharge, and concentration of salts due to evaporation and other losses. Approximately 47 percent of the salinity in the Colorado River system is from natural sources (Reclamation 2002). The remaining 53 percent is due to human activities including agricultural runoff and industrial and municipal sources. The river increases in salinity from its headwaters to its mouth.

In 1974, the Colorado River Basin Salinity Control Act was enacted with the purposes of (1) resolving salinity issues associated with US-Mexico Water Treaty of 1944 deliveries and (2) creating a salinity control program within the US portion of the Colorado River Basin to maintain salinity standards. The Federal/State salinity control program is designed to maintain flow-weighted average annual salinity at or below the adopted numeric criteria. The program is not intended to counteract short-term salinity variations due to the highly variable flows caused by natural factors (Reclamation 2002). Salinity requirements for deliveries of water to Mexico are provided in Minute 242 to the Mexican Water Treaty of 1944. Reclamation will continue to comply with Minute 242.

The Colorado River Basin Salinity Control Forum reviews the standards (numeric criteria and plan of implementation) at least every three years and makes revisions to accommodate changes occurring in the Basin States, most recently in 2005. This review is conducted by the seven states of the Colorado River Basin, acting through the Forum, to meet the requirements of the CWA. At each triennial review, the current and future water uses are analyzed for their impact on the salinity of the Colorado River, including projects proposed as part of Reclamation, US Department of Agriculture

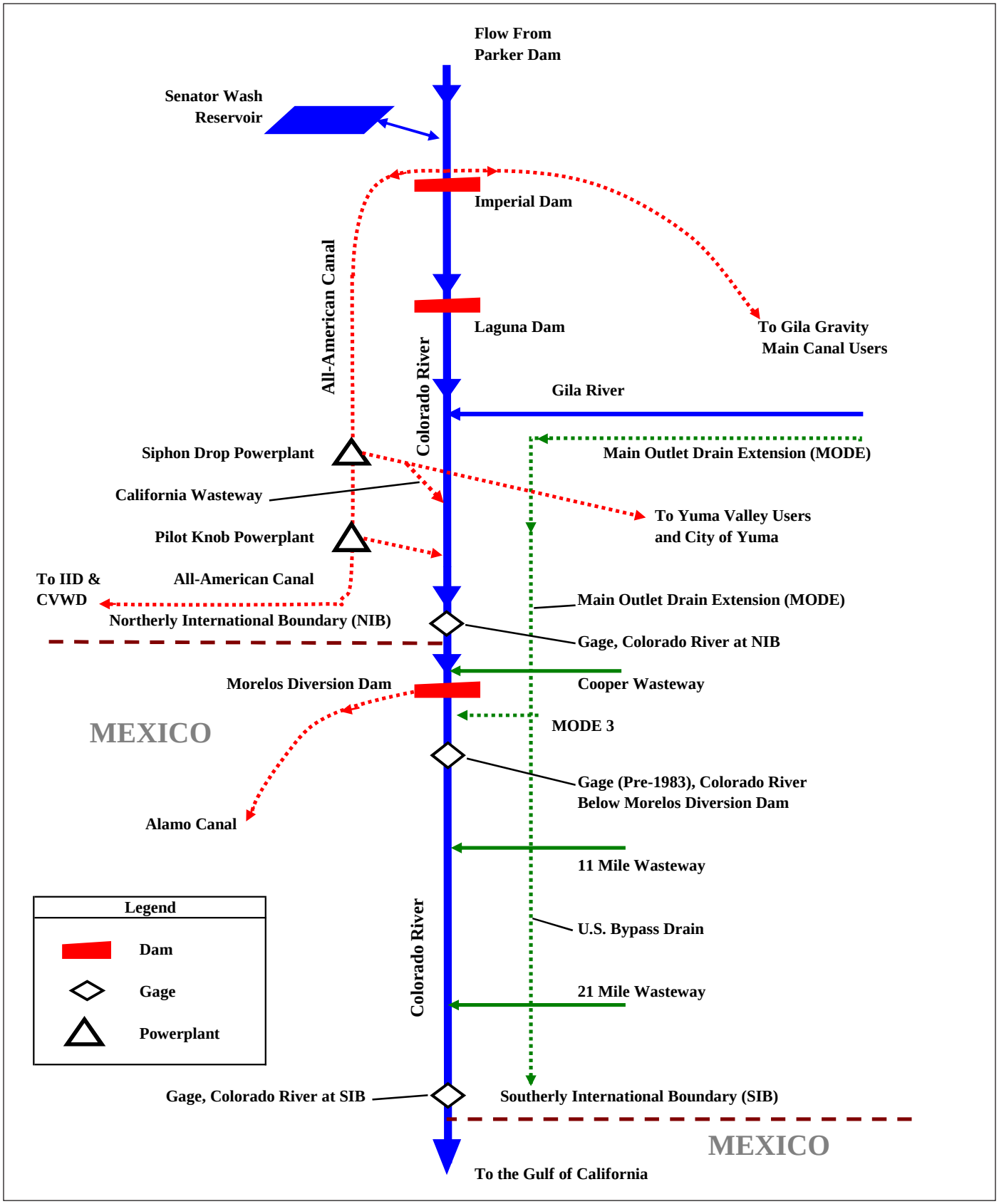


Figure 3.1-1. Limitrophe Division Schematic

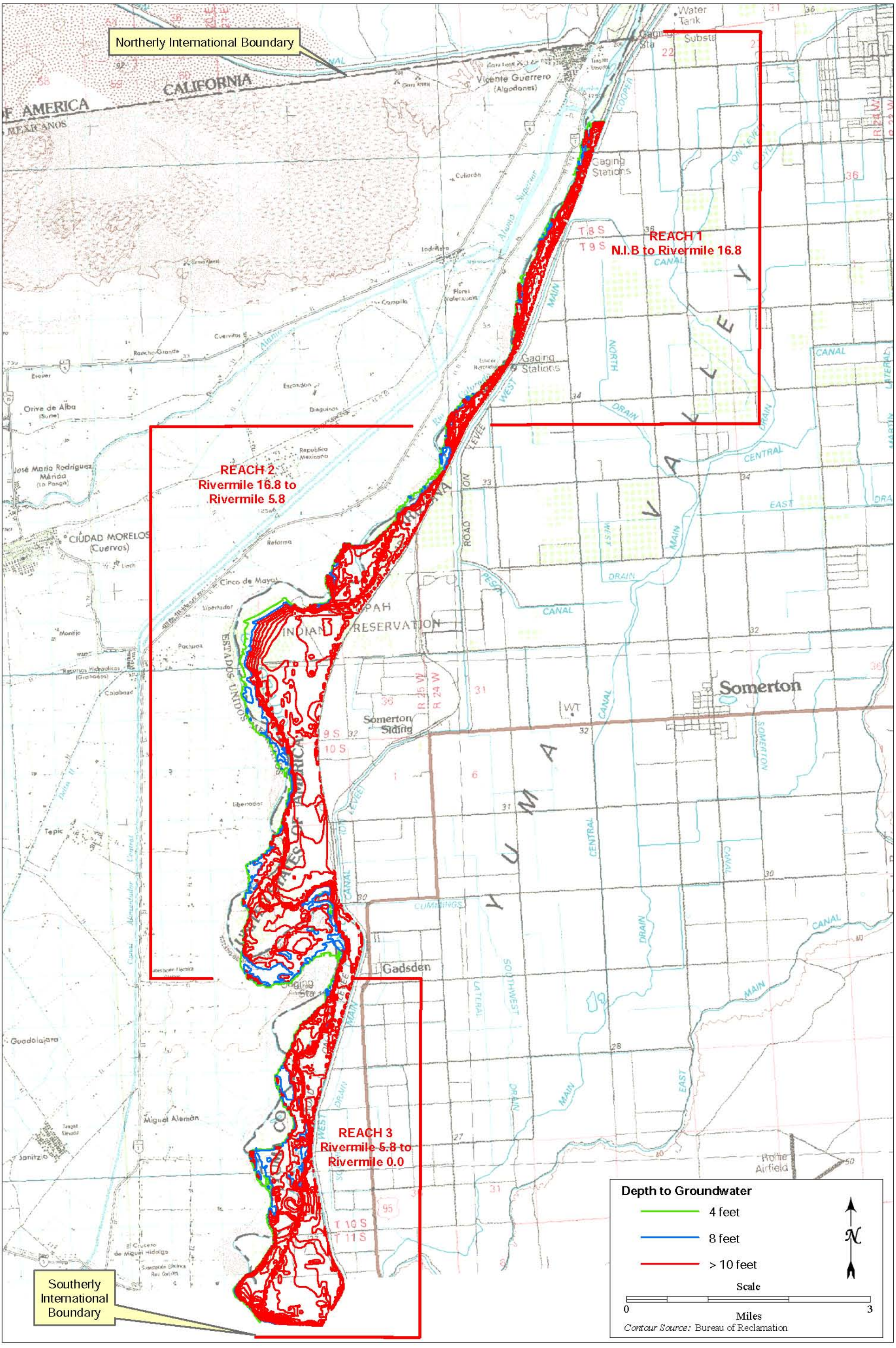


Figure 3.1-2. Observed and Estimated Depth to Groundwater

(USDA), and Bureau of Land Management (BLM) salinity control programs. If needed, additional salinity control projects are added to the implementation plan to assure compliance with standards. The need for one or more additional salinity control projects is determined by monitoring the salinity of the river and making near-term projections of changes in diversions from, and return flows to, the river system. When an additional project is needed it is selected from a list of potential projects that have undergone feasibility investigation. In selecting a project, considerable weight is given to the relative cost-effectiveness of the project. Environmental feasibility is another factor considered.

As part of the Salinity Control Act, Reclamation has a salinity monitoring program whereby it routinely samples and measures the salinity of the river water at various points between Parker Dam and the SIB. With this monitoring, Reclamation is able to estimate the annual salinity concentration in the Colorado River. Reclamation has preplanned a series of measures that it can readily implement to reduce salinity, such as reducing drainage pumping and operating the Yuma Desalination Plant (Colorado River Basin Salinity Control Forum 2005).

3.1.2 Environmental Consequences and Compensation Measures

3.1.2.1 Thresholds of Significance

Impacts on hydrology would be significant if the Proposed Action or alternatives would:

- conflict with water delivery obligations;
- violate any water quality standards or waste discharge requirement;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge; or
- substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which would result in substantial erosion or flooding.

3.1.2.2 Methodology

3.1.2.2.1 Water Management In order to estimate potential impacts of the Proposed Action and alternatives on water management (e.g., the ability to operate existing facilities, ability to meet delivery obligations), Reclamation is preparing an "operations study" for the Drop 2 Reservoir Project. The operations study analyzes existing river flows, the AAC canal capacity, historic flows in the AAC, time necessary to fill and empty the proposed reservoir, proposed inlet canal and proposed outlet canal capacities. The intent of the operations study is to ensure the design of the Drop 2 Reservoir and associated facilities enhance operational flexibility for river system operators.

3.1.2.2.2 Flows in Limitrophe In order to estimate changes in non-storable water arriving in the Limitrophe data on deliveries arriving at NIB, the portion of historic non-storable flows diverted by Mexico, and portion of historic non-storable water that passed Morelos Dam were gathered and compiled into a spreadsheet accounting model. Gage data for the Colorado River at the NIB, reported flow for the Cooper Wasteway, and reported Mexico diversions at the Alamo Canal/Morelos Dam for the period 1974 to 2004 was used in the analysis (see Figure 3.1-1). Non-storable flows arriving at NIB and subsequently the portion diverted by Mexico and passing

Morelos Dam were simulated assuming a repeat of historic conditions but with operation of the Drop 2 Reservoir. To estimate the effect on the Limitrophe, flows passing Morelos Dam both with and without operation of the Drop 2 Reservoir were compared. For details on the analysis see Appendix C.

3.1.2.2.3 Groundwater in Limitrophe Changes to groundwater elevations were estimated using a transient groundwater flow model of the Yuma area developed by the Arizona Department of Water Resources and published in 1993 (Hill 1993). This model was used to compute the potential change in the water table caused by the reduced flows below Morelos Dam due to operation of the Drop 2 Reservoir. The model was run assuming (a) operation of the Drop 2 Reservoir and (b) without operation of the Drop 2 Reservoir and the results compared. The groundwater analysis is based on simulated mean daily surface water flows of the Colorado River passing Morelos Dam for years 1974 to 2003 obtained from results of the surface water spreadsheet accounting model mentioned in the previous section. The analysis includes assumptions that exclude high flows (i.e. flood flows) from surface water flows in both models under certain conditions. Details on the corresponding analyses and inherent assumptions are provided in Appendix C (surface water flows that were used in the groundwater analysis) and in Appendix D (groundwater analysis).

3.1.2.3 Proposed Action

The Proposed Action would create the facilities necessary to capture currently non-storable water on the Colorado River. Non-storable flows from the Colorado River would be conveyed through the AAC to the Drop 2 Storage Reservoir via the inlet canal and from the reservoir back into the AAC via gravity flow. Water in the Drop 2 Storage Reservoir would be held in storage until it could be released back into the AAC. By cycling water through the reservoir, up to approximately 70,000 afy of otherwise non-storable water could be captured, thus reducing the scheduled releases at Hoover Dam.

3.1.2.3.1 Water Management The Proposed Action would be fully consistent with Reclamation's management responsibilities under the Law of the River. The Proposed Action would enhance Reclamation's ability to capture non-storable flows that are released from Parker Dam. The Proposed Action would not impair Reclamation's ability to meet its obligations to deliver 1.5 maf under the US-Mexico Water Treaty.

The canal pool upstream of Drop No. 1 is designed for a flow rate of approximately 10,000 cfs. Historically, the maximum annual flow for this pool ranges up to 7,000 cfs based on IID records including deliveries for CVWD. The inlet canal which is designed to convey non-storable flow to Drop 2 storage reservoir is sized for a maximum flow rate of 1,800 cfs. When non-storable flows are introduced into the AAC, the canal pool upstream of Drop No. 1 (capacity of 10,000 cfs) could convey flows necessary to make deliveries to IID and CVWD (up to 7,000 cfs) as well as flows for delivery to the Drop 2 Reservoir (1,800 cfs). The intent under the Proposed Action is to ensure an uninterrupted water supply to CVWD and IID during construction. The Project will be designed, constructed, operated, and maintained in a manner that will not restrict water orders or operations by CVWD or IID.

3.1.2.3.2 Flows The Proposed Action could result in reduced releases from Hoover Dam. Rather than water being released from Hoover Dam, water could be released from the Drop 2 Reservoir. Reduced releases could result in lowered river elevation, decrease the amount of open water and decrease backwater areas in the lower Colorado River between Hoover and Imperial Dams. However, it is anticipated that these effects would be so small as to be unmeasurable. Studies by Reclamation found that decreasing releases from Hoover Dam by 400,000 afy decreased average water surface elevation by only 0.4 feet (Reclamation 2000). The Proposed Action would potentially result in a much smaller effect by reducing releases by approximately 70,000 afy on average. This change in releases would not conflict with water delivery obligations, cause substantial groundwater depletion, or alter existing drainage. However, reduced river flows could lead to increased river salinity (see Section 3.1.2.3.5 below). Finally, reduced river flows could have biological impacts. As described in Section 2.1.4, a change in point of diversion of up to 1.574 maf between Hoover and Imperial Dams, and the resulting biological impacts, were considered and mitigated for in the development of the LCR MSCP. Hence, biological impacts resulting from change in point of diversion of up to 70,000afy are not further described in this EA.

As dictated by the Water Treaty of 1944, Reclamation has no control of Colorado River water once it reaches Morelos Dam. The Limitrophe is fed by waters passing through and over Morelos Dam and by groundwater. Reclamation cannot control these variables and has no requirement to ensure delivery of waters past Morelos Dam.

3.1.2.3.3 Flows in the Limitrophe Operation of the Drop 2 Storage Reservoir would result in previously non-storable flows being captured rather than flowing from Imperial Dam to Morelos Dam. Statistical analysis was performed on simulated surface water flows arriving at Morelos Dam, flows diverted at Morelos Dam, and flows passing Morelos Dam. Surface water flow data was taken from the spreadsheet accounting model mentioned previously and described in detail in Appendix C. The analysis was performed in two steps, including a model run assuming the Drop 2 Reservoir is not being operated and a model run assuming the Drop 2 Reservoir is being operated, and the results were compared to determine the effect of the Drop 2 Reservoir Project on flows arriving at, being diverted at, and passing Morelos Dam.

Figures 3.1-3a and 3.1-3b provide a graphic comparison of non-storable mean daily flows arriving at Morelos Dam both with and without the Drop 2 Reservoir; Figure 3.1-3a depicts a dataset that excludes floodflow periods and Figure 3.1-3b depicts the same period but includes floodflows.

Figures 3.1-4a and 3.1-4b provide a graphic comparison of non-storable mean daily flows diverted at Morelos Dam both with and without the Drop 2 Reservoir; Figure 3.1-4a depicts a dataset that excludes flood flow periods and Figure 3.1-4b depicts the same period but includes floodflows.

Figures 3.1-5a and 3.1-5b provide a graphic comparison of non-storable mean daily flows passing Morelos Dam both with and without the Drop 2 Reservoir; Figure 3.1-5a depicts a dataset that excludes flood flow periods and Figure 3.1-5b depicts the same period but including flood flows.

Results of the statistical analysis and Figures 3.1-3a and b suggest that daily flows arriving at Morelos Dam in the range of 0 to 2,000 cfs could be affected by operation of the Drop 2 Reservoir to a greater extent than daily flows arriving at Morelos Dam that are greater than 2,000 cfs.

Results of the statistical analysis and Figures 3.1-4a and b suggest that daily diversions at Morelos Dam in the range of 0 to 1,000 cfs could be affected by operation of the Drop 2 Reservoir to a greater extent than daily diversions at Morelos Dam that are greater than 1,000 cfs. Comparing results of the statistical analysis and Figures 3.1-4a and 3.1-4b suggests that the effect of the Drop 2 Reservoir during periods excluding flood flows is more pronounced than the effect of the reservoir when flood flows are included in the analysis. This result is to be expected due to constraints on the Drop 2 Reservoir (inlet capacity limited to 1,800 cfs and ability to fill the reservoir constrained by water already in storage), therefore, the effect of the Drop 2 Reservoir, when considering flood flows, is decreased. Daily diversions are expected to change to a greater degree in the non-flood periods as a result of operation of the Drop 2 Reservoir.

Results of the statistical analysis shown in Tables 11 and 12 in Appendix C suggest that daily flows passing Morelos Dam during flood flow periods are not affected to a large extent by operation of the Drop 2 Reservoir; whereas during non-flood flow periods, operation of the Drop 2 Reservoir could decrease mean daily flows passing Morelos Dam by as much as 1,800 cfs.

Table 3.1-5 provides a summary of simulated annual average non-storable flows passing Morelos Dam for the 31-year period of record. As shown on Table 3.1-5, operation of the Drop 2 Reservoir may decrease non-storable flows passing Morelos Dam by approximately 19,000 afy if flood flows are included in the analysis; whereas, operation of the Drop 2 Reservoir may decrease non-storable flows passing Morelos Dam by approximately 28,000 afy if flood flows are excluded from the analysis.

Decreases in surface water flows passing Morelos Dam, in and of themselves, are not impacts. The anticipated changes in surface water would not lead to a conflict with delivery obligations, or substantially alter the existing drainage pattern of the site. However, decreases in flows could affect groundwater and have water quality impacts, as described in the following section.

3.1.2.3.4 Groundwater in Limitrophe Results from model simulations described in previous sections indicate that operation of the Drop 2 Reservoir has the potential of reducing river flow and creating decreases in groundwater elevation downstream of Morelos Dam. Model simulations suggest potential *overall maximum* declines in groundwater elevation of 0.3 feet (3.6 inches) in Reach 1 (RM 22 to RM 16.8), 0.7 feet (8.4 inches) in Reach 2 (RM 16.8 to 5.8), and 0.7 feet (8.4 inches) in Reach 3 (RM 5.8 to RM 0) and potential *overall mean* declines in groundwater elevation of 0.03 feet (0.4 inches) in Reach 1, 0.09 feet (1.1 inches) in Reach 2, and 0.1 feet (1.2 inches) in Reach 3. The “overall maximum” and “overall mean” statistics mentioned above were calculated with respect to the entire length of specified reach over the entire simulated period of record. A third statistic, *maximum mean* decline, was calculated by averaging the individual estimated declines along the entire specified reach for each time step in the model and choosing the maximum average decline from all time steps. Model simulations suggest potential *maximum mean* declines in groundwater elevation of 0.2 feet (2.4 inches) in Reach 1, 0.5 feet (6 inches) in Reach 2, and 0.6 feet (7.2 inches) in Reach 3.

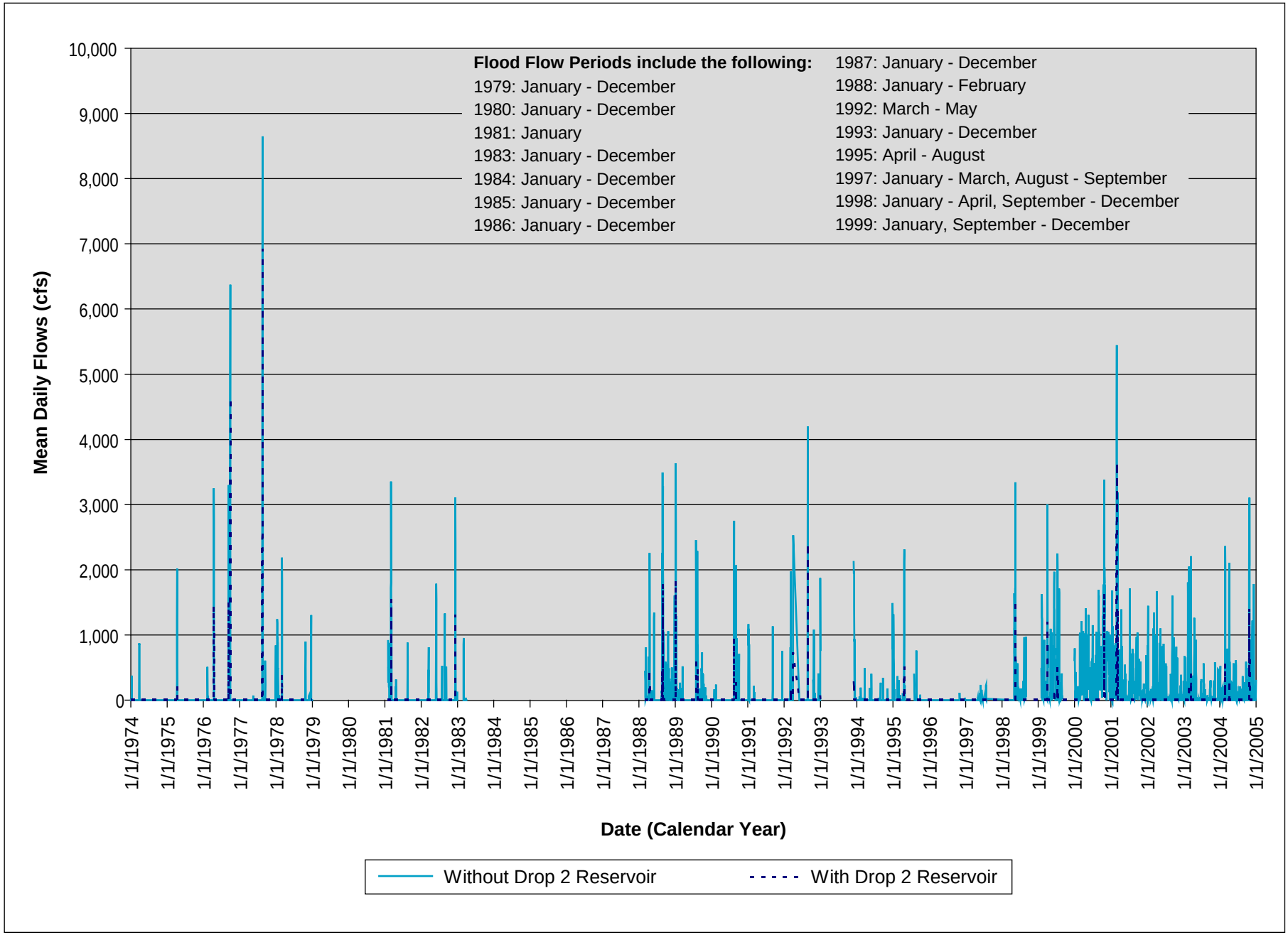


Figure 3.1-3a. Comparison of Non-Storable Flows Arriving above Morelos Dam With and Without Drop 2 Reservoir – Excluding Flood Flows (1974-2004)

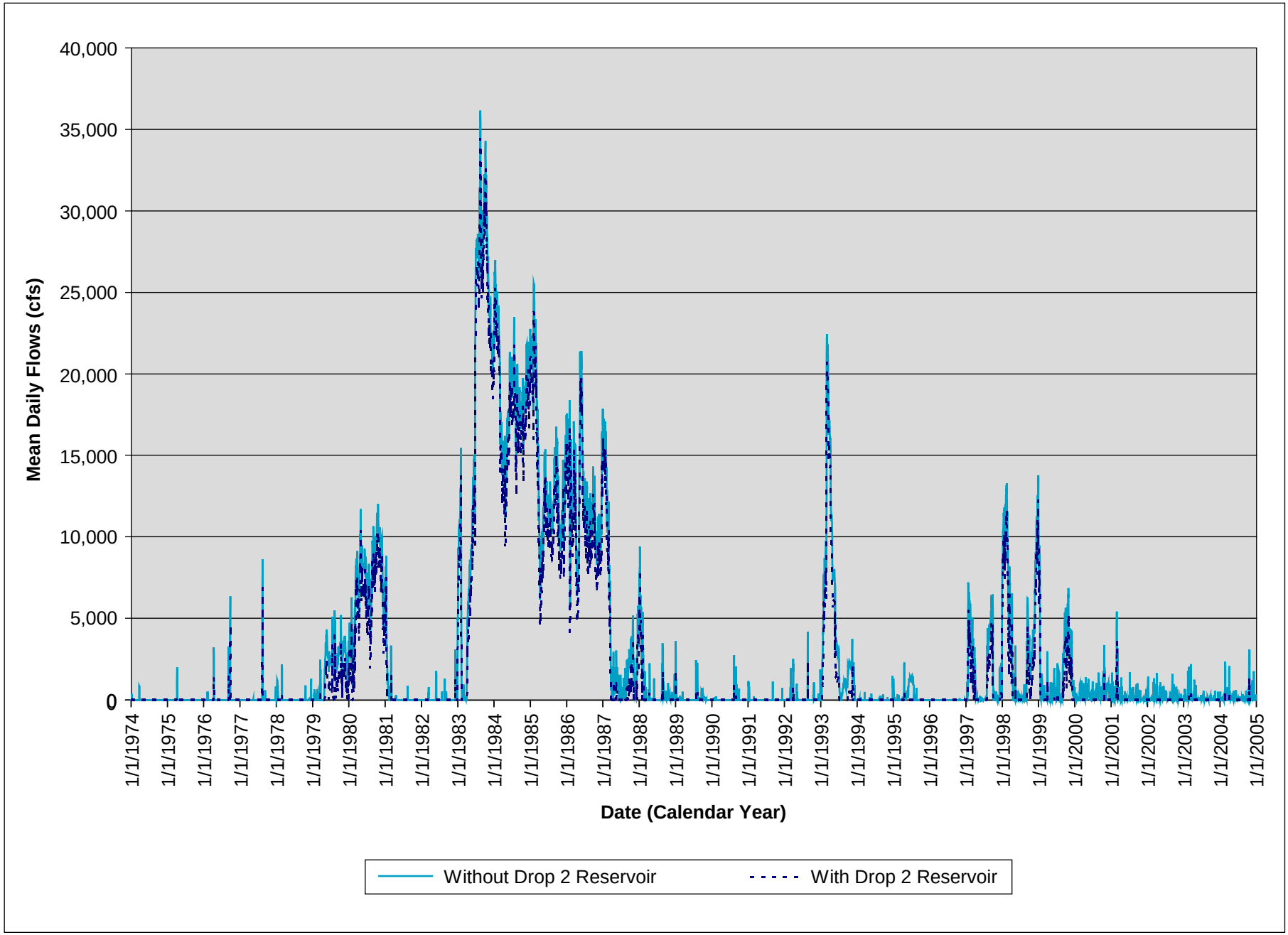


Figure 3.1-3b. Comparison of Non-Storable Flows Arriving above Morelos Dam With and Without Drop 2 Reservoir – Including Flood Flows (1974-2004)

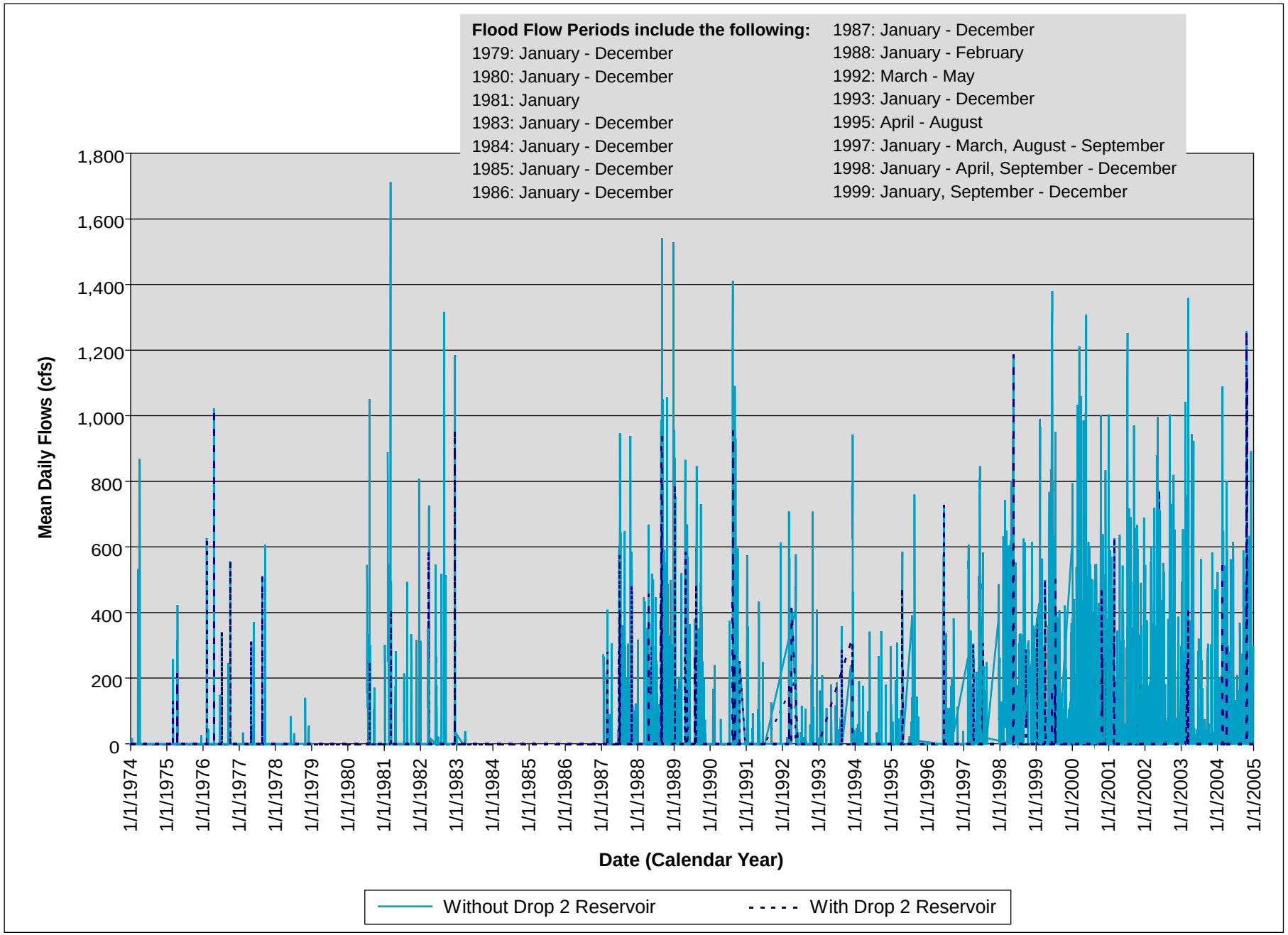


Figure 3.1-4a. Comparison of Non-Storable Flows Diverted by Mexico With and Without Drop 2 Reservoir – Excluding Flood Flows (1974-2004)

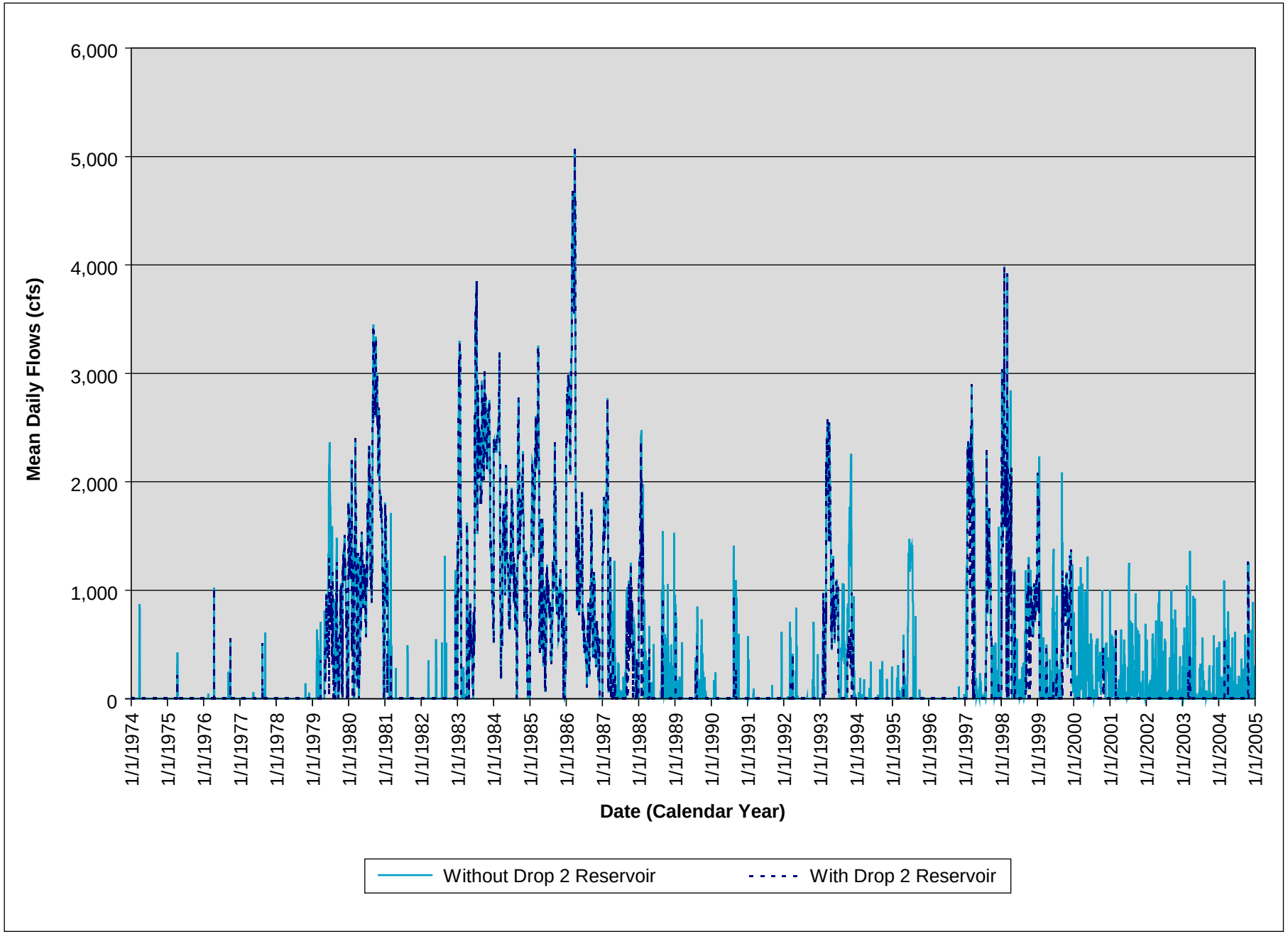


Figure 3.1-4b. Comparison of Non-Storable Flows Diverted by Mexico With and Without Drop 2 Reservoir – Including Flood Flows (1974-2004)

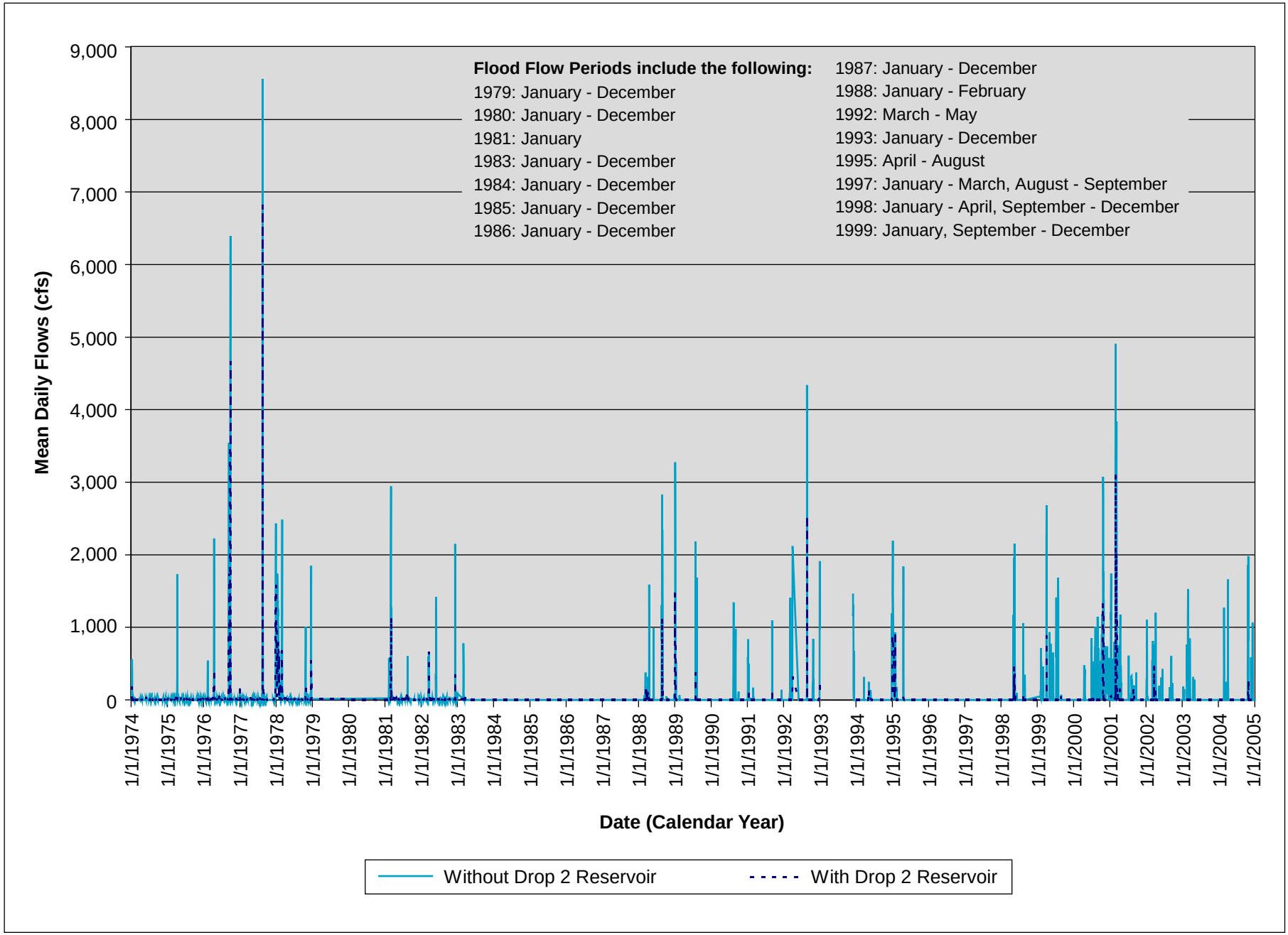


Figure 3.1-5a. Comparison of Non-Storable Flows Passing Morelos Dam With and Without Drop 2 Reservoir – Excluding Flood Flows (1974-2004)

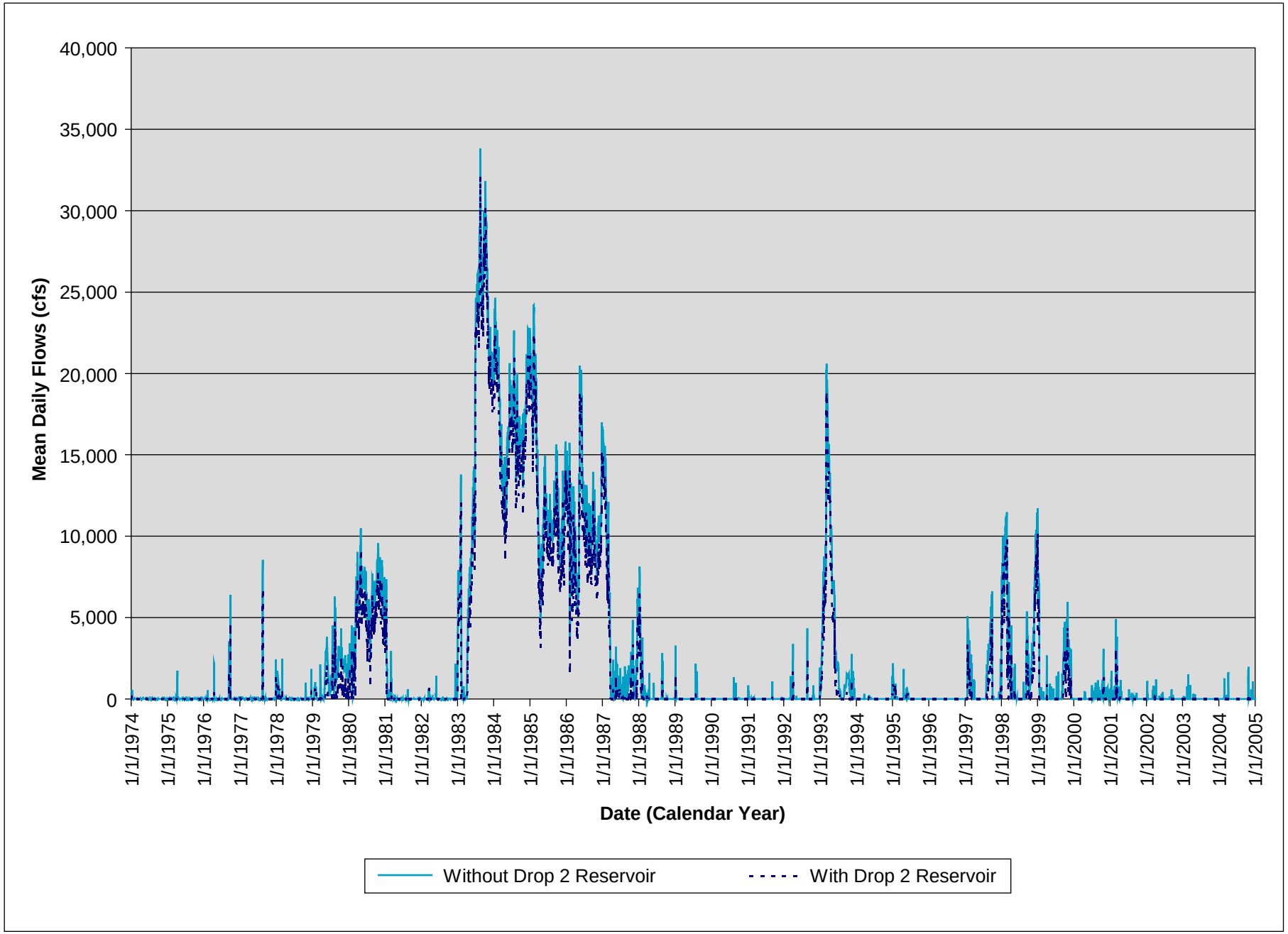


Figure 3.1-5b. Comparison of Non-Storage Flows Passing Morelos Dam With and Without Drop 2 Reservoir – Including Flood Flows (1974-2004)

The anticipated decreases in groundwater are maximums and averages over time due only to the reduced flows below Morelos Dam resulting from operation of the reservoir. Groundwater levels would still rise and fall in the area due to variations in other aquifer stresses, such as variations in pumping or irrigation recharge. The analysis may be considered a 'worst case' analysis because it excluded high-flow years. During and immediately following high flow years, groundwater levels in the Limitrophe would generally be higher (both with and without the reservoir in operation) compared to levels in non-high flow years. Thus impacts to groundwater levels should be more severe when high-flow years are excluded.

The anticipated changes in groundwater elevation would not lead to a conflict with delivery obligations or substantially alter the existing drainage pattern of the site. The change in groundwater elevation does not represent a significant impact to groundwater supplies. However, the change in groundwater elevation could affect biological resources and this potential impact is evaluated in section 3.2.

3.1.2.3.5 Water Quality

Short Term - Temporary Impacts During the construction period, the Proposed Action could have potentially significant impacts to water quality due to the potential for erosion during construction of a diversion barrier in the AAC and connection of the inlet canal to the Coachella Canal turnout. These impacts could result from the erosion of graded areas during periods of wind, rain, or other unfavorable conditions. To avoid or minimize such effects, grading, construction, and desilting operations would be completed in accordance with the provisions of the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit No. 99-08-DWQ), for discharges of storm water during construction. The Construction General Permit requires the development and implementation of a SWPPP, which includes BMPs for erosion control, such as construction of sediment traps (e.g., hay bales, silt fences, straw wattles) and temporary desilting basins. A SWPPP shall be prepared and BMPs shall be implemented as part of the Project and therefore, erosion related impacts would not be significant.

Long Term Impacts Periodic maintenance and silt removal would be expected to occur during the long term operation of the canals and Drop 2 Storage Reservoir facility. Annual regrading and shaping of the embankments would be necessary to maintain the system. No more than once every two years, silt deposits would be removed from the reservoir cells and placed onsite. Due to the infrequent and minor nature of these activities, and because activities would be completed in accordance with provisions of the General Permit for Discharges of Storm Water Associated with Construction Activity, impacts on water quality would not be significant.

The Proposed Action may also result in changes to salinity in water delivered to the AAC and to water delivered to Mexico. Under the Proposed Action, water entering the Drop 2 Reservoir will have similar salinity as flows arriving at Imperial Dam. It is expected that water will be held in the reservoir for only a few days, during which time deterioration in water quality would be minimal at an estimated increase of 2 to 10 ppm in salinity (personal communication, D. Young, 2006). Average flow weighted salinity at Imperial Dam for the period 1990 to 2004 varied from 655 to 803 mg/L, the numeric salinity criteria for this part of the river is 879 mg/L (Department of Interior 2003, Colorado River Basin Salinity Control Forum 2005). An increase of 2 to 10

ppm would not cause the water to exceed the numeric standard of 879 mg/L. The US Environmental Protection Agency (EPA) primary drinking water standard (the standard set to protect human health) for salinity is 1,000 mg/L, with a secondary standard of 500 mg/L1. Water entering the Drop 2 Reservoir would already exceed the guidelines for taste and odor. The operation of the Drop 2 Reservoir would not cause salinity to exceed the primary drinking water standard.

The Proposed Action will result in fewer over-deliveries from Imperial Dam to Mexico, thereby increasing the percentage of delivery to Mexico coming from drainage return flows entering the river below Imperial Dam. Because drainage return flows are typically more saline than water released from Imperial Dam, this change in the composition of water could result in an increase in the salinity of water delivered to Mexico. Reclamation will comply with Minute 242 of the US-Mexican Water Treaty of 1944 and the requirements of the Salinity Control Act to meet water quality requirements at the NIB. Given these requirements, salinity control measures will be reviewed and implemented as necessary to meet established standards. The potentially greater, albeit minor, salinity levels anticipated under the Proposed Action may cause salinity control measures to be implemented on a different schedule than would be necessary without the Project.

3.1.2.3.6 Compensation Measures Reclamation is committed under the Proposed Action to ensure an uninterrupted water supply to CVWD and IID during construction. Reclamation will design, construct and operate in a manner that will not restrict water orders or operations by CVWD or IID. Prior to Project Contract Award, an individual shall be designated by the Contractor as the Hydraulic Coordinator (HC). During construction, the HC shall have the responsibility to ensure uninterrupted water supply to CVWD and IID.

3.1.2.4 No-Action Alternative

Under the No-Action Alternative, a storage reservoir and associated inlet and outlet canals would not be constructed or operated. This alternative would, therefore, not provide additional capacity to maximize beneficial use of the Colorado River. The No-Action Alternative would not allow Reclamation to benefit from increased operational flexibility in the Lower Colorado River System. The No-Action Alternative would result in no change to water management, flow, water quality, or groundwater.

[1] Primary Drinking Water Standards are set to protect human health. Primary Drinking Water Standards are enforceable standards. Secondary standards are set as a guidelines for odor, taste, and aesthetic purposes.

3.2 Biological Resources

3.2.1 Affected Environment

The description of biological resources present at the Project site (see Figure 2-1) is based on site visits conducted by SAIC biologists in September 2004, April 2005, and July 2005, coupled with environmental information from existing documents and contacts with BLM, US Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG) staff, as indicated below. Vegetation and habitat information were assessed during field visits and with the use of existing air photos. The Final Survey Report for the reservoir site, inlet canal, and outlet canal is contained in Appendix E of this EA.

Indirect effects of operating the Drop 2 Reservoir could include reduced flows to Morelos Dam with resulting reduced flows below Morelos Dam to the Limitrophe reach of the LCR (extending from the NIB to the SIB) (see section 3.1 and Figure 3.1-1). Biological resources that could be affected in the Limitrophe are riparian communities and associated wildlife that are dependent on LCR flows and groundwater. The description of riparian-related resources in the Limitrophe are based on review of existing relevant documents, including information compiled for the LCR MSCP (LCR MSCP 2004), and survey information provided by Reclamation.

3.2.1.1 Vegetation and Wildlife Habitat

3.2.1.1.1 Project Site The Project site consists of the reservoir site, known as the former Brock Ranch, the inlet canal corridor between Brock Ranch and the Coachella Canal, and the outlet canal between Brock Ranch and the AAC. Terrain in the Project area (Figure 2-1) is essentially flat and is characterized by sandy flats punctuated by low hummocks of sand at the bases of shrubs. Low sand ridges with a northwest-southeast orientation alternate with sandy flats. Sandy ground is more prevalent and the dunes are best developed about a mile west of Brock Ranch. Even the most developed dunes are low with generally less than about 10 feet of local relief. Elevations at the site slope vary gradually from east to west, ranging from about 160 feet (49 m) near the east end to about 140 feet (42 m) near the west end of Brock Ranch.

Along the inlet canal corridor, the dominant plant community is creosote bush scrub with creosote bush (*Larrea tridentata*) frequently being the only perennial species evident (see Figure 3.2-1 Habitat Map). This plant community was classified by Holland and Kiel in 1995 and falls within the Lower Colorado River Valley Subdivision of the Sonoran Desert, Creosote bush-White Bursage series (Turner and Brown 1982).

In portions of the Project area, creosote bush is accompanied by plicate coldenia (*Tiquilia plicata*), a low, rounded subshrub. Desert buckwheat (*Eriogonum deserticola*), a large shrub, is present in and among low dunes at scattered locations. Occasional clumps of rush milkweed (*Asclepias subulata*) are present and Mexican-tea (*Ephedra trifurca*) is locally dominant on about an acre of sandy soil near the Coachella Canal and AAC junction. Desert lily (*Hesperocallis undulata*), a showy white flower growing from a deeply-buried bulb (corm), is relatively common in the sandy areas. Spring annuals are present in varying densities between

creosote bushes, being especially prevalent and well-developed in the sandy areas, where sand verbena (*Abronia villosa*), dune primrose (*Oenothera deltoidea*), and Spanish needle (*Palafoxia arida* var. *arida*) were prevalent. A list of plant species observed in native habitats during the September 2004 and April 2005 surveys is provided in Table 3.2-1.

Table 3.2-1. Plant Species Observed in Native Habitats During the September 2004 and April 2005 Surveys

Scientific Name	*Common Name*	*Family*	*Habitat*	*Native/ Non-Native*
Abronia villosa	Sand verbena	Nyctaginaceae	Annual herb	Native
Aristida adscensionis	Six-weeks three awn	Poaceae	Annual herb	Native
Aristida purpurea var. *purpurea*	Purple three-awn	Poaceae	Perennial bunchgrass	Native
Asclepias subulata	Rush milkweed; ajamete	Asclepiadaceae	Shrub	Native
Astragalus aridus	Milkvetch	Fabaceae	Annual herb	Native
Atriplex canescens	Fourwing saltbush	Chenopodiaceae	Shrub	Native
Baileya pauciradiata	Desert-marigold	Asteraceae	Annual herb	Native
Brassica tournefortii	Saharan mustard	Brassicaeae	Annual herb	Non-Native
Camissonia claviformis	Brown-eyed primrose	Onagraceae	Annual herb	Native
Cercidium floridum	Blue Palo Verde	Fabaceae	Tree	Native
Chorizanthe rigida	Spiny herb	Polygonaceae	Annual herb	Native
Cryptantha micrantha	Forget-me-not	Boraginaceae	Annual herb	Native
Dalea mollis	Soft dalea	Fabaceae	Annual herb	Native
Dicoria canescens	Desert twinbugs	Asteraceae	Annual herb	Native
Dithyrea californica	Spectacle-pod	Brassicaeae	Annual herb	Native
Ephedra trifurca	Mormon tea	Ephedraceae	Shrub	Native
Eriogonum deserticola	Desert buckwheat	Polygonaceae	Shrub	Native
Eriogonum thomasii	Thomas eriogonum	Polygonaceae	Annual herb	Native
Hesperocallis undulata	Desert lily; Ajo lily	Liliaceae	Perennial herb	Native
Isocoma acradenia var. eremophila	Alkali goldenbush	Asteraceae	Shrub	
Loeseliastrum schottii	Schott's gilia	Polemoniaceae	Annual herb	Native
Larrea tridentate	Creosote bush	Zygophyllaceae	Shrub	Native
Mentzelia sp.	Blazing star	Loasaceae	Annual herb	Native
Oenothera deltoids	Dune primrose, bird-cage primrose, Devil's lantern	Onagraceae	Annual herb	Native
Palafoxia arida var. *arida*	Spanish needle	Asteraceae	Annual herb	Native
Plantago ovata	Desert Plantain	Plantaginaceae	Annual herb	Native
Salsola tragus	Russian thistle	Chenopodiaceae	Annual herb	Non-Native
Schismus arabicus.	Mediterranean grass	Poaceae	Annual herb	Non-Native
Tiquilia plicata	Plicate coldenia	Boraginaceae	Subshrub	Native

Within the creosote bush scrub vegetation, differences in species composition are related to soils. The simplest vegetation is supported by flats with gravelly surfaces, where sandy hummocks form at the bases of the creosote bushes. A generally sparse growth of low-growing annual plants is

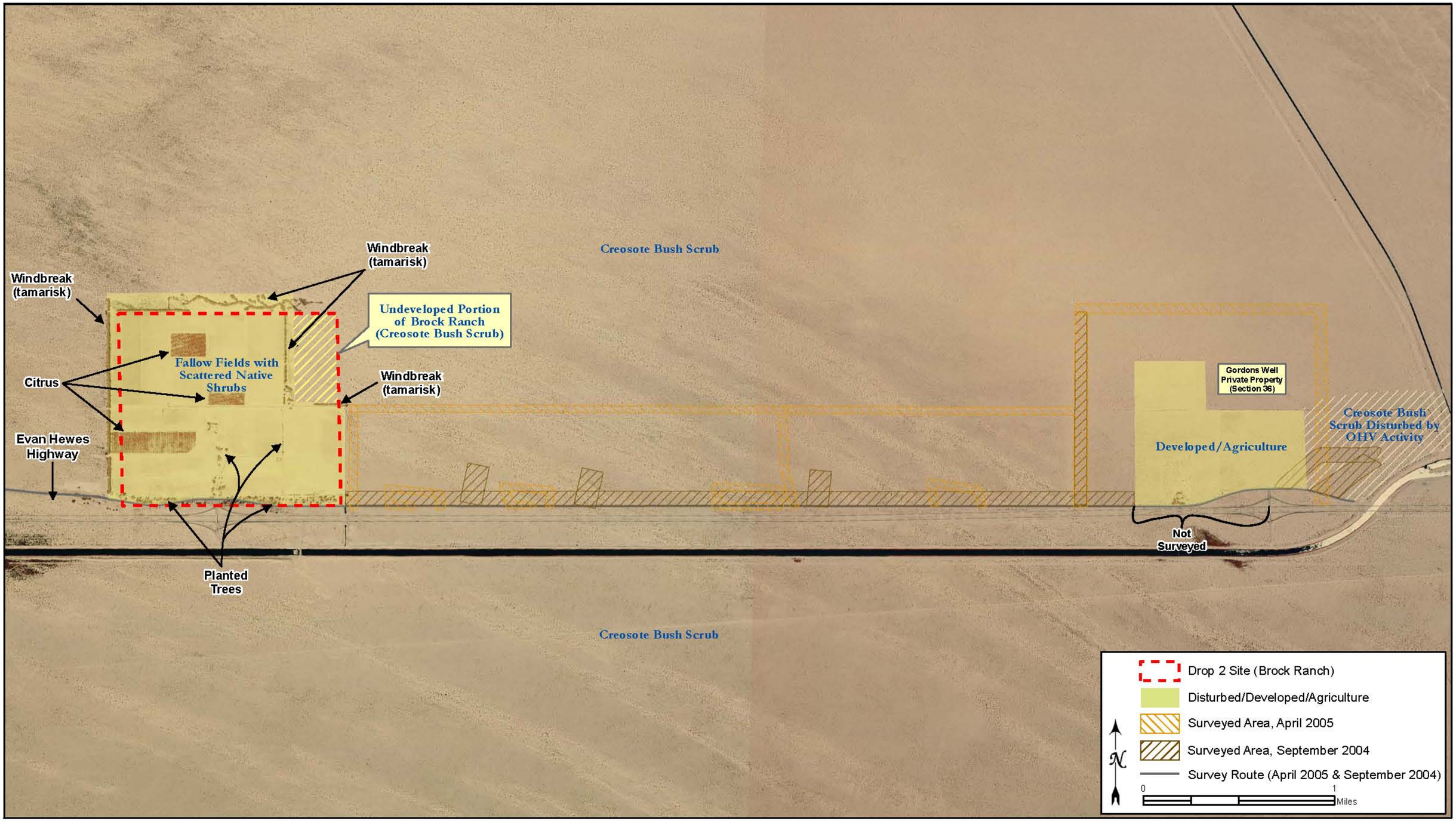


Figure 3.2-1. Habitat Map of the Drop 2 Reservoir Project Site

present, chiefly desert plantain (*Plantago ovata*) and Mediterranean grass (*Schismus arabicus*), a non-native species. Where the entire surface is wind blown sand, the flora is typically richer and includes a denser growth of larger annual plant species. On the sandiest soils, spaces between shrubs are vegetated with a relatively dense growth of annuals that included dune primrose, sand verbena, and Spanish needle. The few perennial species other than creosote bush identified in the Project area were mainly on sandy soils. These included plicate coldenia, desert lily, alkali goldenbush, Mormon tea, and desert buckwheat. White bur-sage (*Ambrosia dumosa*), which is co-dominant with creosote bush over large areas of the Mojave and Sonoran Deserts, was infrequent in the Project area. Four-wing saltbush (*Atriplex canescens*), a widespread desert species, was present in creosote bush scrub habitats near Brock Ranch, where it had likely become established on old fields and dispersed into the native vegetation around the site.

Portions of the reservoir area and inlet canal corridor are composed of disturbed or degraded habitat (Figure 3.2-1 Habitat Map). Disturbances in the area are associated the Evan Hewes Highway and I-8. Both of these roadways run parallel to the inlet canal corridor and have resulted in off-road vehicle use and man-made debris in their vicinity.

The creosote bush scrub community is continuous throughout the surveyed area along the inlet canal corridor except for the former Brock Ranch and the developed portions of Section 36 associated with private property known as Gordon's Well. Portions of Gordon's Well have been developed for a home site, bar, recreational vehicle parking and cultivation of perennial crops, such as jojoba (*Simmondsia chinensis*).

The Drop 2 Reservoir site (Brock Ranch) is located on a section of formerly cultivated land. This land was leveled and was used for a variety of irrigated agricultural activities beginning in 1947. The land was maintained and irrigated until 1999 when the lease for Brock Ranch was terminated. However, a leak from the AAC resulted in several irrigation ditches within the Project vicinity being filled periodically until January 2005 (Schaefer et al 2005). Subsequent to that date there has been no irrigation at the former Brock Ranch site.

Most of the former Brock Ranch property contains fallow, previously cultivated fields in various stages of re-colonization by native and non-native plants (successional stages). Successional vegetation observed includes weedy annual or short-lived perennial plants, areas with scattered well-developed shrubs, and one area near the center of the property with mature creosote bushes that have evidently become established subsequent to cessation of cultivation on that part of the site. The northeastern corner of the former ranch appears to be relatively undisturbed habitat and is dominated by creosote bush. Three areas on the site previously supported citrus groves, but the orchards have been recently cleared. In addition, a few planted trees (e.g., pistachio [*Pistacia atlantica*]; Brazilian pepper [*Schinus terebinthifolius*]) survive along roads or ditches within the property. The northern, eastern, and western boundaries of the site are mostly lined with dense windbreak plantings of athel (*Tamarix aphylla*), while on the southerly boundary, a variety of tree species (mostly *Eucalyptus* spp. and palms) are planted in a broad strip along the Evan Hewes Highway. These windrows create valuable nesting and roosting habitat for resident and migrating raptors and passerine birds.

Three invasive plant species are well established within the native desert scrub community. Russian-thistle (*Salsola tragus*) is most abundant near the former Brock Ranch property and probably has dispersed into the native community from there as wind-blown tumbleweeds. This

species is less abundant with increasing distance from the former ranch property. Mediterranean grass (*Schismus arabicus*) is abundant and nearly ubiquitous in the Project area, especially on flats where it was co-dominant with desert plantain. Saharan mustard (*Brassica tournefortii*) is widespread but uneven in its abundance, being most abundant near the road.

3.2.1.1.2 Limitrophe The Limitrophe is comprised of three hydrologically distinct reaches. Reach 1 extends from RM 22 at Morelos Dam to RM 16.8, Reach 2 extends from RM 16.8 to RM 5.8, and Reach 3 extends from RM 5.8 to the SIB at RM 0.0 (see Figure 3.2-1). The extent and distribution of riparian communities in the Limitrophe by reach is presented in Table 3.2-2 and Figure 3.2-2, respectively. Riparian communities comprise approximately 6,974 acres of the land cover present in the Limitrophe, 3,638 acres in the US portion. Approximately 77 percent of these communities are dominated by non-native saltcedar.

Table 3.2-2. Extent of Riparian Communities in the US Portion of the Limitrophe Division (acres)

Community[1]	*Limitrophe Reach*[2]			
	REACH 1	REACH 2	REACH 3	TOTAL
Arrowweed	24	4	5	33
Atriplex	25	9	4	38
Cottonwood-Willow-I	0	9	5	14
Cottonwood-Willow-II	<1	14	23	38
Cottonwood-Willow-III	32	98	82	212
Cottonwood-Willow-IV	77	51	37	165
Cottonwood-Willow-V	17	4	6	27
Subtotal	*176*	*189*	*162*	*527*
Marsh	<1	22	27	50
Saltcedar	125	2,150	721	2,996
Saltcedar-screwbean mesquite	40	25	0	65
Total	**341**	**2,386**	**910**	**3,638**

Source: Bureau of Reclamation, July-September 2005 surveys.

Notes:

[1] Community definitions:

Arrowweed community. Community in which Arrowweed (*Tesaria sericea*) constitutes 90 to 100% of total shrubs in area.

Atriplex Community. Area where Atriplex species (*Atriplex lentiformis, A. canescens*, and/or *A. polycarpa*) constitute 90 to 100% of total vegetation.

Cottonwood-willow community. Community in which Godding's willow (*Salix gooddingii*) and Fremont's cottonwood (*Populus fremontii*) (the latter in extremely low densities) constitute at least 10% of total trees.

- Structure Type I. Mature stand with distinctive overstory greater than 15 ft high, intermediate class from 2-15 ft tall, and understory from 0-2 ft tall.
- Structure Type II. Stand where the overstory (>15 ft) constitutes greater than 50% of trees, with little or no intermediate class present.
- Structure Type III. Stand where largest proportion of trees are 10-20 ft high with few trees >20 ft or <5 ft.
- Structure Type IV. Few trees >15 ft present; 50% of vegetation is 5-15 ft tall with the other 50% between 0 and 2 ft tall.
- Structure Type V. Sixty to 70 % of vegetation present between 0 to 2 ft tall with the remainder in the 5-15 ft class.
- Structure Type VI. Seventy Five to 100% of vegetation from 0 to 2 ft high.

Marsh community. Area predominated by cattail/bulrush (*Typha/Scirpus*) and common reed (*Phragmites australis*).

Saltcedar community. Community in which Saltcedar (*Tamarix chinensis*) constitutes 80 to 100% of total trees.

Saltcedar-screwbean mesquite community. Community where screwbean (*Prosopis pubescens*) constitutes at least 20% of total trees.

[2] Values are for the US portion of the Limitrophe.

Reach 1 = Extends from RM 22 (Morelos Dam) to RM 16.8

Reach 2 = Extends from RM 16.8 to RM 5.8

Reach 3 = Extends from RM 5.8 to RM 0.0 (SIB)

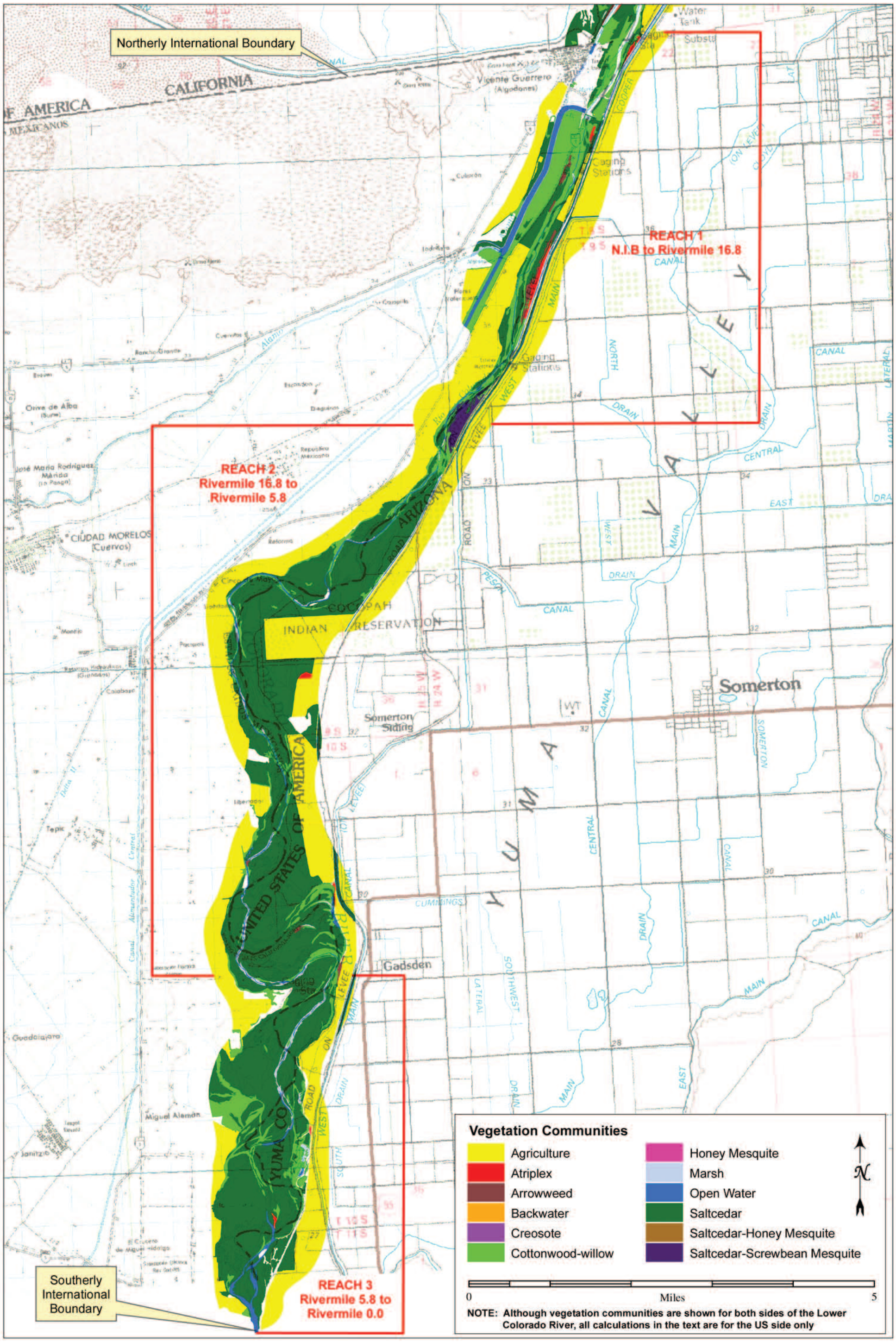


Figure 3.2-2. Distribution of Riparian Communities by Limitrophe Reach

3.2.1.2 Common Wildlife Species

3.2.1.2.1 Project Site In general, disturbed agricultural fields offer fewer resources to most wildlife than native habitats. Although water is a critical feature for most wildlife expected in the area, the former Brock Ranch no longer provides water in irrigation ditches. The planted trees in orchards and windrows on the property provide important shade, cover, foraging habitat, roosting sites and nesting habitat for several wildlife species in the area. In general, the disturbed habitat within the Project site does not present any obstacles to wildlife moving through the area. Sign of several medium and large size mammals (i.e. coyote, mule deer, and black-tailed jackrabbit) were observed throughout the Project site.

Most of the wildlife habitat along the inlet canal corridor and outlet canal consist of a combination of creosote scrub and disturbed habitats. The habitat closest to paved roads and off-road activities have less vegetation and therefore provides less resources (i.e., cover, forage, and den sites) for wildlife species. Several portions of the inlet canal corridor have healthy stands of creosote dune scrub vegetation and are contiguous with other large areas of relatively undisturbed habitats. These areas would support several typical desert wildlife species.

Lizards observed during wildlife surveys of the Project site included desert iguana (*Dipsosaurus dorsalis*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), long-tailed brush lizard (*Urosaurus graciosus*) and flat-tailed horned lizard (*Phrynosoma mcallii).* The latter species is discussed further under sensitive species (section 3.2.1.4). Colorado Desert fringe-toed lizard (*Uma notata*), a sand dune specialist, was not observed but could occur on the sandiest portions of the Project area. It is discussed below under sensitive species (section 3.2.1.4). Because the Project area lacks cacti, yuccas, large woody plants and large rocks, several widespread desert lizards were not observed or expected from the Project area. These include desert night lizard (*Xantusia vigilis*), desert spiny lizard (*Sceloporus magister*), and collared lizard (*Crotaphytus collaris*). Banded gecko (*Coleonyx variegatus*), side-blotched lizard (*Uta stansburiana*), and leopard lizard (*Gambelia wislizenii*) were not observed during surveys but are expected at the site based on habitat conditions.

Apart from the diagnostic tracks of sidewinder rattlesnake (*Crotalus cerastes*), no snakes were directly observed during the surveys. Other snakes that would be expected include mostly nocturnal species such as glossy snake (*Arizona elegans*), spotted night snake (*Hypsiglena torquata*), spotted leaf-nosed snake (*Phyllorhynchus decurtatus*) and Colorado Desert shovelnose snake (*Chionactis occipitalis*). Sonoran gopher snake (*Pituophis melanoleucus affinis*) and California kingsnake (*Lampropeltis getulus*) would be possible, especially on the former Brock Ranch site. Coachwhip (*Masticophis flagellum*) and western patch-nosed snake (*Salvadora hexalepis*), both diurnal species, and western diamondback rattlesnake (*Crotalus atrox*), which may be active day or night depending on conditions, also may be present.

Bird species identified during field surveys of the Project site in September 2004 and April 2005 include greater roadrunner (*Geococcyx californianus*), loggerhead shrike (*Lanius ludovicianus*), black phoebe (*Sayornis nigricans*), common nighthawk (*Chordeiles minor*), red tail hawk (*Buteo jamaicensis*), barn swallows (*Hirundo pyrrhonota*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), rock dove (*Columba livia*), western kingbird (*Tyrannus verticalis*), killdeer (*Charadrius vociferus*), and Gambel's quail

(*Callipepla gambelii*). At least two raptor nests were observed during field surveys in the windrows of Brock Ranch. Windrows create important nesting and roosting habitat for raptors in the area, including red tailed hawk, American kestrel, barn owls, and loggerhead shrike. In addition, several dozen mourning dove nests were observed in various locations in the citrus groves.

Mammals known to occur in or associate with creosote bush scrub in the Project region include desert kangaroo rat (*Dipodomys deserti*), Merriam's kangaroo rat (*Dipodomys merriami*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), round-tailed ground squirrel (*Spermophilus tereticaudus*), Audubon cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus)*, gray fox (*Urocyon cinereoargenteus*), mule deer (*Odocoileus hemionus*), and coyote (*Canis latrans*). Numerous small mammal burrows, many of which were likely kangaroo-rat burrow complexes, were observed in the least disturbed areas of the inlet canal corridor.

3.2.1.2.2 Limitrophe Woody riparian vegetation in the Limitrophe provides habitat for common mammals such as coyote, bobcat (*Felis rufus*), Audubon cottontail, several species of rodents and bats, muskrat (*Ondatra zibheticus*), beaver (*Castor canadensis*), and raccoon (*Procyon lotor*) (Huerta et. al. 2003). Common birds associated with riparian habitats include mourning dove, ash-throated flycatcher, Crissal thrasher, Bullock's oriole, brown-headed cowbird, Abert's towhee, and verdin. Reptiles and amphibians known to occur include Woodhouse's toad (*Bufo woodhousii*), bullfrog (*Rana catesbeiana*), the non-native spiny softshell (*Trionyx spiniferus*), tree lizard (*Urosaurus ornatus*), and bullsnake (*Pituophis catenifer sayi*) (Huerta et. al. 2003). The LCR also serves as a migration corridor for numerous neo-tropical migrant birds and riparian vegetation present in the Limitrophe provides stopover habitat for these species during migration.

3.2.1.3 Aquatic Habitats and Biota

3.2.1.3.1 Project Site Natural wetlands are not present in the proximity of the proposed Project site. Along the eastern border of the former Brock Ranch, a shallow irrigation canal is present that supports aquatic vegetation at various times throughout the year. This canal along with irrigation ditches on the Brock Ranch are expected to dry up with the cessation of irrigation at Brock Ranch. No water was observed to be present at the time of the April 2005 surveys.

3.2.1.3.2 Limitrophe Aquatic habitats within the Limitrophe are supplied by surface water present in the LCR channel and in backwaters maintained by subsurface LCR flow. Approximately 205 acres of open water were present in the Limitrophe at the time of surveys (July-August) in 2005. These open water areas and associated emergent vegetation provide habitat for a variety of waterfowl, wading birds (e.g., herons), water birds (e.g., grebes), and shorebirds. Huerta et. al. (2003) recorded 13 species of water-associated bird species using aquatic habitats of the Limitrophe in 2003. Permanent fish habitats are limited to the upstream portions of the Limitrophe that maintain surface water throughout the year. Fish present in the Limitrophe are primarily introduced species (e.g., catfish and other sport fishes). Historically, the Colorado River, downstream of the Imperial Dam area, was inhabited by the following four native species that are marine or brackish water species: spotted sleeper (*Eleotris picta*), machete (*Elops affinis*), longjaw mudsucker (*Gillichthys mirabilis*), and striped mullet (*Mugil cephalus*) (LCR MSCP 2004). No sensitive fish species are known to occur in this reach of the LCR.

3.2.1.4 Sensitive Species

3.2.1.4.1 Project Site

Sensitive Plants No federally or state-listed rare, threatened or endangered plant species are known to occur within the Project site (BLM 2003). However, three Federal or State listed plant species are known to occur in the Project vicinity at Algodones Dunes, which are located east of the Coachella Canal, and the proposed Project facilities. Because some potential habitat for these listed psammophytic (sand dune specialist) species was found at the Project site each was provided additional focus in the field surveys and each is addressed in greater detail in the discussion below. In addition, other sensitive plant species on the California Native Plant Society's (CNPS) List of Rare and Endangered Vascular Plants of California (2001) with potential to occur in the Project vicinity were the focus of field surveys and are discussed in Table 3.2-3.

Table 3.2–3. Sensitive Plant Species that are Known or Have the Potential to Occur in the Vicinity of the Project Area

Species	*Status Fed/State/ CNPS*	*Notes/Occurrence*
Astragalus crotalariae Salton milk–vetch	–/–/List 2	This is a perennial herb that flowers January to April. It occurs in Sonoran desert scrub with sandy or gravelly soil, elevation range 60 to 250 meters (197 to 820 feet) (CNPS 2001). This species was not observed during fall surveys, but occurrence is possible in the proposed Project construction area.
Astragalus insularis var. harwoodii Harwood's milk–vetch	–/–/List 2	This is an annual herb that flowers January to May. It occurs in sandy or gravelly soil within desert dunes, elevation 0 to 300 meters (0 to 984 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed Project construction area.
Astragalus magdalenae personii Peirson's milk–vetch	FT/CE/List 1B	This is a perennial herb that flowers December to April. It occurs in desert dunes, elevation range 55 to 250 meters (180 to 820 feet), usually in steep dune terrain, and is known in less than twenty occurrences in California (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed Project construction area based on its absence during the surveys and lack of well–developed dune habitat and the lack of a psammophyte plant community.
Ayenia compacta Ayenia	–/–/List 2	This is a perennial herb that blooms March to April. It occurs in Sonoran and Mojavean desert scrub with rocky soil, elevation 150 to 1095 meters (492 to 3,592 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed Project construction area.
Calliandra eriophylla Fairyduster	–/–/ List 2	This species is a deciduous shrub that blooms from January to March. It occurs on sandy to rocky soil in Sonoran desert scrub, elevation 120 to 1,500 meters (394 to 4,921 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed Project construction area.
Croton wigginsii Wiggins's croton	–/CR/List 2	This is a shrub that flowers March to May. It occurs on desert dunes with Sonoran desert scrub, elevation range 50 to 100 meters (164 to 328 feet) (CNPS 2001). This species, found in the Algodones Dunes, was not observed during surveys, and it is not expected to occur in the proposed Project construction area.

Table 3.2–3. Sensitive Plant Species that are Known or Have the Potential to Occur in the Vicinity of the Project Area (continued)

Species	*Status Fed/State/ CNPS*	*Notes/Occurrence*
Ditaxis clariana Glandular ditaxis	–/–/List 2	This is a perennial herb that blooms in October to March. It occurs on sandy soil in Sonoran desert scrub and Mojavean desert scrub, elevation 0 to 465 meters (0 to 1,525 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed Project construction area, based on its absence during the surveys.
Helianthus niveus ssp. tephrodes Algodones Dunes sunflower	–/CE/List 1B	This is a perennial herb that flowers from September to May. It occurs in desert dunes, elevation 50 to 100 meters (164 to 328 feet) and is threatened by vehicles (CNPS 2001). CNDDB records occurrence of this species in the South Algodones Dunes approximately 5 miles (8 km) from the junction of the All-American and Coachella canals. This species was not observed during surveys, and is not expected to occur within the proposed Project construction area based on its absence during surveys and lack of well-developed dune habitat.
Lyrocarpa coulteri Coulter's lyrepod	–/–/List 4	This is a perennial herb that flowers December to April. It occurs in Sonoran desert scrub with rocky or gravelly soil, elevation range 120 to 795 meters (394 to 2,608 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed Project construction area because of the sandy soils in the area.
Nemacaulis denudate var. gracilis Slender woolly–heads	–/–/List 2	This species in an annual herb that blooms March to May. It occurs in coastal dunes, desert dunes, and Sonoran desert scrub, elevation 50 to 400 meters (164 to 1,312 feet) (CNPS 2001). This species is threatened by urbanization of the Palm Springs area and along the coast (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed Project construction area based on its absence during the surveys.
Palafoxia arida var. gigantea Giant Spanish–needle	–/–/List 1B/ BLMS	This is an annual/perennial herb that blooms February to May. It occurs in desert dunes, elevation 15 to 100 meters (49 to 328 feet) and is threatened by vehicles (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed Project construction area. Its relative *Palafoxia arida* var. *arida* was relatively frequent within the survey area in creosotebush scrub habitat.
Pholisma sonorae Sandfood (ammobroma)	–/–/List 1B	This is a parasitic, perennial herb that blooms April to June. It occurs in desert dunes, elevation 0 to 200 meters (0 to 656 feet) (CNPS 2001). This species is threatened by vehicles and military activities. It is parasitic on *Eriogonum*, *Tiquilia*, *Ambrosia*, and *Pluchea* spp. (CNPS 2001). This species was not observed during surveys; however *Eriogonum deserticola* and *Tiquilia plicata* are present in the Project vicinity so there is potential for this species to occur in the proposed Project construction area. The species has been observed about 20 miles NNW of the Project area in the Algodones Dunes, near Cahuilla Ranger Station.
Pilostyles thurberii Thurber's pilostyles	–/–/List 4	This is a parasitic, perennial herb that blooms in January. It occurs in Sonoran desert scrub, elevation 0 to 365 meters (0 to 1,197 feet) (CNPS 2001). This species grows inside the stems of *Psorothamnus* species, especially *P. emoryi*, and it flowers on the stems of its host (CNPS 2001). This species was not observed during surveys, and it is not expected to occur on the Project property. It is not expected in the proposed Project construction area given the absence of its host plant.

Table 3.2–3. Sensitive Plant Species that are Known or Have the Potential to Occur in the Vicinity of the Project Area (continued)

Sources: CDFG (2005); CNPS (2001); Hickman (1993); CNDDB (2003).

Status:

Federal Status (determined by US Fish and Wildlife Service):

FE	Federally Listed Endangered
FT	Federally Listed Threatened

State Status (determined by California Department of Fish and Game):

CE	California State Listed Endangered
CR	California State Listed Rare

California Native Plant Society (CNPS) List:

1B	Plants considered rare or endangered in California and elsewhere.
2	Rare and endangered in California but more common elsewhere
4	Plants of limited distribution – a watch list.

Bureau of Land Management (BLM):

BLMS	BLM Sensitive Species

Peirson's milk-vetch (Astragalus magdalenae *var*. peirsonii) Peirson's milk-vetch was federally-listed as threatened on October 6, 1998 for the species' entire range, and state-listed as endangered in November 1979. It is included in the CNPS List 1B, rare and endangered in California and elsewhere. It is an annual or short-lived perennial member of the pea family (*Fabaceae*).

This species' historical distribution includes Imperial and San Diego Counties, California. However, it is currently considered extirpated from San Diego County and known only in Imperial County where it occurs as essentially one population of scattered colonies within the Algodones Dunes in the Sonoran Desert. Peirson's milk-vetch also occurs in nearby sand dune habitats in Baja California Norte and Sonora, Mexico (CDFG 2000a). The distribution and relative abundance of the plant vary over place and time (Phillips and Kennedy 2002). The plants tend to be found in patches, possibly due to the localized dispersal of the seeds and fruits, dune morphology and differences in local rainfall patterns. It is threatened by off-highway vehicle (OHV) use (CNDDB 2003).

The USFWS designated critical habitat for *Astragalus magdalenae var. peirsonii* on August 4, 2004 which totaled 21,836 acres in Imperial County, California (USFWS 2004). Habitat consists of intact, active sand dune systems characterized by fine sands of sufficient depth, wind-formed slopes of less than 30 degrees, and an associated psammophytic scrub plant community.

Peirson's milk-vetch is found in sand dunes within desert psammophytic (sand-loving) scrub community. The psammophytic plant community is typically found in depressions between active and semi-stabilized dunes. Typically, Peirson's milk-vetch inhabits slopes and hollows in mobile dunes and on the downwind slopes of dunes, sheltered from the prevailing winds, where the fruits and seeds tend to accumulate. Common species of the psammophytic scrub habitat type include Mormon tea (*Ephedra* spp.), desert buckwheat (*Eriogonum deserticola*), desert dicoria (*Dicoria canescens*), common sandpaper plant (*Petalonyx thurberi*), desert panicum (*Panicum urvilleanum*), and plicate coldenia (*Tiquilia plicata*). Additionally, birdcage evening primrose (*Oenothera deltoides*) and desert lily (*Hesperocallis undulata*) may occur in the relatively stable dunes that form a transitional zone with the creosote bush scrub habitat (BLM

2003). Most of the psammophytic plant species listed above were found within the creosote bush scrub community on sandy soils within the Project area, as described below. However these did not form a discrete community. Of the species listed above, plicate coldenia, birdcage evening primrose, and desert lily were relatively abundant and widespread on sandy soils within the creosote bush scrub community. Individuals of desert buckwheat and desert dicoria were found at widely scattered individuals within the creosote bush scrub and Mormon tea was found only in one area where it occurred as a dense, monotypic stand, roughly one acre in extent, between the Gordon's Well area and the Coachella Canal.

The botanical team visited a known location of Peirson's milk-vetch in the Algodones Dunes to verify its condition and appearance at the time of the survey. This reference site is located about 20 air miles north northwest of the Drop 2 site. The reference population of Peirson's milk-vetch observed by the survey team was located near the Osborne Overlook, off of State Highway 78 about 3.8 miles west of Glamis.

This species was not observed during the field surveys of the Project site (Reclamation 2005). Given the homogeneity of the vegetation, the physical characteristics of the habitat, the seasonal timing of the Project site surveys (typically appropriate to observe this species), the growth stage of this species at the time of the surveys as viewed at a location in the Algodones Dunes and the excellent conditions for plant growth in the survey year, it highly unlikely that Peirson's milk-vetch is present anywhere within the surveyed area. In addition, potential Project construction areas lack well-developed dune systems and well-developed psammophytic scrub. The only species of milk-vetch identified on the Project site (*Astragalus aridus*) is a small, relatively common annual species that is easily distinguishable at a distance from Peirson's milk-vetch. Individuals of several of the plant species typically found in psammophytic scrub communities were found during our field surveys but mostly as isolated individuals within creosote bush scrub rather than as a community.

Wiggins's croton (Croton wigginsii) Wiggins's croton was California State listed as rare in 1982 and no federal status has been established. It is included on CNPS list 2 (Rare and endangered in California, but more common elsewhere). Wiggins's croton is a perennial shrub with silver-haired, branching stems. It is a member of the spurge family (*Euphorbiaceae*). Male and female flowers are produced on separate plants. This species grows mainly along the west side of the Algodones Dunes in southern California and the population extends to similar sites in Baja California Norte and Sonora, Mexico (CDFG 2000b). Preferred habitat includes desert dunes within Sonoran desert scrub communities.

Just over twelve occurrences of Wiggins's croton have been recorded within the Algodones Dunes system. This species is threatened primarily by OHV activities. This species was not observed during field surveys and is not expected to occur on the Project site.

Algodones Dunes sunflower (Helianthus niveus *ssp*. tephrodes) The Algodones Dunes sunflower was California State listed as endangered in 1979 and no federal listing has been given. It is included in the CNPS List 1B, rare and endangered in California and elsewhere. This species has silvery-white hairy leaves and stems and is a semi-shrubby perennial in the sunflower family (*Asteraceae*). It has a woody base and large leaves. The inflorescence exhibits bright yellow rays surrounding reddish-purple centered flowers. The distribution of this species is limited to

unstabilized sand dunes in the Algodones Dunes system of Imperial County, where they are threatened by OHV activity (CDFG 2000c), and dunes in Arizona and Sonora, Mexico. This species was not observed during field surveys and is not expected to occur on the Project site.

Other Sensitive Plants Spanish needle (*Palafoxia arida* var. *arida*), a widespread species that was abundant on the site, was carefully examined and determined not to be Giant Spanish needle (*Palafoxia arida* ssp. *gigantea*), a species included on the California Native Plant Society List 1B (Rare and Endangered in California and Elsewhere) and known from the Algodones Dunes, where it occurs in a specialized psammophytic plant community. The key characters distinguishing Giant Spanish needle from the widespread variety are height, stem diameter, and size of the flowering heads (BLM 2003). Giant Spanish needle can grow to a height of three to six feet and is known to occur within the Algodones Dunes; where as the common Spanish needle reaches a maximum height of two feet and is known throughout the Sonoran and Mojave deserts. The plants observed on site were consistently smaller than var. *gigantea* and fell within the range of var. *arida* in all respects (BLM 2003).

Sensitive Wildlife

*Flat-tailed Horned Lizard (*Phrynosoma mcallii*)* The FTHL was proposed for federally-listed threatened status on November 29, 1993. This proposed listing was later withdrawn in 1996 after the signing of a Conservation Agreement to implement the Rangewide Management Strategy for the protection of the species. A second proposal to list the FTHL as threatened status was published on December 26, 2001 and then withdrawn on January 3, 2003 when the USWFS determined that the threats "are not as significant as earlier believed" (USFWS 2003b). The proposed listing was then reinstated by court order on August 30, 2005 (Tucson Herpetological Society 2005), but on June 28, 2006 the USFWS reaffirmed its previous decision not to list the FTHL under the Endangered Species Act (USFWS 2006). This species is considered a Species of Special Concern in California by the California Department of Fish and Game (CDFG 1994).

The FTHL is distinguishable from other horned lizards by a narrow, dark vertebral stripe running from the head to the base of tail; absence of an external ear opening; and a long, flattened tail (FTHLICC 2003). It has two slender elongated occipital spines protruding from the rear of the head and two rows of fringed scales on sides of its rounded, flattened body (FTHLICC 2003, USFWS 2002).

This species is specialized for sandy habitats and has only been observed on shifting sand substrates with fine, wind-blown particles (CDFG 1994). It is present in several vegetation communities, including habitats dominated by creosote bush, white bur-sage (*Ambrosia dumosa*), and indigobush (*Psorothamnus emoryi*) (CDFG 1994). These densely branching and low growing plants provide the flat-tailed horned lizard with refuge from predators and heat. Sand and organic matter accumulate at the base of these plants and act to stabilize the moving sand dunes. The primary food source for the flat-tailed horned lizard is harvester ants (*Messor* and *Pogonomyrmex*). These ants compose 97 percent of its diet; a higher percentage of ants than in the diets of other horned lizard species (FTHLICC 2003).

The FTHL is endemic to the Sonoran Desert and has the most restricted range of all the horned lizard species (FTHLICC 2003, USFWS 2002). This species is limited to the desert areas of

southern California, southwestern Arizona, and northwestern Sonora and northeastern Baja California Norte, Mexico (USFWS 2002). An estimated 51.2 percent of the historic range remains within the US (USFWS 2002). Urban and agricultural development, off-highway vehicle use, utilities, sand and gravel mining, and military activities are responsible for the loss in habitat for this species and pose major threats to its survival (FTHLICC 2003).

The Flat-Tailed Horned Lizard Rangewide Management Strategy established five MAs for the protection of the species and provided guidance for management and conservation of the habitat. Four of the MAs are located in California (Borrego Badlands MA, West Mesa MA, Yuha Desert MA and East Mesa MA) and one is located in Arizona (Yuma Desert MA). The Flat-Tailed Horned Lizard Rangewide Management Strategy is described further in section 3.2.2.2.

The Drop 2 Reservoir Project area lies near the southern boundary of the East Mesa MA; the inlet canal corridor is near the perimeter and within the MA. The East Mesa MA is bordered on the southern and eastern sides by the Evan Hewes Highway and the Coachella Canal, respectively. The MA excludes the property of Brock Ranch (three quarters of Section 32 and a quarter of Section 31) and some private property in Gordon's Well (lower half of Section 36). See Figure 2-1.

During the April 2005 field survey, one individual FTHL was located north of the Evan Hewes Highway between Brock Ranch and the Coachella Canal (Reclamation 2005). In addition, flat-tailed horned lizard sign (i.e. scat) was observed at several locations within the same general area during September 2004. Outside of the formerly cultivated Brock Ranch site, habitat conditions were judged to be suitable for FTHL and horned lizard scat was found at 5 locations (see Appendix E for a detailed figure). Active anthills with harvester ants (*Pogonomyrmex* spp.) were observed in several locations. FTHL has been confirmed as being present in and around the area of the Project site.

*Colorado Desert Fringe-Toed Lizard (*Uma notata*)* This flattened, sand-dwelling lizard is a federal candidate for listing as endangered or threatened, a California species of special concern, and a BLM sensitive species. It is closely associated with fine, loose, wind-blown sand in areas sparsely vegetated by creosote bush scrub or psammophytic scrub. It is known from the Algodones Dunes, including Imperial Sand Dunes Recreation Area, and could possibly occur in the sandiest areas along the inlet canal corridor between Brock Ranch and the Coachella Canal. It was not observed during surveys conducted for this Project.

3.2.1.4.2 Limitrophe

Sensitive Plants No riparian-associated sensitive plants are known from the Limitrophe (Arizona Game and Fish 2006).

Sensitive Wildlife Nine riparian-associated species of sensitive wildlife are known to occur in the Limitrophe. Table 3.2-4 describes the status of each species and the types and extent of riparian communities that may support species habitat in the Limitrophe.

Table 3.2-4. Special-Status Wildlife Species that Occur or Could Occur in the US Portion of Limitrophe

Common and Scientific Name	*Federal Status*[1]	*Arizona Status*[2]	*Riparian Communities that Provide Habitat*[3]	*Acres of Existing Habitat*[4]
Western red bat *Lasiurus blossevillii*	–	ASC	Cottonwood-willow I-II (roosting habitat)[4]	52
Western yellow bat *Lasiurus xanthinus*	–	ASC	Cottonwood-willow I-II (roosting habitat)[4]	52
Spotted Bat *Euderma maculatum*	–	ASC	All riparian communities (foraging habitat) Areas with cliffs nearby for roosting habitat	3,638
California leaf-nosed bat *Macrotus californicus*	–	ASC	All riparian communities (foraging habitat)	3,638
California Black Rail *Laterallus jamaicensis coturniculus*	–	ASC	Marsh[4]	50
Yuma clapper rail *Rallus longirostris yumanensis*	FE	ASC	Marsh[4]	50
Bald eagle *Haliaeetus leucocephalus*	FE	ASC	Cottonwood-willow I-II (roosting habitat)[4] River (foraging habitat)	192
Western least bittern *Ixobrychus exilis hesperis*	–	ASC	Marsh[4]	50
Great egret *Ardea alba*	–	ASC	Marsh[4]	50
Snowy egret *Egretta thula*	–	ASC	Marsh[4]	50
Yellow-billed cuckoo *Coccyzus americanus occidentalis*	FC	ASC	Cottonwood-willow I-III[4]	264
Southwestern willow flycatcher *Empidonax trailii extimus*	FE	ASC	Saltcedar and Cottonwood-willow I-IV that maintain moist surface soil conditions (breeding habitat)	112[5]

[1] Federal Status
FE = Listed as endangered under the Federal Endangered Species Act ESA.
FT = Listed as threatened under ESA.
FC = Candidate for listing under ESA.

[2] Arizona Status
ASC = Arizona wildlife of special concern.

[3] Riparian communities are defined in Table 3.2-2.

[4] Based on extent of riparian communities shown in Table 3.2-2 that provide species habitat.

[5] Based on delineation of occupied habitat reported in McCleod et. al., 2005.

3.2.2 Regulatory Setting

3.2.2.1 Federal Laws, Regulations, and Executive Orders

3.2.2.1.1 Endangered Species Act (16 USC 1531 *et seq*.) The ESA protects federally listed threatened and endangered species. Consultation with the USFWS is required under ESA Section 7 if a listed species (or conferencing for a species proposed for listing) could be adversely affected by a federal action. ESA Section 9 prohibits the taking of a listed species without authorization from the USFWS. USFWS defines "take" to include the harassment, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or the attempt to engage in such conduct. Harm can include habitat modification or degradation that kills or injures wildlife (USFWS 2004).

3.2.2.1.2 Migratory Bird Treaty Act (16 USC 703 et seq.) and Executive Order 13186 The Migratory Bird Treaty Act (MBTA) governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent overuse. The MBTA also prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 Code of Federal Regulations [CFR] 21.11). Executive Order 13186 (effective January 10, 2001), outlines the responsibilities of federal agencies to protect migratory birds, in accordance with the MBTA, the Bald and Golden Eagle Protection Acts, the Fish and Wildlife Coordination Act, ESA, and NEPA.

3.2.2.1.3 Executive Order 13112 – Invasive Species The National Invasive Species Management Plan was developed in 1997 in response to Executive Order 13112. This order established the National Invasive Species Council (Council) as the leaders in development of the plan, and directs the Council to provide leadership and oversight on invasive species issues to ensure that Federal activities are coordinated and effective. In addition, the Council has specific responsibilities including: promoting action at local, state, tribal, and ecosystem levels; identifying recommendations for international cooperation; facilitating a coordinated network to document, evaluate, and monitor invasive species' effects; developing a web-based information network on invasive species; and developing guidance on invasive species for federal agencies. The Council has developed nine plan priorities that provide direction for federal agencies. The plan priorities are as follows:

- Leadership and coordination of state and federal entities
- Prevention (a risk based approach)
- Early detection and rapid response
- Control and management
- Restoration
- International cooperation
- Research
- Information management
- Education and public awareness

3.2.2.2 Flat-Tailed Horned Lizard Rangewide Management Strategy Plan

The Flat-Tailed Horned Lizard Rangewide Management Strategy Plan (Strategy) (FTHLICC 2003) was prepared by representatives from Federal, state, and local governments to provide guidance for the conservation and management of sufficient habitat to maintain extant populations of FTHL in five MAs in perpetuity. Human activities have resulted in the conversion of roughly 49 percent of the historic FTHL habitat to other uses, such as agriculture and urban development. The Strategy limits surface disturbing activities in the MAs. Although land alterations in FTHL habitat outside of the MAs are not limited by the Strategy, compensation measures are applied.

The Strategy is designed to be used as the basis for a conservation agreement among the signatory agencies. Signatory agencies, including Reclamation, are expected to incorporate measures from the Strategy into their land management plans and projects. Reclamation will provide compensation for disturbed FTHL habitat in accordance with the FTHL Rangewide Strategy as described in Section 3.2.2.2.2, below.

3.2.2.2.1 FTHL Compensation The Strategy states,

> "Pursuant to Title 43 Code of Federal Regulations and the Federal Land Policy and Management Act of 1976, federal land management agencies may permit actions that result in FTHL habitat loss on their lands. To mitigate such losses both within and outside MAs, compensation is charged if residual effects would occur after all reasonable on-site compensation has been applied. Signatories may use compensation funds to acquire, protect, or restore FTHL habitat both within and contiguous with MAs (with Management Oversight Group approval). These actions will help ensure the existence of FTHLs and their habitat in the future."

Compensation is required if adverse effects remain after the project proponent has taken all reasonable on-site compensation measures. To evaluate whether it is appropriate to collect compensation, agency biologists must consider whether the impacted area can potentially support FTHLs based on habitat factors favorable to FTHLs (as described in Appendix 6 of the Strategy). If agency biologists determine that the project area can potentially support FTHLs, then compensation shall be required.

3.2.2.2.2 FTHL Compensation Determination Compensation ratios within a FTHL MA are negotiated with the El Centro BLM office in coordination with the Interagency Cooperating Committee/Management Oversight Group, but are based on the compensation ratios described by the applicable management plan. Under the FTHL Rangewide Management Strategy Plan, compensation is based on the acreage of FTHL habitat lost after all reasonable on-site compensation has been applied. Compensation for habitat lost outside a FTHL MA is "charged" at a 1:1 ratio. When impacts are inside a FTHL MA, a multiplying factor ranging from three to six is applied to the affected acreage to obtain an adjusted compensation acreage. This multiplying factor (M) for disturbances inside FTHL MAs is determined by the following formula:

$$\mathbf{M = 3 + A + G + E + D}$$

where the factors are defined as follows:

A Adjacent habitat impacts:

a) Adjacent lands will not be affected 0

b) Adjacent habitat will receive direct or indirect deleterious impacts 0.5

G Growth inducing effects within flat-tailed horned lizard habitat:

a) The project will have no growth inducing effects 0

b) The project will have growth inducing effects 0.5

E Existing disturbance on site:

a) There is moderate to heavy existing habitat disturbance 0

b) There is little or no existing habitat disturbance 1

D Duration of effect:

a) The effects of the project are expected to be short term (< 10 years) 0

b) The effects of the project are expected to be long term (> 10 years) 1

Signatories to the Strategy require project proponents to replace lost FTHL habitat acreage and provide land in some proportion for FTHL habitat otherwise impacted by a project ("adjusted acreage"). However, signatories may convert either the compensation acreage or adjusted acreage to a monetary equivalent (including administrative costs) that is required to replace the acreage or adjusted acreage. The per acre dollar figure for compensation fees shall be based on the cost of acquiring lands prioritized for acquisition by signatory agencies.

3.2.3 Environmental Consequences and Compensation Measures

The analysis of the environmental consequences for vegetation and wildlife is focused on resources protected under laws, regulations, and executive orders described under section 3.2.2.

3.2.3.1 Thresholds of Significance

Biological resources addressed in this section include sensitive species and sensitive species habitat. Factors considered in determining whether the Proposed Action or alternatives would have significant impacts on biological resources included the extent or degree to which its implementation would:

- Adversely affect sensitive species, including those listed or proposed for listing as endangered or threatened under the ESA (16 USC §§ 1531-1544), migratory birds afforded protection by the MBTA (16 USC §§ 703-712) and Executive Order 13186, or other species of concern; and,
- Degrade or destroy sensitive species habitat, as defined by the ESA.

3.2.3.2 Proposed Action

3.2.3.2.1 Construction Impacts Construction of the reservoir, associated canals, and relocation of a portion of the "Un-named County Road" would result in the loss of vegetation and wildlife habitats, including habitat for the FTHL (discussed below). The loss of vegetation and wildlife habitat includes areas proposed for the reservoir, the 6.6-mile inlet canal, and the 2,000-foot outlet canal (a portion of which will be included in a pipeline under I-8). Additional

impacts on vegetation and wildlife habitat are associated with areas that would be cleared for construction equipment and personnel access and staging areas. There are no wetlands within the Project area and therefore the Project would not impact aquatic habitats or biota. There are no rare, threatened or endangered plant species within the Project area and therefore there would be no impacts to sensitive plant species.

A 460-acre portion of the 615-acre Brock Ranch site would be used for the reservoir and the remaining 155 acres would be cleared for access, construction staging areas, and space for future silt deposits removed during normal operation and maintenance activities. For the canals, a 200- to 250-foot wide construction corridor would be needed including 150 feet for the canal, embankments, and roadways with an additional 50 to 100 feet for access and staging areas. Construction impacts are summarized in Table 3.2-5.

Table 3.2-5. Construction Impacts on Vegetation and Wildlife Habitats (acres)

	Total Disturbance
Reservoir (Brock Ranch)	615 Acres
Inlet Canal (6.6 miles)	179 Acres
Relocation of 1.15 Mile Portion Un-Named County Road	3 Acres
Outlet Canal (2,000 feet, crosses I-8)	0 Acres

Areas that would be occupied by Project components including the reservoir and canals represent a long-term (permanent) loss of vegetation and wildlife habitats. Areas that would be cleared for construction represent a long- or short-term loss of resources during the time needed to restore these areas to pre-disturbance conditions.

The 615-acre former Brock Ranch site had been in agricultural development until recently. A large portion of the ranch has been left fallow and native and non-native plants species have become established. In addition, the northeast corner contains 64 acres of relatively undisturbed creosote bush scrub that has not been previously cleared. With the exception of the creosote bush scrub, the current condition of this property has limited value as wildlife habitat although the site does not currently inhibit access to wide-ranging species. Construction activities would result in mortality of some smaller species such as kangaroo rats and reptiles; and construction would prevent larger species from moving through the site. In addition, the loss of planted trees would eliminate potential roost and nesting habitat for several species of birds. The destruction of any active nest could be avoided by scheduling tree removal outside of the nesting season.

Because the habitat within much of the former Brock Ranch property is already relatively disturbed, the loss of the agricultural lands within the Brock Ranch development would not result in a significant adverse effect on vegetation and wildlife habitat. The trees on the outer edges of the Brock Ranch site would be left in place to provide screening for the reservoir.

Construction of the inlet canal would result in a loss of 179 acres of desert scrub habitats in addition to the 64 acres of creosote bush scrub within the former Brock Ranch site and 3 acres for the relocating a portion of the un-named county road. A portion of this disturbance would be considered temporary if these areas were revegetated similar to pre-Project conditions. Although the loss of a total of 246 acres (64 acres on the Brock Ranch and 179 acres along the inlet canal, 3 acres for the

relocation of the un-named county road) is a substantial amount of native habitat, it represents a small amount of desert scrub habitat present in the Project vicinity (hundreds of square miles). In addition, the quality of the habitat at the Project site and its value to wildlife is compromised by the presence of a highway and frontage road adjacent to the habitat and indication that the habitat is periodically disturbed by off-road vehicles. Therefore, the loss of 246 acres of partially degraded desert scrub habitat would be considered an adverse but not significant impact on vegetation and wildlife habitat. This impact could be minimized by implementation of compensation measures that include minimization of temporary disturbances and revegetation of temporary construction corridors and staging areas (see Compensation Measures in section 3.2.3.2.4). Restoration of natural habitats in the construction zone could require several decades to return to fully-functional creosote bush scrub habitat and are therefore considered long-term impacts.

There is the potential for indirect impacts to adjacent habitat originating from areas left bare once construction is complete. Invasive species that become established on temporarily disturbed areas could spread into adjacent undisturbed habitats. Similarly, erosion caused by wind or water could move soil outside the constriction zone and contribute to the degradation of adjacent vegetation and wildlife habitats. The significance of the impact of these indirect effects would depend on the amount of habitat affected. These impacts could be minimized by implementation of compensation measures that include restriction of temporary construction corridors and staging areas coupled with revegetation, or other means to stabilize soils, of areas left bare once construction is complete (see Compensation Measures in section 3.2.3.2.4). Construction activities are likely to result in the mortality or injury of individual flat-tailed horned lizards present in the inlet canal corridor.

The Project would result in permanent disturbances to both suitable FTHL habitat within and outside of the FTHL Management Area. Reclamation has designed the Project to avoid MA impacts to the maximum extent practicable in selecting the inlet canal location (see Appendix B, *Evaluation of Alternative Alignment for the Drop 2 Reservoir Inlet Canal*. Technical Memorandum dated August 9, 2005). Table 3.2-6 lists each of the particular areas affected by the Project accompanied with the acreages for each disturbance area:

Table 3.2-6. FTHL Habitat Acreages Affected by the Proposed Action

Project Feature	*Figure Designation*	*Inside Management Area (acres)*		*Outside Management Area (acres)*	
		DIRECT	INDIRECT	DIRECT	INDIRECT
Inlet Canal within MA	A	134	0	0	0
Inlet Canal outside MA	B	0	0	45	0
FTHL Habitat within Proposed Reservoir Site	C	0	0	64	0
Fragmented portion of MA in Sections 31 and 36	D and E	0	469	0	0
FTHL Habitat between Evan Hewes Hwy and Interstate 8	F	0	0	0	90
Un-Named County Road Relocation	G	3	0	0	0
Outlet Canal	NA	0	0	0	0
Totals		137	469	109	90
		606		199	

- Area A: The Inlet Canal would result in a long term loss of FTHL habitat and is partially located within the East Mesa MA. The canal was sited in the Evan Hewes Highway ROW to the maximum practical extent to minimize permanent impacts to the MA. Approximately 134 acres of the inlet canal is located within the MA. See Figure 3.2-3.
- Area B: A portion of the Inlet Canal corridor running perpendicular to the Highway is located outside of the MA and is comprised of 45 acres. See Figure 3.2-3.
- Area C: Suitable FTHL habitat is located outside the MA and will be directly affected by the proposed Project and comprised of approximately 64 acres of suitable FTHL habitat located in the northeast corner of the former Brock Ranch property. This portion of the former ranch is relatively undisturbed and could support the species. See Figure 3.2-3.
- Areas D and E: The inlet canal would act as a barrier to 469 acres of the FTHL MA located within privately owned lands within Section 36 near Gordon's Well and a portion of Section 31. The habitat in this portion of the MA is a combination of creosote dune scrub vegetation and habitat disturbed by agricultural activities. This area is comprised of both agricultural affected property and relatively undisturbed creosote scrub vegetation suitable for FTHL. The FTHL habitat within Section 31, south of the inlet canal, closest to the Coachella Canal is heavily disturbed by OHV use and is unlikely to support FTHL. See Figure 3.2-3.
- Area F: The habitat between Evan Hewes Highway and the I-8 (approximately 90 acres) is heavily disturbed by OHV use, is in close proximity to barriers in the form of the Interstate and the highway, and is unlikely to support FTHL. See Figure 3.2-3.
- Area G: the Un-named County Road Relocation" adjacent to the inlet canal would result in a permanent loss of 3 acres of FTHL habitat within the FTHL MA. The road is not expected to act as barrier to FTHL so there is no indirect loss associated with this road. The area that would be affected by the construction of the outlet canal is heavily disturbed by OHV use and is not considered suitable for the species.

Although the approximately seven-mile long inlet canal would function as an effective immigration barrier to flat-tailed horned lizards inhabiting the marginal-quality habitat south of the FTHL Management Area, most of this area between the Evan Hewes Highway and I-8 is heavily disturbed and predominantly devoid of vegetation and is unlikely to support resident FTHL. Existing barriers to animal movement, such as the AAC, I-8, and the Evan Hewes Highway isolate small populations which can not be re-colonized and are therefore more susceptible to extirpation. The habitat south of the MA that would be isolated by the new canal is already heavily impacted by the isolating effects of the above-mentioned corridors. There is also heavy OHV use in the areas adjacent to the Evan Hewes Highway. Population densities for this species are expected to decrease significantly (FTHLICC 2003) the closer the habitat is to I-8 and to the Evan Hewes Highway.

Project Compensation Final compensation ratios and the Project compensation for all disturbances within the FTHL MA would be negotiated with the El Centro BLM office in coordination with the FTHL MA's Interagency Cooperating Committee/Management Oversight Group consistent with the FTHL Rangewide Management Strategy Plan.

3.2.3.2.2 Operational Impacts Impacts to vegetation and wildlife habitats associated with operation of the proposed reservoir, inlet canal, and outlet canal are limited to periodic personnel and equipment access for maintenance, such as repair of the facilities or silt removal. Operations are not anticipated to result in the removal of vegetation or destabilization of soils in undisturbed areas (e.g., areas not affected by Project construction) or areas designated for revegetation.

3.2.3.2.3 Limitrophe Impacts Reductions in non-storable flows to Morelos Dam with implementation of the Proposed Action would not significantly affect riparian communities and associated wildlife of the Limitrophe. Primary water sources supporting riparian communities in this reach include seepage from Morelos Dam, groundwater inflow to the channel, releases of water from Morelos Dam, and inflows from the 11-Mile Wasteway and 21-Mile Wasteway (see Section 3.1).

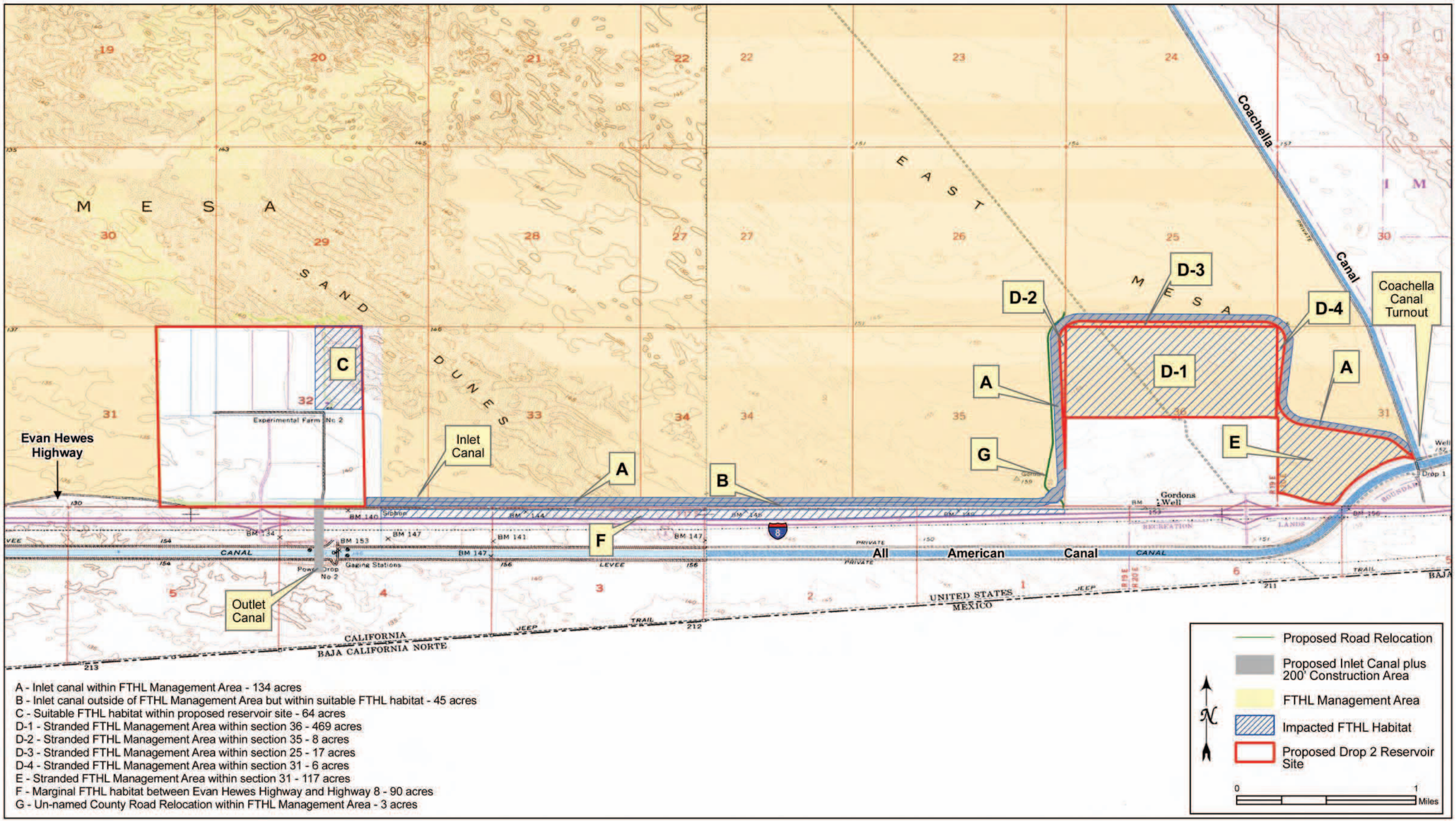
Hydrology/Water Quality The Proposed Action would reduce the frequency and magnitude of over-deliveries of Colorado River water to Morelos Dam, which in turn would reduce the frequency and magnitude of releases from Morelos Dam to the Limitrophe. Scour and overbank flows associated with flood flows serve as an ecological process that provides for the establishment and setting back the succession of riparian communities in floodplain environments. Hydrologic modeling conducted by Reclamation (see Appendix C) indicates that the effect of the Proposed Action on the magnitude of flood flows passing Morelos Dam would be minimal. Consequently, potential effects of the Proposed Action on flood flows is not expected to measurably affect the existing pattern of regeneration of cottonwood, willow, and other woody riparian plants, or the scour regime that maintains marsh. This potential impact, therefore, is not significant.

Groundwater modeling conducted by Reclamation indicates that reduction in flows below Morelos Dam could affect the elevations of aquifers hydrologically connected to the LCR (see Appendix D). Modeling results indicate that the average lowest annual groundwater elevations would decline insignificantly in all reaches from existing conditions, with the greatest change in Reaches 2 and 3 (see Table 3.2-7).

Table 3.2-7. Reduction in Groundwater Elevations with the Proposed Project based on Groundwater Modeling

Reach	*Maximum Reduction in Groundwater Elevation (feet)*	*Mean Reduction in Groundwater Elevation (feet)*
1 (RM 22-16.8)	0.3	0.03
2 (RM 16.8-5.8)	0.7	0.09
3 (RM 5.8-0)	0.7	0.1

Reductions in groundwater elevation could result in conversion of cottonwood-willow and marsh communities to types dominated by plant species that are more drought tolerant in locations where groundwater levels decline to elevations below the rooting zone of the dominant plant species. The estimated range of potential reductions in groundwater elevations are unlikely to affect saltcedar-dominated and atriplex communities because the dominant plant species are deep-rooting and roots would be capable of growing down to with-project groundwater elevations (LCR MSCP 2004).



A - Inlet canal within FTHL Management Area - 134 acres
B - Inlet canal outside of FTHL Management Area but within suitable FTHL habitat - 45 acres
C - Suitable FTHL habitat within proposed reservoir site - 64 acres
D-1 - Stranded FTHL Management Area within section 36 - 469 acres
D-2 - Stranded FTHL Management Area within section 35 - 8 acres
D-3 - Stranded FTHL Management Area within section 25 - 17 acres
D-4 - Stranded FTHL Management Area within section 31 - 6 acres
E - Stranded FTHL Management Area within section 31 - 117 acres
F - Marginal FTHL habitat between Evan Hewes Highway and Highway 8 - 90 acres
G - Un-named County Road Relocation within FTHL Management Area - 3 acres

Figure 3.2-3. Flat-tailed Horned Lizard Compensation Areas

Cottonwood-Willow Based on Reclamation's groundwater modeling, the existing depth to groundwater beneath patches of cottonwood-willow ranges from 0-25 feet (Table 3.2-8). As indicated in Table 3.2-7, the mean reduction in groundwater elevation would be 0.03 feet (0.4 inches) in Reach 1, 0.09 feet (1.1 inches) in Reach 2, and 0.1 feet (1.2 inches) in Reach 3. Such reductions, including the maximum predicted reductions in groundwater elevations (see Table 3.2-7), beneath existing patches of cottonwood-willow are well within the range of groundwater elevations that are currently supporting cottonwood-willow. Additionally, because the availability of water for storage in the Drop 2 Reservoir will vary substantially among water years, changes in minimum annual groundwater elevations are expected to occur incrementally over a period years, thus allowing cottonwood-willow to extend their roots as groundwater elevations decline. Furthermore, because Reclamation's model estimates the change in the lowest annual groundwater levels with implementation of the Proposed Action, it is expected that under most conditions groundwater elevations will remain within the range of groundwater elevation fluctuations that occur under existing conditions. Based on results of the groundwater modeling, the potential impacts of changes in groundwater elevations on woody riparian communities and associated wildlife habitats are not significant.

Table 3.2-8. Existing Depth to Groundwater Beneath Patches of Cottonwood-Willow (acres)

Reach	*Depth to Groundwater (feet)*				
	0-5	6-10	11-15	16-20	>20[A]
Reach 1	40.1	49.1	220	14.7	2.5
Reach 2	54.2	86.9	24.4	3.7	6.1
Reach 3	29.0	70.8	40.0	4.4	3.6

[a] Depth to groundwater beneath cottonwood-willow extended to 25 feet.

Marsh Four types of marsh, characterized by dominant plant species and extent of open water, are present in the Limitrophe (see Table 3.2-9 for a description of marsh types). Type 6 marsh is comprised of dense monotypic stands of phragmites, a non-native invasive species, that provide low habitat value for marsh associated species, including the Yuma clapper rail and California black rail (LCR MSCP 2004). Therefore, potential impacts of changes in annual minimum groundwater elevations and surface flows on type 6 marsh are considered not significant.

Groundwater depths beneath patches of marsh range up to 17 feet (see Table 3.2-9). Because bulrush and cattail (present in marsh types 3, 5, and 7) typically do not root to depths greater than 6 feet, it is likely that marsh types 3, 5, and 7 shown in Table 3.2-9 as occurring in locations with groundwater depths greater than 6 feet are sustained by surface water and not by groundwater. Effects of changes in flow passing Morelos Dam are expected to be not significant on these patches of marsh because the likely primary source of surface water maintaining these marshes, which are located in Reaches 2 and 3, are inflows of surface water and from agricultural returns, which would be unaffected by the Proposed Action.

A total of 6.0 acres of marsh types 5 and 7 are present in Reach 2 where groundwater depths are 6 feet or less. These patches of marsh are likely sustained, at least in part, by groundwater. A total of 5.4 acres of this marsh is located in areas where groundwater depths are 5 feet or less.

Table 3.2-9. Existing Depth to Groundwater Beneath Patches of Marsh (acres)

Reach	*Depth to Groundwater (feet)*			
	0-6	7-10	11-15	16-20 [a]
Reach 1				
Type 6	0.3	0.1	0	0
Reach 2				
Type 5	0.7	0.2	0	0
Type 6	10.4	0.7	0	0
Type 7	5.3	4.4	0	0
Reach 3				
Type 3	0	2.2	0	0
Type 6	11.3	7.7	5.2	0.2

Notes:

[a] Depth to groundwater beneath marsh extended to 17 feet.

[b] Definitions of marsh types are from Anderson and Ohmart 1984

Type 3 marsh = About 25–50 percent cattail/bulrush; some *Phragmites australis*, open water, trees, and grass.

Type 5 marsh = About 50–75 percent cattail/bulrush; few trees and grasses interspersed throughout cover.

Type 6 marsh = Nearly 100 percent *Phragmites australis*; little open water.

Type 7 marsh = Open marsh (75percent water) adjacent to sparse marsh vegetation; sandbars and mudflats visible when Colorado River is low.

Consequently, a 0.09-foot mean decline in minimum groundwater elevations would maintain minimum groundwater elevations within the rooting depths of marsh plants. A total of 0.6 acres of marsh are located where groundwater depths are 5-6 feet. It is not expected that a slight decline in annual minimum groundwater elevations would affect these patches of marsh because, as described above for cottonwood-willow, it is expected that under most conditions, groundwater elevations will remain within the range of groundwater elevation fluctuations that occur under existing conditions. Therefore, potential impacts on these patches of marsh from potential changes in minimum groundwater elevations are considered not significant.

Three historically occupied southwestern willow flycatcher habitat areas are present in the Limitrophe (see Table 3.2-10). Occupied habitat is defined as habitat used by flycatchers during the breeding season after June 15 (individuals observed prior to June 15 are assumed to be migrants). An element of southwestern willow flycatcher breeding habitat is the presence of moist surface soils or surface water during the breeding season (LCR MSCP 2004). Although, as described above, lowering the annual low groundwater elevations is not expected to affect existing vegetation, lowered groundwater elevations potentially could affect the existing presence of moist surface soils and surface water. The depth of surface water present at each of the habitat areas is greater than the potential depths that the lowest annual groundwater elevations would decline under the Proposed Action. Consequently, although the extent of surface water and associated moist surface soils may decline slightly with lower groundwater elevations during some years and months, effects on these habitat areas are expected to be minimal. Potential impacts on occupied southwestern willow flycatcher habitat, therefore, are considered not significant.

Table 3.2-10. Occupancy and Hydrologic Conditions at Southwestern Willow Flycatcher Habitat Areas in the Limitrophe during 2004

Habitat Area	*Habitat Area (acres)*	*Occupied in 2004*	*%Site Inundated* [a] *May/June/July*	*Depth of Surface Water (inches)* [a] *May/June/July*	*% of Area with Saturated Soil that is not Inundated* [a] *May/June/July*	*Distance to Surface Water or Saturated Soil (feet)*[a] *May/June/July*
Gadsden Bend	10.9	Yes	0/5/15	0/3.9/--[b]	0/10/--[b]	0/0/0
Gadsden	60.0	No	5/5/5	11.7/19.5/19.5	0/0/0	0/0/0
Hunter's Hole	40.8	No	7/10/15	11.7/27.3/19.5	2/0/2	0/0/0

Notes:

[a] Values are recorded for mid-May/mid-June/mid-July

[b] Water depth not recorded during surveys.

Source: McLeod et. al., 2005.

Other potential effects of the Proposed Action include a reduction in open water area as a result of a reduction in flows passing Morelos Dam. Reduction in the extent of open water within the river channel would be minimal and, because open water does not support habitat for sensitive species, this potential effect is considered not significant.

3.2.3.2.4 Compensation Measures

FTHL Compensation Measures In addition to the habitat compensation described above (and repeated in Compensation Measure BIO-9) the following summation of appropriate FTHL compensation from the Strategy (FTHLICC 2003) shall be implemented.

BIO-1 Prior to Project contract Awards, an individual shall be designated as Reclamation's Field Biological Monitor (FBM). The FBM shall have the responsibility to ensure Project compliance with protective measures for the FTHL and will be Reclamation's Lead Representative regarding these measures.

BIO-2 All Project work areas shall be clearly flagged or similarly marked at the outer boundaries to define the limit of work activities. All construction and restoration workers shall restrict their activities and vehicles to designated work areas.

BIO-3 Within FTHL habitat, the area of permanent disturbance of vegetation and soils shall be minimized as feasible. Clearing of vegetation and grading shall be minimized. Where grading is necessary, surface soils (approximately the upper 6-12 inches) shall be stockpiled to preserve the local seed bank, and replaced following construction to facilitate habitat restoration. Under the coordination of the FBM, disturbance of shrubs and surface soils due to stockpiling shall be minimized.

BIO-4 Existing roads shall be used for travel and equipment storage whenever possible.

BIO-5 Where feasible and desirable, in the judgment of the lead agency, access to newly created access routes may be restricted by constructing barricades, erecting fences with locked gates at road intersections, and/or by posting signs. In these cases, Reclamation shall maintain, including monitoring, all control structures and facilities for the life of the Project and until habitat restoration is completed.

BIO-6 The FBM shall be present in each area of active surface disturbance throughout the work day from initial clearing through habitat restoration, except where the Project is completely fenced and cleared of FTHLs by a biologist (see Measure BIO-7). The FBM shall meet the requirements set forth in Appendix 6 of the Strategy. The FBM shall perform the following functions:

a) Develop and implement a worker education program as described in the FTHL Compliance Strategy that will include a summary of the biology and status of the FTHL, and will detail protection measures designed to reduce potential impacts to the species

b) Examine areas of active surface disturbance periodically (at least hourly when surface temperatures exceed 85ºF) for the presence of FTHLs. In addition, all hazardous sites (e.g., open pipeline trenches, holes, or other deep excavations) shall be inspected for the presence of FTHLs prior to backfilling.

c) If avoiding disturbance to a FTHL is not possible or if a FTHL is found trapped in an excavation, the affected lizard shall be captured by hand and relocated.

BIO-7 Sites of permanent or long-term (greater than one year) projects in MAs where continuing activities are planned and where FTHL mortality could occur (the north side of the canal and west, north, and east side of the reservoir that are exposed to occupied FTHL habitat), may be enclosed with FTHL barrier fencing to prevent lizards from wandering onto the Project site where they may be subject to collection, death, or injury. Barrier fencing should be in accordance with the standards outlined in Appendix 7 of the Strategy. After clearing the area of FTHLs, no on-site monitor is required.

BIO-8 Reclamation shall develop a project-specific habitat restoration plan under approval by the lead agency. The plan shall consider and include as appropriate the following methods: replacement of topsoil, seedbed preparation, fertilization, seeding of species native to the Project area, noxious weed control, and additional erosion control. Generally, the restoration objective shall be to return the disturbed area to a condition that will perpetuate previous land use. Reclamation shall conduct periodic inspection of the restored area. Restoration shall include eliminating any hazards to FTHLs created by construction, such as holes and trenches in which lizards might become entrapped. Disturbance of existing perennial shrubs during restoration shall be minimized where feasible, even if such shrubs have been crushed by construction activities (i.e., it is preferable to drive over and crush vegetation as opposed to removal of vegetation).

BIO-9 Compensation consistent with the FTHL Management Strategy Plan.

General Compensation Measures

BIO-10 Minimize the removal of vegetation by restricting construction corridors or areas designated for equipment and personnel access and staging as much as feasible. This would be most valuable on the north side of the inlet canal where the desert scrub is contiguous with larger expanses of this habitat type and away from existing disturbances, such as the Highway and frontage road.

BIO-11 Where feasible, minimize the loss of creosote bush scrub by avoiding the destruction of the root crown of creosote bush and other perennial native shrubs. Creosote bush can sprout from its root crown after disturbance to the above ground portions (Marshall 1995). This would decrease the amount of time required for the habitat to recover to pre-existing conditions.

BIO-12 Revegetate or implement other means of erosion control on areas left bare by construction.

BIO-13 For areas to be revegetated:

a) Salvage and replace topsoil (approximately upper 6 to 12 inches) in order to conserve the existing seedbank.

b) Heavily compacted soils should be ripped before the start of restoration activities in order to increase water infiltration and soil mineralization and reduce soil strength (Soil Ecology Restoration Group 2000).

c) Disturbed areas shall be planted with creosote bush and other perennial native plants grown from locally collected seed. Planting should occur during spring or fall and seedlings should be heavy pruned one month before transplanting (Marshall 1995).

d) Protection of plantings from rodents and a watering and monitoring program will be required.

BIO-14 To minimize impacts associated with operation of the reservoir and canals, designate and restrict personnel and equipment to clearly labeled access points.

BIO-15 Tree removal within the entire Project footprint shall be scheduled to occur outside the breeding season for raptors, most songbirds and other migratory birds (February 1 through August 15). Should this not be feasible, a biological survey of trees proposed to be removed shall be conducted no more than five days prior to any construction activities to ensure that no raptors or other migratory bird species are nesting. Should raptors or other protected species be nesting in trees, construction activities shall be postponed until nesting has been completed.

BIO-16 Reclamation shall ensure that all specific eviction procedures appropriate to burrowing owls (*Athene cunicularia*) are used, and that any removal of this animal from the proposed project site shall be conducted outside of the nesting season (February 1-August 31).

3.2.3.2.5 Residual Impacts after Compensation The implementation of the proposed compensation and the set aside of habitat to compensate for impacts on FTHL habitat will fully mitigate impacts to individual FTHL, FTHL habitat, and other non-sensitive biological resources so that no significant impacts would occur.

3.2.3.3 No-Action Alternative

The No-Action Alternative would mean that the reservoir and associated canals would not be built and there would be no loss of vegetation or wildlife habitat, including habitat for the FTHL and no indirect impacts on the Limitrophe.

3.3 Aesthetics

This section addresses the potential temporary aesthetic impacts resulting from construction and maintenance activities, as well as long-term impacts from the proposed permanent structures associated with the LCR Drop 2 Storage Reservoir Project.

An overview of the existing visual resources located within the Project area, including sensitive viewsheds, scenic vistas, and scenic resources (e.g., vegetation, special rock formations, and open space characteristics) are identified in this section of the EA. Scenic and visual resource policies within applicable plans are also discussed.

3.3.1 Affected Environment

Visual resources consist of the natural and manmade features that give a particular environment its aesthetic qualities. These features may be natural appearing or modified by human activities. Together, they form the overall impression of an area, referred to as its *landscape character*. Landforms, water surfaces, vegetation, and manmade features are treated as characteristic of an area if they are inherent to the formation, structure, and function of the landscape. Landscape character is evaluated to assess whether a proposed action would be compatible with the existing setting or would contrast noticeably with the setting and appear out of place.

Visual resources also have a social setting, which includes public values, goals, awareness, and concern regarding visual quality. Social setting is addressed as *visual sensitivity*, or the relative degree of public interest in visual resources and concern over adverse changes in the quality of that resource. Visual sensitivity is key in assessing how important an effect on the visual resource would be and whether it represents a significant impact. Recreational uses are generally considered to have high visual sensitivity, as are views from scenic routes or corridors.

The region of influence of the Proposed Action includes former agricultural lands and desert areas located within Imperial County. Natural features include open space and desert wilderness areas. In addition, the region of influence includes the Imperial Sand Dunes Recreation Area (ISDRA) in Imperial County, which rise to heights of over 300 feet above the surrounding desert floor (see section 3.12 Recreation for additional information on the ISDRA).

3.3.1.1 Regulatory Environment

Areas considered to have the greatest visual sensitivity are typically along scenic highways and wilderness or other natural areas. The primary areas of concern generally are associated with changes to prominent topographic features, changes in the character of an area with high visual sensitivity, removal of vegetation, or blocking public views of a visually sensitive landscape.

3.3.1.1.1 Bureau of Land Management Project elements are located within the California Desert Conservation Area, managed by the Bureau of Land Management (BLM). BLM has developed a system (the Visual Resource Management [VRM] Program) for evaluating the

visual resources of a given area to determine what degree of protection, rehabilitation, or enhancement is desirable and possible. BLM is concerned with managing visual resources equally with other resources and attaining acceptable levels of visual impact without unduly reducing commodity production or limiting overall program effectiveness.

The purpose of the VRM Program is twofold: (1) to manage the quality of the visual environment and (2) to reduce the visual impact of development activities, while maintaining effectiveness in its resource programs. Managing the visual aspects of changes to the natural landscape is particularly important for the BLM because most activities taking place on BLM lands involve some degree of alteration.

Under the VRM Program, landscape character is determined by four basic visual elements (form, line, color, and texture), which are present in every landscape and exert varying degrees of influence. The stronger the influence exerted by these elements, the more interesting the landscape. Landscapes with increased visual variety are considered aesthetically pleasing. Variety in the landscape with harmony is considered attractive; landscape alterations that create disharmony are considered unattractive (BLM 1980). BLM has not formally inventoried the Project site or vicinity, nor has it given those lands relative visual ratings (Management Classifications), according to the VRM Program.

3.3.1.1.2 Scenic Highway Designations The following provides an overview of scenic highway programs in the project region because scenic highways often have high visual sensitivity.

A National Scenic Byway is a road recognized by the US Department of Transportation, Federal Highway Administration, for its archeological, cultural, historic, natural, recreational, and/or scenic qualities. The program was established by Congress in 1991 to preserve and protect the nation's scenic but often less-traveled roads. There are no designated scenic byways within the immediate vicinity of the Project site. The closest byway associated with this program is Route 78 along Anza-Borrego Desert State Park, located over 60 miles from the project site.

California Department of Transportation (Caltrans), as part of the California Scenic Highways Program, designates scenic roadways and highways to preserve and protect corridors from change that could diminish the aesthetic value of lands adjacent to the highway. There are no state-designated scenic roadways or highways within the immediate vicinity of the Project site. Interstate 8 from Sunset Cliffs Boulevard in San Diego County to State Route 98 near Coyote Wells in Imperial County is a part of the California State Scenic Highway System; however, this roadway segment is located over 50 miles west of the Project site.

The Imperial County's Scenic Highway Program was developed to protect and enhance the County's scenic, historic, and recreational resources. A portion of I-8, from the San Diego County line to its junction with State Route 98 is identified by the County as a scenic highway. This segment is also a part of the California State Scenic Highway System noted above, and is located over 50 miles from any portion of the Project site.

3.3.1.2 Visual Setting

The visual resources of the area vary according to the type of land use, the amount of open space, and the existence of prominent topographic features such as mountains and ridgelines or other

unique features. The immediate Project construction area for the inlet and outlet canals is dominated by views of the AAC, Coachella Canal, I-8, powerlines, and Evan Hewes Highway (see Figure 3.3-1). The Drop 2 Reservoir site is characterized by former agricultural land, abandoned irrigation canals, remnant citrus and windrow trees, and patches of desert scrub, saltcedar, and tamarisk. Visual resources within the Project vicinity generally include large expanses of desert wilderness and former agricultural areas located in the Imperial Valley. The regional area along the AAC and the Coachella Canal is generally undeveloped desert area used for recreational purposes associated with the ISDRA. With the exception of the visually dominant AAC and Coachella canals, most of the landscape appears natural (undisturbed). Visually sensitive resources within the vicinity include the ISDRA to the east of the Coachella Canal, and sensitive viewpoints associated with recreational areas popular for OHV recreation, including the Dune Buggy Flats Management Area.

3.3.1.3 Views

Views may be discussed in terms of *foreground*, *middle ground*, and *background* views. Foreground views (from 0 – 0.25 miles from the site) are those immediately present to the viewer, and include objects at close range that may tend to dominate the view. Middle ground views (from 0.25 – 1 mile) occupy the center of the viewshed, and tend to include objects that are the center of attention if they are sufficiently large or visually different from adjacent visual features. Background views (greater than 1 mile) include distant objects and other objects that make up the horizon. Objects in the background eventually fade to obscurity with increasing distance. In the context of the background, the skyline can be an important location feature because objects above this point are generally highlighted against the blue background of the sky. *Scenic views* or *vistas* are the panoramic public view access to natural features, including open space, striking or unusual natural terrain, or unique urban or historic features.

Existing views include the prominent AAC and Coachella canals, as well as diversion gates, power plants at Drops 1 and 2 and roadways including an interstate highway, and private development including houses (see Figure 3.3-1).

As described in section 3.12, Recreation, the proposed inlet and outlet canals would be located outside of the ISDRA boundary, but within the ISDRA "planning area." As some camping and travel on designated routes would be allowed in this area, westerly views of the proposed construction and new facilities would be possible.

In addition, views northward by passengers traveling along I-8 immediately south of the Project facilities, including the proposed reservoir, and inlet and outlet canals would be available. It is expected that the proposed new facilities would be visible in the distance due to the flat topography and limited intervening development.

3.3.1.4 Light and Glare

The majority of the Project vicinity is undeveloped, desert open space with few sources of light. However immediately adjacent to the Project construction area there are concentrations of development including homes and an eating establishment in Township 16 South, Range 19 East, Section 36 (see Figure 2-1). Interstate 8 and associated traffic in the Project area (as many

as 1,600 cars an hour) contribute light and glare (Highway Capacity Manual, 1999 and 2000 traffic volumes). In addition, the existing Drop 1 and Drop 2 facilities have some low security lighting. Project facilities are adjacent to heavily used OHV recreation areas and the Project construction area itself is currently used for camping and OHV riding (camping and OHV use in the area is limited by BLM regulations, but some unauthorized use is known to occur [personal communication, R. Wahl March 2006]). It is estimated that in 2001 over 1.4 million persons visited ISDRA recreational area to the east of the Project area and it is estimated that over holiday weekends there are as many as 100,000 visitors, primarily OHV users to the ISDRA area (BLM 2003a). During the recreational vehicle riding season (October to April), OHV's can create a noticeable source of light and glare (personal communication R. Wahl March 2006).

3.3.2 Environmental Consequences and Compensation Measures

All land-disturbing activities have a direct effect on the visual resource. These effects can be either positive or negative, depending on the location, size, color, and viewing location. Generally speaking, alternatives that attract higher levels of recreational use have the greatest potential for decreasing scenic quality. Ground-disturbing activities like road and facilities construction also have the potential of not harmonizing with the natural character of the landscape. In addition, alternatives that remove non-native and other encroaching vegetation would increase the visual variety of a landscape.

3.3.2.1 Thresholds of Significance

The Project would have a significant environmental impact on aesthetic resources if it would result in any of the following:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

3.3.2.2 Methodology

Each Project component was evaluated with regard to its potential to create visual impacts resulting from changes in scenic vistas, changes or damage to scenic resources, or degrading the visual character of a site. Potential impacts to aesthetic resources would result primarily from construction activities and resulting operational changes and were assessed by comparing Project-induced changes to existing conditions. Impacts from potential light sources were also considered, but it was determined that no Project components would require substantial lighting.

Views of Drop 2 Reservoir Site

Views of Project Vicinity Looking East from Drop 2 Reservoir Site

Figure 3.3-1. Views from Locations within Proposed Action Construction Area

3.3.2.3 Proposed Action

Because the Proposed Action would consist of developing a new earthen embankment-type reservoir on former agricultural lands with some remnant citrus and windrow trees, changes to the aesthetic environment are anticipated. Agricultural lands typically are not considered visually sensitive; however, some Project features would be located within or near the ISDRA. A discussion of potential changes to scenic views or resources as a result of Project implementation is provided, taking into account the public's anticipated perception of the existing visual resources onsite, and their visual setting. Compensation measures are identified, as appropriate, to minimize impacts on aesthetics.

The Project facilities are expected to be visible from two main vantage points, including within panoramic views available at higher elevations to the east associated with the ISDRA sand dunes, and northerly views available from vehicles traveling along I-8. Because these are public views and views from a recreation area, they are considered visually sensitive. Although proposed Project facilities would be recognized within these current views, the Project would be consistent with the existing landscape character, which includes other low-lying water development facilities. In addition, due to overall distance between the sand dunes and Project facilities, the majority of this view would remain undisturbed following Project development. Also, due to vehicle speed when traveling along I-8 and the overall low-lying profile of new facilities, views would be intermittent and would not be easily distinguished from the surrounding landscape. Therefore, no significant impacts to scenic views or vistas would occur as the views of open desert landscape against the Chocolate Mountains and sky horizon would continue to form the prominent backdrop of this view. The new Project facilities would not be visible from any county, state, or federally designated scenic highway.

Facilities associated with the Proposed Action would be located entirely within Reclamation withdrawn land and would consist of low-lying structures not readily visible from offsite locations. As the Project site is presently void of any significant visual feature, and as the nearby open space areas would remain unchanged from existing conditions, construction and operation under the Proposed Action would not degrade the existing visual character or quality of the site and its surroundings. Furthermore, the more prominent scenic resources consisting of the Chocolate Mountains in the distant background to the north, the remnant windrow trees, and the sand dunes within the ISRDA to the east would not be affected by implementation of the Project as visual access to these resources would be maintained. The Proposed Action would not affect the overall impression of the area.

During construction, temporary use of construction lighting may be required, resulting in potential offsite glare, particularly if any construction activities occur at night. However, if construction were to occur at night and require the use of night lighting, it is expected that these lights would blend visually with the nearby vehicle lights from I-8 and from OHV use in the area. In addition, operations would require the use of site lighting on key facilities for security purposes, which could result in potential offsite glare to traffic along I-8 and to adjacent recreation areas. Therefore, project activities could create a new source of substantial light or glare that would adversely affect day or nighttime views in the area, which is considered a

significant impact. The following proposed compensation measures would ensure that no significant offsite light/glare impacts would occur.

3.3.2.3.1 Compensation Measures

AES-1 All site facilities shall be color treated with non-reflective materials to avoid off-site glare, except where safety is an issue.

AES-2 Night lighting shall be directed downward and inward through use of standard light shields or hoods toward the area to be illuminated, in accordance with Reclamation standards, in order to minimize nighttime light and glare.

3.3.2.3.2 Residual Impacts after Compensation With implementation of compensation measures AES-1 and AES-2, no significant impacts associated with light and glare under the Proposed Action would occur.

3.3.2.4 No-Action Alternative

No new facilities would be developed under this alternative; therefore, no change in the visual environment and no impacts are anticipated.

3.4 Agricultural Resources

This section addresses the potential for the proposed LCR Drop 2 Reservoir facilities to impact agricultural resources. This analysis meets the requirements of the Farmland Protection Policy Act (7 USC 4201) on a programmatic basis. The Act does not prohibit Federal agencies from undertaking actions that convert farmland to nonagricultural use, but only requires that Federal agencies "identify and take into account the adverse effects of Federal programs on the preservation of farmland; consider alternative actions, as appropriate, that could lessen such adverse effects; and assure that such Federal programs, to the extent practicable, are compatible with State (and local) programs and policies to protect farmland" (7 USC §4202[b]).

3.4.1 Affected Environment

The Imperial Valley contains a variety of agricultural uses ranging from field crops (alfalfa) and row crops (melons) to livestock production, including aquaculture. Approximately 20 percent of lands (512,163 acres) within Imperial Valley are irrigated for agricultural purposes (Imperial County 1996).

The proposed Drop 2 Reservoir site and canal routes are situated on primarily flat lands with areas of undulating, northwest-trending sand dunes. The proposed 615-acre reservoir site is located on fallow, previously cultivated fields on lands that were withdrawn by Reclamation and subsequently leased to the Imperial Irrigation District who in turn subleased to a private party for operation of the Brock Ranch Research Center. A variety of irrigated agricultural activities were conducted on the proposed reservoir site until the Brock lease was terminated in 1999. Remnants of citrus groves are found on site, but most of the area is in various stages of re-colonization by native and non-native plants. Vegetation on the proposed reservoir site, except for windrow trees, will be removed during future site clearing activities.

The Project area consists of federally owned lands that are managed by Reclamation and are no longer used for agricultural purposes. As the Project site is located completely within Reclamation's jurisdiction, these lands are not subject to local land use and zoning regulations. Further, the proposed reservoir site is not part of a Williamson Act Agricultural Preserve contract that could commit it to long-term agricultural uses.

Important Farmland

The United USDA, Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS), has defined Important Farmlands based upon a number of factors, including the physical and chemical characteristics of the land and the suitability of the land for producing crops (see Table 3.4-1 for these definitions). The NRCS's Farmland Mapping and Monitoring Program (FMMP) produces information that is used for analyzing impacts on California's agricultural resources; the FMMP data rates agricultural land according to soil quality and irrigation status. Important Farmlands are afforded special protection due to their importance to agricultural production.

Table 3.4-1. General Definitions of Categories Used in Important Farmland Maps[1]

Farmland Category	*Definition*[1]
Prime Farmland	Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, Prime Farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. Prime Farmland must have been used for irrigated agricultural production at some time during the past four years prior to the mapping date.
Unique Farmland	Unique Farmland is land other than Prime Farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods.
Farmland of Statewide Importance	This is land, in addition to Prime and Unique Farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Criteria for defining and delineating this land are to be determined by the appropriate State agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly Prime Farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as Prime Farmlands if conditions are favorable. Farmland of Statewide Importance must have been used for irrigated agricultural production at some time during the past four years prior to the mapping date.
Farmland of Local Importance	In some local areas there is concern for certain additional farmlands for the production of food, feed, fiber, forage, and oilseed crops, even though these lands are not identified as having national or statewide importance. Where appropriate, these lands are to be identified by the local agency or agencies concerned. In Imperial County, unirrigated and uncultivated lands with Prime and Statewide soils are considered Farmland of Local Importance. Per the USDA-SCS Land Inventory and Monitoring system, Farmland of Local Importance does not include publicly owned lands for which there is an adopted policy preventing agricultural use. .
Grazing Land	Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities. The minimum mapping unit for Grazing Land is 40 acres.
Urban and Built-up Land	A Land Cover/Use category consisting of residential, industrial, commercial, and institutional land; construction sites; public administrative sites; railroad yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment plants; water control structures and spillways; other land used for such purposes; small parks (less than 10 acres) within urban and built-up areas; and highways, railroads, and other transportation facilities if they are surrounded by urban areas. Also included are tracts of less than 10 acres that do not meet the above definition but are completely surrounded by Urban and Built-up land. Two size categories are recognized in the National Resources Inventory (NRI): (1) areas 0.25 to 10 acres, and (2) areas greater than 10 acres.
Other Land	Land not included in any other mapping category. Common examples include low wetland and riparian areas.
Water	A General cover category consisting of permanent water, such as a perennial stream, lake, or pond with at least 25 percent open water. If the vegetative canopy obscures more than 75 percent of the water surface from view, the area is recorded under the category appropriate for the canopy vegetation. Four types of water areas are large streams, large water bodies, small streams, and small water bodies.

Notes:

1. The definitions for Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Urban Built-up Land were developed by the USDA-SCS as part of the nationwide Land Inventory and Monitoring (LIM) system. The LIM definitions have been modified for use in California with the most significant modification being that Prime Farmland and Farmland of Statewide Importance must be irrigated. In addition, mapping of Grazing Land as part of an Important Farmland Map is unique to California.

Sources: 7 CFR 657.5; NRI 1997; CDOC 2003; CDOC undated.

Farmland of Statewide and Farmland of Local Importance have been mapped in the Project site vicinity as depicted on Figure 3.4-1 (California Division of Land Resources Protection 2002). However, because the farm lease was terminated in 1999, the Brock Ranch site will not meet the California Department of Conservation criteria for Farmland of Statewide Importance at the time Important Farmland is next mapped by the state of California because a site must have been farmed and irrigated within the past four years to qualify as Farmland of Statewide Importance. Nor would the Project site qualify as having Farmland of Local Importance. As defined by the USDA-SCS Land Inventory and Monitoring system, Farmland of Local Importance does not include publicly owned lands for which there is an adopted policy preventing agricultural use. Because the proposed reservoir site is Reclamation Withdrawn Land, Reclamation's specific project needs and purposes take precedent and these uses will prevent future agricultural use. Therefore, current Project site conditions do not meet the criteria for Important Farmlands as defined in Table 3.4-1.

Per the USDA Soil Conservation Service's Soil Survey, Imperial County and Imperial Valley Area (USDA 1981), the proposed reservoir site soils consist of Antho loamy fine sand and Rositas fine sand, which have Class II to Class III irrigated soil capability ratings. Soils within the proposed inlet and outlet canal alignments consist of Rositas fine sand wet (Class III), Rositas loamy fine sand (Class III), and Superstition loamy fine sand (Class III). These areas include soils that have the potential for irrigated farming, but development depends on an adequate supply of good quality water; land leveling for surface irrigation is required for cultivation (USDA 1981). The Soil Conservation Service considers Class II soils prime agricultural soils, while Class III soils are considered non-prime soils (USDA 1981).

3.4.2 Environmental Consequences and Compensation Measures

The following criteria were used to evaluate potential impacts on prime agricultural land and agricultural land productivity. Impacts on agricultural resources are considered significant if the Proposed Action or alternatives would:

- Conflict with existing zoning for agricultural use, or other legal protections (i.e., agricultural preserve programs) for agricultural use; or
- Convert a substantial portion of the available Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland) in the project area to non-agricultural use.

3.4.2.1 Proposed Action

Construction and operation of the proposed reservoir site and ancillary infrastructure (i.e., inlet and outlet canals) would not conflict with any agricultural operations on adjacent lands currently in agricultural use. The Project area and surrounding lands are federally owned lands that are managed by Reclamation and BLM and not used for agricultural purposes. Federal agencies are not subject to local land use and zoning regulations; however, Reclamation does take these into consideration and cooperates with local agencies to the extent feasible.

Although onsite soils at the Drop 2 Reservoir site are considered prime, their agricultural viability is dependent upon their being irrigated; the Project site has not been irrigated and

utilized for agriculture operations subsequent to termination of the Brock Ranch lease in 1999. Accordingly, the lack of irrigation limits the site's agricultural viability and eligibility for inclusion in a Williamson Act Agricultural Preserve contract.

Soils in the vicinity of the inlet and outlet canal alignments have a Class III USDA rating (non-prime) based on regional soil and climatic characteristics. Accordingly, this portion of the Project site has no regionally unique agricultural resources that would constitute inclusion within a designated agricultural preserve program. As the Project site is not located in or adjacent to any existing Williamson Act Agricultural Preserve contracts, operation of the Drop 2 Reservoir and ancillary infrastructure would not conflict with any designated agricultural preserve programs.

The Drop 2 Reservoir site has been designated as having both Farmland of Statewide and Farmland of Local Importance; however, as explained above, current Project site conditions no longer meet the criteria for Important Farmlands as defined in Table 3.4-1. Because the reservoir site's agricultural viability is dependent on onsite soils receiving an adequate supply of good quality water, the Drop 2 Reservoir site is not considered a viable agriculture operation due to the lack of irrigation,.

3.4.2.2.1 Compensation Measures Because no agricultural resource impacts are anticipated, no compensation measures are required.

3.4.2.2.2 Residual Impacts after Compensation No significant residual impact on agricultural resources would occur.

3.4.2.3 No-Action Alternative

Under the No-Action Alternative, a reservoir and associated facilities would not be constructed. Therefore, no impacts on agricultural resources (i.e., loss of Important Farmland) would occur.

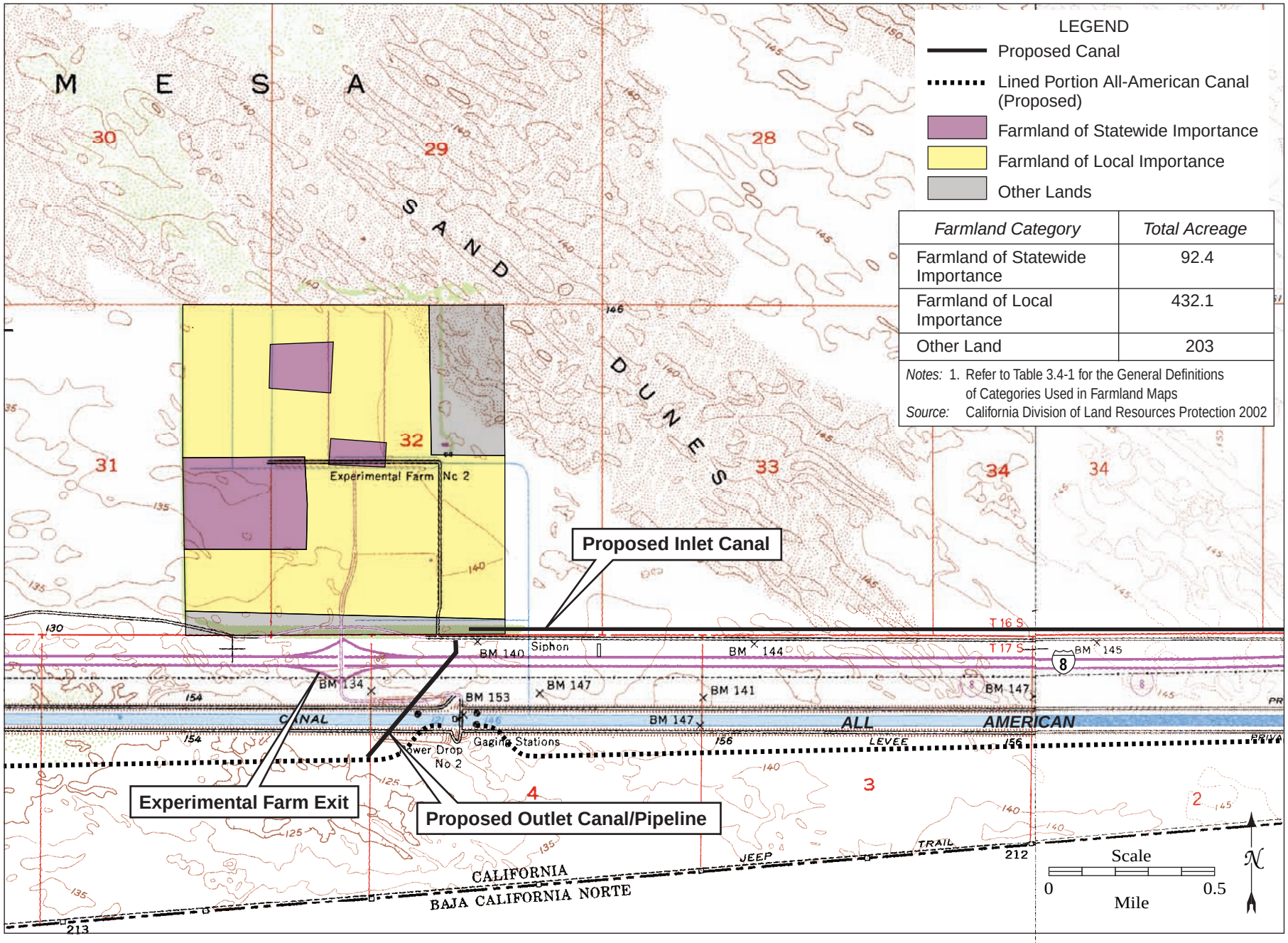


Figure 3.4-1. Location of Important Farmland in the Project Vicinity

3.5 Air Quality

Air emissions produced by the Proposed Action mainly would affect air quality within Imperial County and areas immediately adjacent to the Project site. Imperial County is part of the Salton Sea Air Basin (SSAB). The following section describes the existing air quality within SSAB and the air regulations that would apply to the Proposed Action and alternatives.

3.5.1 Affected Environment

Air quality in a given location is defined by pollutant concentrations in the atmosphere and is generally expressed in units of ppm or micrograms per cubic meter ($\mu g/m^3$). One aspect of significance is a pollutant's concentration in comparison to a national and/or State ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards, established by the EPA, are termed the National Ambient Air Quality Standards (NAAQS). The NAAQS are defined as the maximum acceptable ground-level concentrations that may not be exceeded more than once per year except for annual standards, which may never be exceeded. California standards, established by the California Air Resources Board (ARB), are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist.

The Project site is within an area that is currently in violation of the national and state standards for particulate matter less than 10 microns in diameter (PM_{10}) and ozone (O_3). Volatile organic compounds (VOC) and nitrogen oxides (NO_x) are precursors to O_3 and the generation of these pollutants and fugitive dust (PM_{10}) from Project emission sources would be the main air quality issues associated with this Proposed Action.

3.5.1.1 Region of Influence

Identifying the Region of Influence (ROI) for air quality requires knowledge of the types of pollutants being emitted, pollutant emission rates, topography, and meteorological conditions. The ROI for inert pollutants (pollutants other than O_3 and its precursors) is generally within a mile or two downwind from a source. The ROI for photochemical pollutants, such as O_3, can extend much farther downwind than for inert pollutants. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. Ozone precursors are mainly VOCs and NO_x. In the presence of solar radiation, the maximum effect of VOCs and NO_x emissions on O_3 levels usually occurs several hours after they are emitted and many miles from the source.

3.5.1.2 Baseline Air Quality

The EPA designates all areas of the US as having air quality better than or equal to (attainment) or worse than (nonattainment) the NAAQS. A nonattainment designation generally means that a primary NAAQS has been exceeded more than once per year in an area. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas. In regard to the

NAAQS, Imperial County is presently in "marginal" nonattainment for the 8-hour O_3 standard. Roughly the southwest three quarters of the County is also in "serious" nonattainment area for PM_{10} NAAQS (known as the Imperial Valley Planning Area). In regard to the CAAQS, Imperial County is presently in nonattainment for O_3 and PM_{10}. The county is in attainment for CO, except the City of Calexico, which is in nonattainment for the CO state standard. Otherwise, the County attains all other national and state ambient air quality standards.

Ozone concentrations are generally the highest during the summer months. Maximum O_3 concentrations tend to be regionally distributed, since precursor emissions become homogeneously dispersed in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

Fugitive dust emissions (PM_{10}) within the Project region mainly occur from ground-disturbing activities, such as agricultural tilling, vehicular activities on paved and unpaved surfaces, and high wind events. The arid conditions of the Project region enhance the potential for fugitive dust emissions.

3.5.1.3 Regulatory Setting

The Federal Clean Air Act of 1969 (CAA) and its subsequent amendments establish air quality regulations and the NAAQS and delegate the enforcement of these standards to the states. The ARB enforces air pollution regulations and sets guidelines to attain and maintain the national and state ambient air quality standards within the state of California. These guidelines are found in the California State Implementation Plan (SIP). This section provides a summary of the air quality rules and regulations that apply to the proposed action.

The Imperial County Air Pollution Control District (ICAPCD) regulates sources of air emissions within Imperial County. In 1991, the ICAPCD developed a plan to bring the Imperial Valley Planning Area (IVPA) into attainment of the national PM_{10} standard, as the area was in moderate nonattainment of this standard. In August 2004, the EPA formally reclassified this area as in serious nonattainment of the national PM_{10} standard. As a result, the ICAPCD will be required to develop a new attainment plan to bring the IVPA into attainment of this standard. However, the EPA has yet to issue an official request for this requirement. In 1992, the ICAPCD developed a plan to bring the County into attainment of the national 1-hour ozone standard, as the region was in moderate nonattainment of this standard. It is unknown if the ICAPCD will be required to develop a plan to bring the County into attainment of the national 8-hr ozone standard, as the EPA is still developing guidance for the requirements of marginal nonattainment areas.

Through the attainment planning process, the ICAPCD develops the *Rules and Regulations of the Imperial County Air Pollution Control District* to regulate stationary sources of air pollution in the County (ICAPCD 2005a). The most pertinent ICAPCD rules that apply to the proposed action are (1) Regulation VIII - Fugitive Dust Rules and (2) Rule 925 - General Conformity. The purpose of Regulation VIII is to reduce PM_{10} emissions generated from anthropogenic (man-made) sources of fugitive dust by requiring actions to prevent, reduce, or mitigate these emissions. Rule 925 states that a federal agency cannot support an activity unless the agency

determines that the activity will conform to the most recent EPA-approved SIP within the region of the proposed project. This means that federally supported or funded activities will not (1) cause or contribute to any new air quality standard violation, (2) increase the frequency or severity of any existing standard violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. Based upon the present attainment status of the project area, the Proposed Action would conform to the SIP if its annual emissions remain below 100 tons of NOx or VOC and 70 tons of PM_{10}. If the Proposed Action exceeds one of these *de minimis* thresholds, performance of a formal conformity determination is the next step in the conformity analysis process.

The ICAPCD relies on the project proponent to comply with all applicable ICAPCD rules and implement compensation measures identified in the California Environmental Quality Act (CEQA) Air Quality Handbook to ensure that air quality impacts from proposed construction are less then significant (ICAPCD 2005b). Although CEQA does not apply to Reclamation actions, the CEQA Air Quality Handbook contains measures to comply with the ICAPCD rules and the CAA. Therefore, the proposed action would adhere to the Handbook's guidelines when appropriate. The compensation measures provided in section 3.5.2.2.3 of this EA include the ICAPCD requirements that would achieve this objective.

3.5.2 Environmental Consequences and Compensation Measures

3.5.2.1 Thresholds of Significance and Methodology

Criteria to determine the significance of air quality impacts are based on federal, state, and local air pollution standards and regulations. The ICAPCD has not established criteria for assessing the significance of construction air quality impacts for NEPA purposes or within their CEQA Air Quality Handbook. Therefore, this analysis assumes that Project impacts would be potentially significant if Project emissions exceed the annual thresholds that trigger a conformity determination, as described above (100 tons for VOC and NO_x and 70 tons for PM_{10}). While the Project region attains the ambient air quality standards for CO and sulfur dioxide (SO_2), this analysis also adopts the conformity thresholds of moderate nonattainment areas for these pollutants (100 tons per year) as significance criteria. This approach is conservative, as the CO and SO_2 thresholds are designed to assess the potential for emission sources to impact a nonattainment area for these pollutants.

If emissions exceed a significance threshold described above, further analyses of the emissions and their consequences would be necessary to assess whether there is a likelihood of a significant impact to air quality. The nature and extent of such analyses would depend on the specific circumstances. The analyses could range from a more detailed and precise examination of the likely emitting activities and equipment to air dispersion modeling analyses. If Project emissions were determined to increase ambient pollutant levels from below to above a national or state ambient air quality standard, these emissions would be considered a significant affect.

Air pollutant emissions produced from the proposed construction activities were estimated using the most up to date and comprehensive emission factors and methods, and then were compared to the criteria identified above to determine their significance. Based upon activity and

scheduling data estimated for the Proposed Action, the analysis estimated annual emissions from the proposed construction and operational activities assuming a three year construction period.

Factors used to estimate Project emissions were obtained from the (1) *ARB OFFROAD Model* for mobile construction equipment (ARB 1999), (2) the EMFAC2002 mobile source emissions models for on-road trucks (ARB 2003), and (3) the EPA *AP-42* document for stationary fugitive dust sources (EPA 1995). Details of emission source data and calculations used to estimate emissions from the Proposed Action are included in Appendix F of this EA.

3.5.2.2 Proposed Action

The following presents an analysis of the air quality impacts associated with the Project. Emission sources would include combustive and fugitive dust (PM_{10}) emissions generated by the proposed construction and operational activities.

3.5.2.2.1 Annual Emissions A summary of the annual emissions that would occur from the proposed construction activities is presented in Table 3.5-1. These data show that Project air emissions would remain below all emission significance thresholds and therefore the proposed construction activities would produce no significant air quality impacts. The main source of PM_{10} emissions would occur from fugitive dust generated from vehicles that operate on bare soils.

Table 3.5-1. Annual Emissions for Proposed Construction Activities – Drop 2 Reservoir

Year/Project Activity	*Annual Emissions (Tons)*				
	VOC	CO	NOx	SOx	PM10
Year 1					
All-American Canal Turn-In Construction	0.35	2.31	5.44	0.01	1.94
Year 1 Emissions	**0.35**	**2.31**	**5.44**	**0.01**	**1.94**
Year 2					
All-American Canal Turn-In Construction	0.06	0.39	0.91	0.00	0.32
Reservoir Construction	4.18	20.26	59.22	0.05	40.31
Inlet and Outlet Canal Construction	0.86	4.66	12.39	0.01	19.68
Year 2 Emissions	**5.10**	**25.30**	**72.52**	**0.07**	**60.31**
Year 3					
Reservoir Construction	2.79	13.50	39.48	0.04	26.87
Inlet and Outlet Canal Construction	0.86	4.66	12.39	0.01	19.68
Year 3 Emissions	**3.65**	**18.16**	**51.87**	**0.05**	**46.55**
NEPA Significance Thresholds	**100**	**100**	**100**	**100**	**70**

A summary of the annual emissions that would occur from the proposed maintenance activities is presented in Table 3.5-2. Sufficient water will be maintained in the storage reservoir during drawdowns to prevent the reservoir bottom from being exposed, limiting dust. The reservoir cells may be infrequently dried prior to silt removal operations. As indicated in this table, Project air emissions would remain below all emission significance thresholds for proposed operations and maintenance activities.

Table 3.5-2. Annual Emissions for Proposed Maintenance Activities – Drop 2 Reservoir

Project Activity	*Annual Emissions (Tons)*				
	VOC	CO	NOx	SOx	PM10
Silt Removal Operations	0.23	0.96	2.87	0.00	5.08
Annual Emissions	**0.23**	**0.96**	**2.87**	**0.00**	**5.08**
NEPA Significance Thresholds	**100**	**100**	**100**	**100**	**70**

3.5.2.2.2 Conformity Applicability Analysis Table 3.5-3 summarizes the annual conformity-related emissions that would occur from the proposed construction activities and for post-year 2010 maintenance activities. Consistent with the conformity guidelines, PM10 emissions from the concrete batch plant and soil cement pugmill are not included in these data, as these sources would require an ICAPCD air permit and by definition, would conform to the SIP. The data in Table 3.5.-3 show that emissions from the proposed construction activities would remain below all pollutant conformity thresholds. Additionally, Project emissions would not be regionally significant, as they would be substantially less than 10 percent of any air pollutant estimated for the SSAB emissions inventory. Appendix B presents the emission calculations associated with the Project conformity applicability analysis.

Table 3.5-3. Annual Conformity-Related Emissions – Drop 2 Reservoir

Year/Project Activity	*Annual Emissions (Tons)*		
	VOC	NOx	PM10
Year 1			
All-American Canal Turn-In	0.35	5.44	1.94
Year 1 Emissions	0.35	5.44	1.94
Year 2			
All-American Canal Turn-In	0.06	0.91	0.32
Reservoir Construction	2.87	40.58	24.96
Inlet and Outlet Canal Construction	1.00	14.46	22.94
Year 2Emissions	**3.93**	**55.95**	**48.23**
Year 3			
Reservoir Construction	4.10	57.97	35.66
Inlet and Outlet Canal Construction	0.71	10.33	16.39
Year 3 Emissions	**4.81**	**68.30**	**52.05**
Post-Year 3			
Silt Removal Operations	0.23	2.87	5.08
Post-Year 3 Emissions	**0.23**	**2.87**	**5.08**
Conformity Thresholds	**100**	**100**	**70**

3.5.2.2.3 Compensation Measures The unmitigated impact analysis determined that the proposed construction activities would produce no significant air quality impacts. However, Reclamation must comply with the requirements of ICAPCD Regulation VIII to minimize fugitive dust emissions, as outlined in the following rules:

- Rule 800 – General Requirements for Control of Fine Particulate Matter
- Rule 801 – Construction and Earthmoving Activities
- Rule 802 – Bulk Materials
- Rule 803 – Carry-out and Track-out
- Rule 804 – Open Areas
- Rule 805 – Paved and Unpaved Roads
- Rule 806 – Conservation Management Practices

In addition to a variety of dust control measures outlined in these rules, ICAPCD Rule 801 requires the development of a dust control plan for construction sites of 5 acres or more for non-residential developments. Reclamation shall consult with the ICAPCD to ensure Project compliance with the requirements of Regulation VIII. Reclamation shall also implement the feasible compensation measures identified in Section 7.1 of the ICAPCD *CEQA Air Quality Handbook* (Construction Equipment and Fugitive PM_{10} Mitigation Measures) that are not part of the Regulation VIII requirements. Due to the implementation of the above requirements, the Project would produce no significant impacts to air quality.

3.5.2.3.4 Residual Impacts After Compensation No significant air quality impacts from the proposed construction would occur.

3.5.2.2 No-Action Alternative

Under the No-Action Alternative, Reclamation would not conduct construction activities related to the Drop 2 Storage Reservoir Project. Therefore, the No-Action Alternative would result in no significant impacts to air quality.

3.6 Cultural Resources

3.6.1 Affected Environment

Reclamation has completed a Class III cultural resources inventory and evaluation of the Drop 2 Storage Reservoir Project site (Schaefer et al., 2005). The study was undertaken to determine whether the Project area contains prehistoric or historic resources that may be eligible for listing on the National Register of Historic Places (NRHP). The Class III study included an intensive pedestrian survey of the entire Project area, including the reservoir, inlet canal and outlet canal. Nine sites and five isolated resources were newly recorded and evaluated. Shovel test pits were excavated in prehistoric sites to check for subsurface cultural materials. Native American and California State Historic Preservation Officer consultations are ongoing. Key results of the Class III study are briefly summarized below.

3.6.1.1 Background

Although the prehistory of the Colorado Desert spans at least 12,000 years, prehistoric resources identified in the Project area are restricted to the Late Prehistoric Period (A.D. 1000 to 1700) also known as the Patayan cultural pattern. During this period desert people developed a diversified economy based on high residential mobility. Residential bases and associated temporary camps were moved from place to place, often to take advantage of seasonally available plant foods. Movement between the Colorado River and Lake Cahuilla increased in frequency and trails throughout the Colorado Desert attest to long-range travel to resource collecting zones and ceremonial locations, trading expeditions and, possibly, warfare. The Project area is located within an east-west transportation corridor that includes traditional territories and areas of use by several Yuman-speaking groups subsequent to contact with European explorers in the late 18th century, including the Yuman groups: the Quechan and Mojave; the delta Yuman groups: the Cocopah, Halchidhoma, Kouanas and Halyikwamais; and the Kamia, desert bands of Kumeyaay people residing in what are now San Diego and Imperial counties. As a transitional zone between tribal groups, the Project area would have seen the movement of prehistoric and ethnohistoric people and goods for trade and exchange. Archaeological manifestations along the trail system include pottery fragments representing "pot drops," trailside shrines, and isolated artifacts.

Historic Period activities within and near the Project area strongly reflect the development of Yuma. Fort Yuma was established in 1850 at the confluence of the Gila and Colorado rivers to keep peace at the ferry that was used by California gold-seekers and settlers. A Quartermaster's Depot constructed in 1864 on the Arizona side of the river soon spawned population growth and development south of the depot. This town, first named Arizona City, was renamed Yuma in the 1860s and grew steadily until 1877 when completion of the Southern Pacific Railroad linking Los Angeles and Yuma accelerated the town's expansion. San Diego leaders, stung by the loss of the transcontinental railroad terminus to Los Angeles, helped fund construction of a wooden road between Yuma and San Diego. Although a major improvement, the Plank Road was dangerous and difficult and usually in need of repair. It finally was replaced in 1928 by US 80, nearby portions of which still serve as a frontage road for I-8, constructed in 1974.

Efforts to use the Colorado River to irrigate the Imperial and Coachella valleys have affected the landscape throughout the California Desert and elsewhere. The first irrigation system was the Imperial or Alamo Canal. Built in 1900 by the California Development Company (CDC), this privately owned system delivered Colorado River water to the Alamo River Channel just above the Mexican Border. The availability of water soon attracted settlers but the CDC charged exploitive costs that forced many into hardship. Signing the Newlands Reclamation Act in 1902 led to the formation of the Reclamation Service and the federal government began a campaign to take control of the irrigation system. By 1904 the Alamo Canal system had silted up. To provide more reliable sources of water, the Reclamation Service surveyed the Lower Colorado River and found several alternative sites for development. One of these, the Yuma Dam site (later Imperial Dam), was eventually the preferred site for the AAC. The CDC finally lost it rights to the Colorado River water when the government declared it navigable.

The CDC attempted to construct a new irrigation intake south of the border but an engineering failure caused the horrendous 1905-1907 flood that created the Salton Sea and destroyed the Imperial Valley irrigation system. The bankruptcy of the CDC gave impetus to a movement in California to create publicly owned irrigation programs. The Imperial Irrigation District was formed in 1911, eventually acquired all mutual water companies of Imperial Valley, and helped support the financial and political campaign that eventually led to the construction of the AAC to water the East Mesa.

3.6.1.2 Inventory Results

Seven historic sites, two prehistoric sites, and five isolates occur within and adjacent to the Project area (Schaefer et al., 2005). Four sites are considered NRHP eligible, and five sites and five isolates are evaluated as ineligible. Resources are listed in Table 3.6-1 and described below.

Table 3.6-1. Drop 2 Reservoir Project Site Cultural Resources Inventory *

Temp No.	*Description*	*Attributes*	*NRHP Eligibility*
D2-1	Brock Ranch Research Center (Experimental Farm No. 2) (1947-1996)	demolished buildings, open fields, irrigation ditches	Not eligible
D2-2	Historic trash dump (1935-1945)	cans, auto parts, glass	Not eligible
D2-3	Historic trash dump (1935-1945)	oil cans, auto parts, melted and other glass, 500+ bottle caps	Not eligible
D2-4	Historic trash dump (1935-1950)	six loci, 1000+ bottle caps, glass, auto parts	Not eligible
D2-5	Prehistoric ceramic scatter	22 Tumco Buff sherds	Eligible
D2-6	Prehistoric ceramic scatter	37 Tumco Buff sherds	Eligible
D2-7	Historic US Army telegraph line (1875-1891)	remnant wood posts, wire, glass insulator	Eligible
D2-8	Historic Old Highway 80/Evan Hewes Highway	concrete pavement	Not eligible
CA-IMP-7658[1]	Old Coachella Canal (1939-1982)	canal and berms	Eligible

* *Source:* Schaefer et al., 2005

Note: 1. Permanent archaeological site trinomial assigned.

The Brock Ranch Research Center (D2-1) is a former experimental farm (1947-1996) designed to evaluate whether the East Mesa could support crops and ornamental plants. Houses once associated with the property have been demolished. The inventory noted the presence of a main concrete canal, feeder canals and flow gates that once irrigated individual plots, an old water pump, a partially demolished corrugated metal shed, remains of a chicken coop, storage tanks, a disassembled windmill, associated demolition and farm-related debris, lemon and grapefruit groves, and ornamental trees and shrubs. This Brock Ranch Research Center is evaluated as ineligible for NRHP listing due to its lack of integrity, most physical remains are less than 50 years of age, and has only minor historical significance at the local level.

Three historic trash dumps (D2-2, D2-3, and D2-4) were identified. All materials were probably dumped by proprietors of a rest stop at Gordon's Well located less than a mile away. D2-2 consists of two small loci each of which measure approximately 2-3 m in diameter. Locus A includes eight beverage cans, a motor oil can, three food cans, and one chrome auto molding strip. Locus B is a trash dump of household and automotive items such as motor oil cans, three beer bottles, three coffee can lids and one smashed coffee can, D-cell batteries, wire nails, and fragments of red automotive tail light glass and window glass fragments. D2-3 consists of two loci that appear to represent the contents of trash barrels or burn barrels that include a variety of household and automotive-related items. Locus A consists of automotive materials such as motor oil cans, burned tires, car frame parts, melted glass, and chunks of cement while Locus B includes a quantity of bottle caps that probably indicates retail sales of soda, milk cans, a 1940s lid to a household cleanser, fragments of a hand lotion bottle, one drinking glass, and other fragments of bottles, cans, and a jar. Trash dump D2-4 consists of six discrete loci that appear to be dumped contents of trash barrels or burn barrels. Materials include a quantity of bottle caps, milk cans, drinking glasses, condiment jars, dinnerware fragments, Purex bottle fragments, beer bottle fragments, burned and unburned tires, sparks plus, oil cans and other similar debris. The absence of whole bottles and collectible items suggest the site has been visited by artifact collectors. All three historic trash dumps are evaluated as ineligible because they lack significant historic or research values.

Prehistoric pottery scatters D2-5 and D2-6 are considered NRHP-eligible because they can contribute to an archaeological district that includes dozens of such scatters located in a wide corridor between Imperial Valley and the Colorado River. Information about clay sources and temporal and ethnic aspects of these scatters have significant research values associated with such topics as prehistoric and ethnohistoric regional patterns of trade and exchange, population movements and social interaction, and ceramic typology and chronology. Individual ceramic scatters have limited research value and usually are not considered eligible for the NRHP but collectively they have the potential to yield data important to prehistory and ethnohistory.

Remains of the San Diego-to-Yuma US Army Telegraph (D2-7) are considered eligible for listing in the NRHP under Criteria A and D on the local, regional and national levels. Although the remains are fragmentary and exhibit generally poor integrity, the military telegraph played an essential role in helping to secure the southwest for American settlement after the Civil War and helped spur development of what is now downtown San Diego. Remains of the telegraph represent one of the oldest historic resources in the Imperial Valley. Although examples of insulators have been collected at the Serra Museum of the Sand Diego Historical Society and at

the Yuma Historical Society, the field survey identified a rare fragment of an insulator still attached to telegraph wire.

Resource D2-8 is a segment of old Highway 80/Evan Hewes Highway located on the north side of I-8. It commemorates Evan Hewes who served as the Executive Superintendent of Imperial Irrigation District from 1938-1957. The road segment measures a little over four miles long and includes a right-of-way 200 feet north and south of the centerline. The route was established in 1915 and was part of the Plank Road, although this segment was not constructed with wooden planks. Cracks on the modern road suggest the original road surface is sealed beneath the asphalt but was probably modified in 1949 when the highway was widened and resurfaced. In 1973 the highway was bypassed when I-8 was completed.

Portions of the Evan Hewes Highway were previously evaluated as ineligible for the NRHP (Steven Wee in Cook et al. 2001) and that evaluation applies to the D2-8 segment as well. While the road played an important role in transporting goods in and out of the Imperial Valley and across country, the same can be said for all trunk roads and there is nothing to distinguish the road in the context of transportation history. Although the road is named after an influential superintendent of IID, Hewes' involvement was commemorative and thus the road is not truly associated with a significant person. The road is not unique and, finally, the highway lacks integrity to its original period of construction as a result of subsequent widening and resurfacing.

Approximately 60 to 80 roadside trash dumps were noted within the right-of-way on the north side of the highway. They include typical roadside debris such as beverage cans and bottles and pieces of shredded tires. Most of the artifacts seem to date from the late 1950s to the early 1970s although a small proportion appears to date to the late 1940s.

Old Coachella Canal (CA-IMP-7658): the excavated prism of the original Coachella Canal is located near the Project area and filled portions of the old canal are within the Project area. Portions of the canal have been determined eligible for NRHP listing as part of a past lining project. Compensation measures were implemented as part of the past lining project, including documenting the entire system to standards of the Historic American Engineering Record (HAER) with emphasis on the segment between Siphons 7 and 32. The existing Coachella Canal Turnout Structure is located adjacent to the AAC Drop No. 1 Structure. The existing Turnout Structure will be modified to allow flows to be bifurcated and allow controlled delivery to the existing Coachella Canal and to the new proposal Inlet Canal. A detailed photographic record of the original construction of the existing Coachella Canal Turnout Structure was prepared.

The five isolated remains (D2a-e as listed in Table 3.6-2) include one prehistoric pottery sherd, one 1937 Reclamation benchmark and three Government Land Office (GLO) survey markers established in 1915. Isolates are ineligible for listing in the NRHP, although the benchmark and markers have limited historical value. The four survey monuments although not eligible to the NRHP, bear some historical significance with regard to the early history of land survey in the area (three 1915 GLO section markers) and also to the building of the AAC (one 1937 Reclamation elevation control monument).

Table 3.6-2. Drop 2 Reservoir Project Isolate Inventory

Temp No.	*Description*	*NRHP Eligibility*
D2-a	Tumco Buff sherd	Not eligible
D2-b	1937 Reclamation benchmark	Not eligible
D2-c	1915 GLO section corner marker	Not eligible
D2-d	1915 GLO quarter-section marker	Not eligible
D2-e	1915 GLO section corner marker	Not eligible

There is a possibility that some unrecorded ceramic scatters may lie beneath smaller dunes in the Project area. Otherwise, there is little or no potential for the Project area to contain unrecorded sites that may lie buried beneath the present ground surface. The alluvial deposits of the East Mesa pre-date the Holocene and no archaeological sites have ever been found associated with nearby Pleistocene shorelines of Lake Cahuilla.

3.6.2 Environmental Consequences and Compensation Measures

3.6.2.1 Thresholds of Significance

Impacts would be significant if the Proposed Action or alternatives would have an adverse effect on qualities that make a cultural resource eligible for listing in the NRHP. The federal criteria for defining if a cultural resource is significant is stated in the eligibility requirement for nomination to the National Register of Historic Places (36 CFR § 60.4), maintained by the National Park Service, Department of the Interior. In order to qualify for the National register, a property must possess integrity of location, design, setting, material, workmanship, feeling, and association and meet one or more of the following eligibility criteria:

a) Is associated with events that have made a significant contribution to the broad patterns of history; or

b) Is associated with the lives of persons significant in the past; or

c) Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or

d) Has yielded, or may be likely to yield, information important in prehistory or history.

3.6.2.2 Proposed Action

Initial clearing and excavation of the reservoir and canal could adversely affect cultural resources in the Project right-of-way. Eligible resources that could be disturbed or destroyed include ceramic scatters D2-5 and D2-6. In addition, fragments of rare historic insulators and other remains of the historic U.S. Army telegraph line (D2-7) are located within or just outside of the north side of the right-of-way and could be directly disturbed during grading, inadvertently affected by vehicular travel, or collected by unauthorized personnel. Such impacts are considered significant. In addition, there is the possibility that the project could destroy any

unrecorded ceramic scatters that may lie underneath some of the smaller dunes crossed by the right-of-way. The proposed alignment will cross a filled-in segment of the Old Coachella Canal.

3.6.2.2.1 Compensation Measures Four historic properties will be either directly or indirectly affected by the proposed project. The following compensation measures are proposed:

CA-IMP-7658 (Old Coachella Canal): The lower sections of the old canal system was documented, according to HAER standards, when the newer, lined segment was constructed. No further compensation is required for this historic property. Benchmark and section markers will be avoided by the project.

CR-1 NRHP-eligible ceramic scatters D2-5 and D2-6 will be avoided through project design. Temporary barriers or markers and monitoring will be used to ensure avoidance.

CR-2 Artifacts associated with the historic U.S. Army telegraph line (site D2-7), located just within or immediately north of the project area, that will be disturbed by project activities will be collected. Although examples of insulators have been collected previously, the field survey identified a rare fragment of an insulator still attached to its telegraph wire. Display of this item in an appropriate setting will be considered. Otherwise, the item will be curated at Reclamation's repository in Boulder City, Nevada.

CR-3 Monitoring for cultural resources in sand dune areas will be conducted by qualified archaeologists and Native American monitors as required during all ground disturbing activities in the area of known or suspected cultural resources. The shifting sands may uncover previously unidentified cultural resources. In the event that a site is found, the procedures for Post-review discoveries outlined in 36CFR Part 800.13 will be followed by site workers and a Reclamation archaeologist will be notified immediately.

3.6.2.2.2 Residual Impacts After Compensation No additional effects to historic properties are anticipated. In the event that a discovery is made after compensation, the Post-review discoveries procedures outlined in 36CFR Part 800.13 will be followed.

3.6.2.3 No-Action Alternative

The No-Action Alternative will not result in ground disturbance and impacts to cultural resources would not occur.

3.7 Environmental Justice

This section addresses the potential for the Project to create disproportionate impacts on minority and low-income populations.

In 1994, the President issued EO 12898, Federal Actions to Address Environmental Justice in Minority and Low-income Populations. The objectives of the EO include developing Federal agency implementation strategies, identifying minority and low-income populations, including Indian tribes, where proposed Federal actions could have disproportionately high and adverse human health and environmental impacts, and encouraging the participation of minority and low-income populations in the NEPA process.

Minority populations include all persons identified by the Census of Population and Housing to be of Hispanic or Latino origin, regardless of race, as well as non-Hispanic persons who are Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander.

Low-income populations are those that fall within the statistical poverty thresholds from the Bureau of the Census for the 2000 Census. For the purposes of this analysis, low-income populations are defined as persons living below the poverty level ($17,463 for a family of four with two children in 2000, adjusted based on household size and number of children), as reported by the Census. The Census Bureau uses a set of money income thresholds that vary by family size and composition. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as being "below the poverty level." The percentage of low-income persons is calculated as the percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a slightly lower number than the total population since it excludes institutionalized persons, persons in military group quarters and in college dormitories, and unrelated individuals under 15 years old.

3.7.1 Affected Environment

The affected area includes the locations where most of the Proposed Action's effects are expected to occur including the reservoir site, the inlet and outlet canal locations and nearby communities where construction workers are likely to reside. The affected area therefore includes Imperial County, California and Yuma County, Arizona, the City of El Centro, City of Calexico, City of Holtville, and community of Winterhaven in Imperial County, and the City of Yuma in Yuma County. Two types of data were reviewed to evaluate environmental justice effects: minority populations (reported as ethnicity and race by the Census) and poverty status. Information on total population, minority population, and poverty status for the two counties and two cities for 2000 is provided in Table 3.7-1 below.

Of the two counties, Imperial County has a higher percentage of both minority and low-income populations, at approximately 80 percent and 23 percent, respectively. The City of El Centro has similar characteristics; approximately 82 percent of the population is minority and 23 percent low-income, compared to approximately 98 percent minority and 26 percent low-income for the

City of Calexico, approximately 76 percent minority and 18 percent low-income for the City of Holtville, and approximately 67 percent minority and 47 percent low-income for the community of Winterhaven. The population of Yuma County is approximately 56 percent minority and 19 percent low-income. The City of Yuma's population is approximately 53 percent minority and 15 percent low-income, slightly less than Yuma County.

Table 3.7-1. Total Population, Minority Population and Population Living Below Poverty in the Affected Area, 2000

County	*Total Population*	*Minority Population*	*Percent Minority*	*Population Living Below Poverty Level*	*Percent of Population Living Below Poverty Level*
Imperial County, CA	142,361	113,872	80.0	29,681	22.6
City of Calexico	27,109	26,467	97.6	6,918	25.7
City of El Centro	37,835	30,998	81.9	8,405	22.8
City of Holtville	5,612	4,263	75.9	1002	18.2
Winterhaven CDP	529	354	66.9	246	47.1
Yuma County, AZ	160,026	88,896	55.6	29,670	19.2
City of Yuma	77,515	40,731	52.5	10,910	14.7

Note:
Percent of population living below poverty is calculated by taking into consideration the population for whom poverty status is determined, a number that is generally less than the total population, because certain populations are excluded. Winterhaven is identified by the Census as a census designated place (CDP). CDPs comprise densely settled concentrations of population that are identifiable by name but are not legally incorporated places.
Source: US Census Bureau, 2000.

Executive Order 12898 states that Federal agencies should also analyze environmental effects on Indian tribes, when such analysis is required by NEPA. Tribal lands are located in areas along the Colorado River and tribes are included among the river system's users (e.g., Quechan Tribe [Fort Yuma Indian Reservation]). As described in section 3.9, Indian Trust Assets, Reclamation has requested consultation with the Quechan and Cocopah Tribes. There are no known Indian Trust Assets or other resources of tribal concern in the Project area.

3.7.2 Environmental Consequences and Compensation Measures

3.7.2.1 Thresholds of Significance

The analysis of environmental justice impacts is required by EO 12898 and must be evaluated in NEPA documents. NEPA does not require the use of significance criteria. This analysis considers whether the impacts of the Project would disproportionately affect minority or low-income populations.

3.7.2.2 Methodology

The impact analyses for other resources presented in Chapter 3 were reviewed to determine whether they identified impacts on human populations and these impacts were used as the basis for the environmental justice analysis. If impacts exceeded a recognized threshold or were otherwise considered to be significant or substantial, an environmental justice analysis was done

to determine if disproportionate impacts would result. This analysis requires the comparison of demographics of the jurisdiction or jurisdictions (e.g., a county) containing the adversely affected area with the demographics of the area adversely affected. Populations are not present in the immediate vicinity of the site but are located in nearby communities where workers would potentially reside (e.g., El Centro and Yuma.) If the percentage of minority or low-income persons in any adversely affected area appreciably exceeds that of the comparison region, disproportionate effects could occur. If applicable, proposed compensation and residual effects identified for other resources are taken into account in determining whether additional compensation would be needed to specifically address environmental justice.

3.7.2.3 Proposed Action

The Proposed Action would not result in disproportionately high and adverse human health and environmental effects on minority or low-income populations. No significant impacts were identified for the Proposed Action that would be expected to adversely affect human populations or the public. Construction of the reservoir site would occur on federally withdrawn land that contains abandoned farmland (see section 3.4 Agricultural Resources for discussion of affects on agriculture). Although construction easements will be required on County roads for the inlet canal, construction will not require acquisition of private property. No population or housing would be displaced by the Proposed Action and construction and operations employment for the Proposed Action would not induce substantial population growth. LCR system users would be the direct beneficiary of additional system storage space by the capture of non-storable flows presently passing uncontrolled to Mexico when flows in the river exceed demand. Secondary benefits would be derived by the increased operational flexibility of the AAC. The additional storage will not have an effect on agricultural productivity or fallowing because water would still be delivered according to established operating criteria. The Proposed Action would produce economic benefits including construction jobs and purchases of construction materials and services. The Proposed Action would not result in disproportionately high and adverse human health and environmental effects on minority or low-income populations.

3.7.2.4 No-Action Alternative

Under the No-Action Alternative, no new facilities would be developed. As a result, non-storable flows would continue to leave the US with a similar frequency and volume as current conditions. The No-Action Alternative, therefore, would not create benefits for system users of the Colorado River by improving operational flexibility and increasing ability to maximize use of the Colorado River within the US. The Proposed Action would not result in disproportionately high and adverse effects on minority and low-income populations. The No-Action Alternative would therefore not avoid any such environmental justice effects.

This page intentionally left blank.

3.8 Hazards/Hazardous Materials

This section addresses the potential impacts related to hazards and hazardous materials resulting from construction and operation of the Proposed Action, as well as the No-Action Alternative.

3.8.1 Affected Environment

The proposed reservoir and canals are located in a desert/agricultural environment with very limited commercial and/or industrial land uses. Therefore, the potential for petroleum products and/or hazardous materials in soils or groundwater in the Project area is relatively low. Most of the land within the proposed reservoir site has been operating as a farm for an extended period of time. Approximately 120 acres of the reservoir site supports abandoned citrus trees. Localized areas of soil and groundwater contamination were previously present at the Brock Ranch Experimental Research Center (Brock Ranch), which is the location of the proposed Drop 2 reservoir site. The following is a summary of former soil and groundwater contamination on the Brock Ranch.

Soil and groundwater beneath Brock Ranch was locally impacted by an accidental release of diesel from an aboveground farm type storage tank (AST). Based on groundwater sampling completed in 1999, groundwater contamination extended approximately 40 feet laterally and at least 50 feet deep. The depth to groundwater is approximately 40 feet below ground surface. In 1999, soil in the vicinity of the AST leak contained up to 27,900 milligrams/kilogram (mg/kg) of total petroleum hydrocarbons (TPH), as diesel, and the groundwater contained up to 18,000 micrograms/liter (ug/l) of dissolved TPH, as diesel (Reclamation 2005a). However, subsequent soil sampling, from depths of 0 to 3 feet, indicated no detectable concentrations of petroleum hydrocarbons (Jason Associates Corporation/Northwind Environmental, Inc. 2005).

Soil sampling completed in two regions of oil-stained soil indicated metals concentrations greater than background levels, but less than EPA Region IX Preliminary Remediation Goals (PRGs) established for the site (except for arsenic, which naturally exceeds the PRG in all samples collected). These metals concentrations have been attributed to waste oil from machinery. Petroleum hydrocarbons were not detected in soil samples collected in these areas (Zenitech Environmental 2005; Jason Associates Corporation/North Wind Environmental, Inc. 2005).

Soil sampling was completed adjacent to a pesticide storage shed, located on Brock Ranch. These samples were analyzed for California Title 22 metals, semi-volatile organic compounds (SVOCs), chlorinated herbicides, organophosphate pesticides, and organochlorine pesticides. Nonhazardous concentrations of metals were detected. The SVOC bis (2-ethylhexyl) phthalate, which is used as an inert ingredient in pesticides and hydraulic oil, was detected at concentrations of 610 ug/kg and 1,400 ug/kg. These concentrations are within EPA acceptable levels for residential use. Similarly, Mecoprop (MCPP), Dinoseb, chlordane, 4,4-DDE, and 4,4-DDT were found at concentrations up to 41 ug/kg, which is less than PRGs established for the site (Reclamation 2005a; Zenitech Environmental 2005; Jason Associates Corporation/North Wind Environmental, Inc. 2005).

Soil sampling was completed in the vicinity of a former burn area, where among other items, oil was reportedly burned. Results indicated concentrations of TPH, as diesel, although the

substance in the soil appeared to be heavier than diesel (Reclamation 2005a). Additional soil remediation) may be required in this area during Project excavations.

Electrical transformer equipment located on the Brock Ranch was found to contain oils with polychlorinated biphenyls (PCBs). Soil sampling completed in the vicinity of this electrical equipment did not indicate PCB concentrations in soil in excess of the action level of 50 mg/kg, as established by the California Department of Toxic Substances Control (Zenitech Environmental 2005). The transformers have been removed as a part of IID's transformer management system, in accordance with all state and federal regulations. In addition, the soil containing detectable concentrations of PCBs comprised a thin veneer, overlying wooden, creosote-treated wooden planks. These wooden planks and overlying soil material were removed from the site and transported to a recycler in Arizona as recycled "treated wood and related waste material" (Reclamation 2005b).

On-site buildings were found to have asbestos-containing materials (ACMs) and lead-based paint (Geocon Consultants, Inc. 2001; Masek Consulting Services, Inc. 1999). These materials were removed in 2001 in concurrence with proper ACM inspections, analyses, and reporting requirements (Geocon Consultants, Inc. 2001; Reclamation 2005b).

Although petroleum contaminated soil, petroleum contaminated groundwater, ACMs, and lead-based paint were detected on-site, no further regulatory action was warranted at the site, based on a 2001 closure letter from the lead agency, the California Regional Water Quality Control Board (RWQCB) (RWQCB 2001), which agreed with the synopsis of the IID (IID 2002) that the petroleum hydrocarbon concentrations in soil and water posed no risk to human health or the environment and therefore that passive remediation (i.e., materials to be left in place to degrade naturally) should be employed. Similarly, the RWQCB also agreed that no further action was necessary with respect to ACMs and lead-based paint in on-site structures. These structures have been removed from the site. The letter did not address pesticide contamination at the site; however, pesticide concentrations in soil are within EPA acceptable levels for residential use and less than PRGs established for the site. No other areas of soil or groundwater contamination are known in the Project area.

3.8.2 Environmental Consequences and Compensation Measures

3.8.2.1 Thresholds of Significance

Impacts would be considered significant if the Proposed Action or alternatives result in:

- Discharge that creates a pollution, contamination, or nuisance, as defined in Section 13050 of the California Water Code.
- Release of toxic substances that would be deleterious to humans, fish, bird, or plant life.
- Release of hydrocarbon or related contaminants to the surface waters in such concentrations that existing local (e.g., RWQCB), state, or federal statutes would be violated.

3.8.2.2 Proposed Action

The proposed reservoir and canals are located in a desert/agricultural environment with very limited commercial and/or industrial land uses. Therefore, the potential for petroleum products and/or hazardous materials in soils or groundwater in the Project area is relatively low. Localized areas of soil and groundwater contamination were previously present at the Brock Ranch. The RWQCB closed the Brock Ranch property with respect to petroleum hydrocarbons, asbestos, and lead. The site has not been closed with respect to pesticide contamination; however, pesticide concentrations in soil are within EPA acceptable levels for residential use and less than PRGs established for the site. Therefore, impacts due to residual levels of pesticides, asbestos, and lead are considered not significant. See the following text regarding petroleum hydrocarbons.

In 1999, soil in the vicinity of the former AST contained high levels of petroleum contaminated soil, up to 27,900 mg/kg of TPH, as diesel. The RWQCB has closed the site, based in part on the assumption that passive remediation would result in a lowering of concentrations of diesel in onsite soil and groundwater, resulting in no risk to human health or the environment. However, with the exception of soil sampling to a depth of three feet, additional soil and groundwater sampling has not been completed to verify that such passive remediation has been completed. The risk to human health and the environment would change as a result of proposed excavations, up to 20 feet deep, for the proposed reservoir.

In the event that diesel-contaminated soil is encountered during Project excavations, adverse health impacts could occur to on-site workers as a result of direct contact or inhalation of residual petroleum odors. In addition, re-use of contaminated soil for embankment construction could potentially result in the introduction of contaminated soil into a previously clean area. Impacts would be potentially significant. In the event that contaminated soils are excavated, characterized, and properly disposed at an off-site facility that is designed to accept such waste, beneficial impacts would occur, thus partially offsetting any potentially significant impacts.

Project-related grading and construction equipment would use various types of petroleum products and hazardous materials during normal operations. Fueling and maintenance activities could potentially result in incidental spills of such substances, in turn causing adverse affects to on-site soils, surface water, and underlying groundwater. Impacts would be potentially significant.

3.8.2.2.1 Compensation Measures

HAZ-1 A monitor shall be present during excavation of known and suspected areas of soil contamination, including the former AST area and burn area, to direct proper excavation and characterization of contaminated materials. In addition, the monitor shall periodically (i.e., at least once a day) observe those identified Project excavations for potential signs of contaminated soil, such as discoloration, unusual odors, and/or positive readings with a portable photo ionization detector (PID) or organic vapor analyzer (OVA). The monitor shall be 40-hour OSHA trained with respect to handling of hazardous substances.

HAZ-2 Spill response equipment, such as absorbent pads, plastic sheeting, and temporary spill containment booms, shall be readily available during equipment fueling and maintenance.

HAZ-3 Prior to Project construction, existing monitoring wells, located in the vicinity of the former fuel AST, shall be abandoned, in accordance with Imperial County and State of California regulations, to prevent monitoring wells from becoming conduits for groundwater contamination from surface sources.

3.8.2.2.2 Residual Impacts after Compensation Excavation monitoring and soil sampling, if necessary, in areas of known and/or suspected contamination would reduce potential health and safety impacts to on-site workers, as well as soil reuse and/or disposal impacts, so that no significant impacts would occur. In addition, equipment fueling and maintenance equipped with spill response apparatus would reduce potential spill impacts so that no significant impacts would occur.

3.8.2.3 No-Action Alternative

No ground disturbance would occur under this alternative, resulting in no potential impacts associated with excavation of contaminated soil. However, potential beneficial impacts associated with the Project induced remediation of previously unknown contaminated soil would not be realized under this alternative.

3.9 Indian Trust Assets

3.9.1 Affected Environment

This section outlines potential impacts to tribal resources associated with the implementation of the Proposed Action. Tribal resources include all potential impacts to tribal lands and resources, including the specific category referred to as Indian Trust Assets (ITAs). ITAs are legal assets associated with rights or property held in trust by the US for the benefit of federally recognized Indian Tribes or individuals. The US, as trustee, is responsible for protecting and maintaining rights reserved by, or granted to, Indian Tribes or individuals by treaties, statutes, and executive orders. All Federal bureaus and agencies share a duty to act responsibly to protect and maintain ITAs.

ITAs include property in which a Tribe has legal interest, such as lands, minerals, water rights, and hunting and fishing rights. While most ITAs are located on a reservation, they can also be located off-reservation. For example, tribal entitlements to water rights pursuant to water rights settlements are considered trust assets, although the reservations of these Tribes may or may not be located along the river. A Tribe may also have other off-reservation interests and concerns that must be taken into account. There are no recorded ITAs within the proposed Project area.

In regard to this proposed project, Reclamation conducted a public scoping process and also contacted representatives from the Bureau of Indian Affairs, Chemehuevi Indian Tribe, Cocopah Indian Tribe, Fort Mohave Indian Tribe, Quechan Indian Tribe, and the Colorado River Indian Tribes prior to preparing the Draft EA (see Appendix A for a summary of the public scoping contacts).

In June 2006, Reclamation requested consultation with both the Quechan and Cocopah Tribes. As of the date of this Draft EA, the Cocopah have not requested government-to-government consultation. The Quechan Tribe, however, requested government-to-government consultation, which was held on 27 September 2006. The Quechan Tribe did not express any concerns regarding the Proposed Action during this meeting, and Reclamation considers government-to-government consultation completed.

3.9.2 Environmental Consequences and Compensation Measures

3.9.2.1 Thresholds of Significance

In accordance with Environmental Compliance Memorandum (ECM) 97-2, Reclamation's policy is to protect ITAs from impacts resulting from its programs and activities whenever possible. In cooperation with Tribe(s) potentially impacted by a given project, Reclamation must inventory and evaluate assets and then mitigate or compensate for impacts to the asset. The Proposed Action and alternatives were reviewed to determine whether effects of the components of the Federal actions would have an adverse impact on tribal resources, including ITAs.

3.9.2.2 Proposed Action

As described in Chapter 1, the purpose of the Proposed Action is to provide additional system storage and regulating capacity so as to capture previously non-storable flows released at Parker Dam. The Proposed Action would enhance beneficial use of Colorado River water in the US. The Proposed Action would augment Reclamation's ability to meet its obligations to Colorado River water users, including the Quechan Tribe. No significant impacts to ITAs or other tribal resources from implementation of the Proposed Action are anticipated.

Reclamation intends to keep all Tribes listed in section 3.9.1 informed of the Project's progress, even though no archaeological sites were documented within the Project area and no heritage preservation issues have been identified.

3.9.2.2.1 Compensation Measures Because no significant impacts on ITAs would occur as a result of implementation of the Proposed Action, no compensation measures are proposed.

3.9.2.2.2 Residual Impacts After Compensation The residual impact on ITAs would not be significant.

3.9.2.2.3 No-Action Alternative Under the No-Action Alternative, there would be no change from current conditions. Tribal resources would not be impacted by this alternative.

3.10 Land Use

This section discusses existing land uses at, and adjacent to, the proposed Project area in order to evaluate the compatibility of the Proposed Action and alternatives with those uses.

Land use attributes addressed in this analysis focus on general land use patterns, management plans, policies, and regulations. These provisions determine the types of uses that are allowable and identify appropriate design and development standards used to address specially designated or environmentally sensitive areas. State and Federal agencies are not subject to local land use and zoning regulations; however, these agencies cooperate with local agencies to avoid conflicts to the extent feasible.

3.10.1 Affected Environment

All proposed Project facilities would be located within federally owned, Reclamation withdrawn lands. When federal lands are withdrawn from the public domain they become administered by, and are under the jurisdiction of, an agency whose specific needs and purposes take precedent over other land uses. BLM provides assistance with managing Reclamation withdrawn lands by providing law enforcement and by overseeing any allowed recreational uses.

The Project site is situated in the proximity of the AAC with I-8 to the south and the Coachella Canal to the east. The proposed 615-acre reservoir site was withdrawn from the public domain for Reclamation's specific needs and purposes and subsequently leased to a private party for operation of the Brock Ranch Research Center (Brock Ranch). However, onsite agricultural operations have not been conducted since the Brock Ranch lease was terminated in 1999. The proposed reservoir site is not part of a Williamson Act Agricultural Preserve contract that would commit it to long-term agricultural uses. Project ancillary infrastructure (inlet and outlet canals) is located within the southern boundary of the FTHL East Mesa MA (see Figure 2-2).

3.10.1.1 Land Use Management Plans

As described earlier, Project facilities would be located within Reclamation withdrawn lands, owned and administered by Reclamation. Although the Project site is not subject to local land use and zoning regulations, the following adopted plans and programs guide land use planning on federal and state lands. Adopted plans and studies present factors affecting land use and include recommendations to assist officials and local community leaders in ensuring compatible development.

Flat-tailed Horned Lizard Rangewide Management Strategy (2003 Revision) The Flat-tailed Horned Lizard Rangewide Management Strategy (RMS) was developed to provide guidance to maintain existing populations of the FTHL. The RMS was developed in cooperation with federal, state, and local agencies, and was designed to be used as the basis for a conservation agreement among the agencies. This strategy provides the framework for securing and managing sufficient habitat to maintain several self-sustaining populations of the FTHL

throughout the species range in the US (FTHL Interagency Coordinating Committee 2003). The RMS established five designated FTHL MAs, including Yuma Desert, East Mesa, West Mesa, Yuha Desert, and Borrego Badlands, where surface disturbing activities are limited. Management Area lands are subject to RMS compensation policies, including compensation for impacts to management areas (FTHL Interagency Coordinating Committee 2003). See also section 3.2.

Imperial Sand Dunes Recreational Area Management Plan (Proposed Amendment to the 1980 California Desert Conservation Plan) This Recreation Area Management Plan (RAMP) was developed to guide the management of the lands and resources of the Imperial Sand Dunes Recreational Area (ISDRA) located within the BLM California Desert Conservation Area. The RAMP provides a framework for making effective programming, design, and resource management decisions. The purpose of the RAMP is to provide a comprehensive management plan designed to provide a variety of sustainable recreational activities while maintaining the unique and diverse habitat of the dunes system (BLM 2003). The RAMP delineates multiple-use goals and ecosystem management objectives to provide the maximum recreational use of the ISDRA while preserving sensitive species and habitats. The plan also includes evaluation requirements for monitoring recreational use, habitat condition, and species abundance within the ISDRA. The RAMP was developed in accordance with the Federal Land Policy and Management Act, as amended by the National Forest Management Act, and in accordance with the BLM's California Desert Conservation Plan including lands designated as Areas of Critical Environmental Concern.

Imperial County General Plan The Imperial County General Plan is a comprehensive, long-term framework for the protection of the county's resources and for its future growth development. The Imperial County General Plan contains goals, objectives, policies, and programs which support the County's desire to develop in a particular manner and to attain the vision expressed in the plan. The General Plan was developed pursuant to Section 65300 et seq. of the California Government Code and requires all planning jurisdictions to prepare and adopt a comprehensive, long-term general plan for the physical development of the county. The General Plan consists of a statement of development policies and text setting forth objectives, principles, standards and plan proposals (Imperial County 1993a).

The Land Use Element provides the framework for the future growth, expansion of public facilities, and environmental resource protection within Imperial County. The element establishes policies and regulations for maintaining and promoting the economic importance of agricultural operations, while determining the appropriate locations of urban centers and encouraging economic development within the County. Imperial County land use policies seek to protect the existing character of rural and recreational areas and maintain the unique natural and cultural resources of the Imperial Valley region (Imperial County 1993b).

3.10.2 Environmental Consequences and Compensation Measures

3.10.2.1 Thresholds of Significance

The following criteria were used to evaluate potential impacts on land use patterns and land management plans. Impacts on land use would be considered significant if the Proposed Action or alternatives would:

- Physically divide an established community;
- Conflict with existing land uses;
- Conflict with any applicable land use plan, policies, or regulations; or
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

3.10.2.2 Proposed Action

Construction and operation of the proposed reservoir and ancillary infrastructure (i.e., inlet and outlet canals) would not physically divide an established community; the Project would be implemented on undeveloped lands located away from populated, developed areas.

Proposed Action activities would occur on Reclamation withdrawn lands. The Project site and surrounding lands are located completely within Reclamation's jurisdiction; these lands are not subject to local land use and zoning regulations. All permanent and temporary required rights-of-way are anticipated to be on government lands. The Proposed Action would not alter or conflict with existing land uses.

The Project would result in permanent disturbances to both suitable FTHL habitat within and outside of the FTHL MA (see section 3.2 for more details). The proposed inlet canal alignment would result in direct and indirect impacts to 606 acres of suitable FTHL habitat within the FTHL MA. The Drop 2 Reservoir site and outlet canal would have direct and indirect impacts on 199 acres of FTHL habitat outside the FTHL MA. These permanent disturbances to suitable habitat are considered a significant impact to the FTHL RMS.

Project implementation would be consistent with the Imperial Sand Dunes RAMP policies, which amends BLM's 1980 California Desert Conservation Plan. Project activities would occur outside of RAMP management areas (including sensitive dune habitat), and therefore would not conflict with the multiple-use goals and ecosystem management objectives delineated in the RAMP. Accordingly, the Project would not conflict with any applicable federal land use plan, policy, or regulation.

Existing land uses for OHV recreation north and east of the Project area are managed by BLM. Reclamation facilities within the Project area are closed to public use. Access to existing BLM designated and maintained trails will be provided although such access may be modified as a result of Project activities.

Implementation of the compensation measures identified in section 3.2 (MM BIO 1 through BIO 16) compensate for Proposed Action impacts according to RMS policies adopted for the purpose

of managing sufficient habitat to maintain several self-sustaining populations of the FTHL. Therefore, the Proposed Action would not impede the implementation of RMS plans or policies.

Implementation of the Proposed Action would also be consistent with the guidelines specified in the Imperial County General Plan.

3.10.2.2.1 Compensation Measures No compensation measures specific to land use are required. Implementation of Compensation Measures BIO-1 through 16 would compensate for FTHL impacts as required by the RMS plans and policies.

3.10.2.2.2 Residual Impacts after Compensation Adherence to Compensation Measures BIO-1 through 16, for FTHL impacts as required by the RMS, would ensure no significant impacts on surrounding land uses and management plans would occur.

3.10.2.3 No-Action Alternative

Under the No-Action Alternative, no new reservoir or associated facilities would be constructed. Therefore, no impacts on land use compatibility would occur.

3.11 Noise

This section addresses noise from potential sources related to the implementation of the LCR Drop 2 Reservoir Project, including noise impacts from construction activities and other potential long-term operational noise.

3.11.1 Affected Environment

3.11.1.1 Regulatory Environment

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. Several noise measurement scales are used to describe noise in a particular location. A decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities.

The most common method of characterizing sound is the A-weighted sound level, or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 3.11-1. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

Because the sensitivity to noise increases during the evening and at night—excessive noise interferes with the ability to sleep—24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The Community Noise Equivalent Level (CNEL) is a measure of the cumulative noise exposure in a community, with a 5-dB penalty added to evening (7:00 P.M. to 10:00 P.M.) and a 10-dB addition to nocturnal (10:00 P.M. to 7:00 A.M.) noise levels. The Day/Night Average Sound Level (L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this 3-hour period are grouped into the daytime period.

Noise Regulations Land use compatibility with differing noise levels is regulated at the local level, although the Federal government has established suggested land use compatibility criteria for different noise zones (Federal Interagency Committee on Urban Noise 1980). Residential areas and schools are considered compatible where the L_{dn} is up to 65 dBA; outdoor recreational activities such as fishing, golfing and horseback riding are compatible when noise exceeds 75 dBA; and parks are compatible with noise levels up to 75 dBA (14 CFR A150.101).

Table 3.11-1. Typical Sound Levels Measured in the Environment and Industry

At a Given Distance from Noise Source	*A-Weighted Sound Level in Decibels*	*Noise Environments*	*Subjective Impression*
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100')	100		Very Loud
	90	Boiler Room	
Freight Cars (50')		Printing Press Plant	
Pneumatic Drill (50')	80		
Freeway (100')		In Kitchen with Garbage Disposal Running	
Vacuum Cleaner (10')	70		Moderately Loud
		Data Processing Center	
	60		
		Department Store	
Light Traffic (100')	50		
Large Transformer (200')			
	40	Private Business Office	Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
	0		

Source: US Department of Housing and Urban Development, 1985

California has not adopted any quantitative noise regulations that are applicable to the Proposed Action, although the California Department of Health Services, Environmental Health Division has established guidelines regarding land use compatibility.

Noise regulations established by local jurisdictions that govern stationary noise sources are typically included in noise ordinances, although policies that limit public exposure to noise may be included in the general or community plans of individual cities or counties. Some jurisdictions also have specific provisions addressing construction noise impacts that often limit the hours and days of construction and may establish noise thresholds that may not be exceeded at specific locations, such as the

property line of the site that is under construction. Tables 3.11-2 and 3.11-3 provide summaries of the regulations governing noise from construction and long-term operations, respectively.

Table 3.11-2. Construction Noise Regulations

County/State	*Ldn or CNEL (dBA)*
Imperial County, CA	75 dBA Leq when averaged over an 8-hour period and measured at the nearest sensitive receptor (e.g., residences, schools, hospitals, parks, office buildings, and certain non-human species, including riparian bird species).

Table 3.11-3. Long-Term Noise Compatibility Thresholds

County/ State	*Noise Ordinance/ Controls? Yes/No*	Ldn OR CNEL (dBA)			
		Residential	*Commercial*	*Industrial*	*Recreational*
Imperial County, CA	Yes	Daytime [50-55dB] Nighttime [45-50 dB]	Daytime [60dB] Nighttime [55 dB]	Anytime [70-75dB]	Not specified
Note: Daytime is typically 7:00 A.M. to 10:00 P.M. and nighttime is typically 10:00 P.M. to 7:00 A.M.					

3.11.1.2 Noise Setting

The affected environment is the area to the north of the AAC and I-8, west of the Coachella Canal. There are several scattered permanent and temporary structures in the vicinity of Gordon's Well, where the Pair-A-Dice Bar and Grill is located. The principal existing noise generators in the area are the Evan Hewes Highway that is approximately 50 feet from the nearest structure and I-8 that is approximately 150 feet away.

The area is popular with OHV recreational riders. California Vehicle Code Section 38370 requires that decibel levels measured at 50 feet for Green Sticker vehicles (OHV vehicles certified for year-round use) be below (a) 92 dBA for any vehicle manufactured before January 1, 1973, (b) 88 dBA for any vehicle manufactured after that date but before January 1, 1975, (c) 86 dBA for vehicles manufactured after that date but before January 1, 1986, and (d) 82 dBA for vehicles manufactured after January 1, 1986. For OHV riders, the noise is part of the excitement of the sport. They commonly use the area to the northeast of Gordon's Well.

Because of the frequent usage of OHVs in the vicinity, the noise level in a particular location may be highly variable.

3.11.2 Environmental Consequences and Compensation Measures

3.11.2.1 Thresholds of Significance

Impacts would be significant if the Proposed Action or alternatives would result in the following:

- exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies;
- exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels;
- a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project; or
- a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.

3.11.2.2 Proposed Action

3.11.2.2.1 Construction The Proposed Action would require standard construction activities, including clearing, grading, excavation, and construction of infrastructure. Limited noise would result from the operation of diesel or electric pumps. No elements of the Project would result in excessive groundborne vibration or groundborne noise levels.

The nearest structure is more than 3,000 feet away from areas where the Proposed Action would result in construction or equipment operation. Calculated noise levels at various distances from the construction are presented in Table 3.11-4. The numbers in Table 3.11-4 are probably overestimated because additional attenuation would be expected due to atmospheric and topographical effects. The day-night noise level for a receptor at 3,000 feet will be less than 60 db, the level anticipated for all the phases of the construction.

Traffic noise as a result of construction or hauling requirements, would occur in remote areas and would not affect noise-sensitive receptors; additionally, traffic noise in the Project area would be imperceptible from that generated by traffic already present on I-8.

3.11.2.2.2 Operations Noise generation during the operations phase will be related to periodic maintenance and repair. Periodically, it will be necessary to dredge the reservoir and to remove the accumulated debris. This may involve heavy equipment as well as trucks. Because of the infrequent nature of these activities and the remoteness of the reservoir, no significant impact is expected from these activities.

3.11.2.2.3 Compensation Measures Because of the lack of impacts, no compensation measures are required.

3.11.2.3 No-Action Alternative

There are no noise impacts as a result of the No-Action Alternative.

Table 3.11-4. Maximum Noise Levels (L_{dn}) with No Noise Reduction Measures in Place (Background Noise Level = 45 dBA)

Feet	*Reservoir Construction*	*Inlet Canal Construction*	*Outlet Canal Construction*	*Modified Coachella Canal Turnout*
50	95	94	92	91
100	89	88	86	85
200	83	82	80	79
300	79	79	77	76
400	77	76	74	73
500	75	74	72	71
600	73	73	71	70
700	72	71	69	68
800	71	70	68	67
900	70	69	67	66
1,000	69	68	66	65
1,200	67	67	65	64
1,400	66	65	63	62
1,600	65	64	62	61
1,800	64	63	61	60
2,000	63	62	60	59
2,500	61	60	59	58

This page intentionally left blank.

3.12 Recreation

This section provides an overview of regional and site-specific recreational resources in the Project vicinity. Recreational resources consist of natural and manmade features or areas that are used, or could potentially be used, by the public for recreational purposes. This section addresses the potential impacts to recreational resources that could occur from construction and operation of the Proposed Action as well as the No-Action Alternative.

3.12.1 Affected Environment

3.12.1.1 Regional Recreational Resources

There are a number of regional recreational areas in and around Imperial County that include California State Parks, State Vehicular Recreational Areas (SVRAs), and State Recreation Areas (SRAs) (see Figure 3.12-1).

3.12.1.1.1 Imperial Sand Dunes Recreational Area The ISDRA (also called the Algodones Dunes), located in Imperial County, approximately four miles east of the Project site, is part of BLM's California Desert Conservation Area (CDCA). The ISDRA contains the largest mass of sand dunes in California, covering an area over 40 miles long and five miles wide. It is the most heavily and intensively used OHV recreation area in the CDCA with over 1.4 million OHV visitors per year (BLM 2003b). Off-highway vehicle activity, mainly dune buggy's and all terrain vehicles, is the most popular use of the sand dunes and is permitted on over 118,000 acres. Mammoth Wash at the north end of the dunes, Glamis/Gecko south of State Highway 78, and Buttercup Valley south of I-8 near the Mexican Border are the three most popular areas for OHV recreation. Other recreational uses include photography, hiking, backpacking, nature studies, walking, hunting, rock collecting, filming, conservation activities, and horseback riding (BLM 2003b). The demand for recreation opportunities at the ISDRA is greatest from October 1 to May 30, with the highest levels of visitation on major holiday weekends (BLM 2003a). Summer visitation is low due to extremely high temperatures. However, some OHV activity does occur during summer nights.

Within fifty miles of the Project site are the following recreational areas:

- Heber Dunes State Vehicular Recreation Area
- Anza-Borrego Desert State Park
- Picacho State Recreation Area
- Imperial National Wildlife Refuge
- Martinez Lake
- Cibola National Wildlife Refuge

3.12.1.2 Site Specific Recreational Resources

Presently, as can be seen in Figure 3.12-2, the Project site is traversed by multiple BLM trails designated by the BLM *Western Colorado Desert Route of Travel* (BLM 2002). Because the Project site lies within an Area of Critical Environmental Concern, BLM regulations limit OHV use to trails within the Project area. Camping is limited to south of I-8 or within 50 feet of centerline of designated trails.

Other Important recreational resources in the Project vicinity include the private businesses in the vicinity of the Gordon's Well exit. These businesses provide miscellaneous OHV parts and indoor and outdoor restaurant facilities (BLM 2003b). An important trail feature in the Project area is the Herman Schneider Memorial Bridge. The bridge provides OHV access across the AAC south of I-8 at the Gordon's Well overpass. The bridge allows OHV users legal access across the AAC from the Buttercup Valley to the Dune Buggy Flats area.

The Dune Buggy Flats Area of the ISDRA is adjacent to the Project area and access to this recreation area is from the Project vicinity. The main access to Dune Buggy Flats is via the Gordon's Well exit off I-8, Evan Hewes Highway, an improved dirt road, and across the existing Coachella Turnout Structure. Dune Buggy Flats is an area used extensively for OHV recreation, but also camping and commercial vending (BLM 2003b). Facilities include kiosks, signs, trash receptacles, and a portable ranger station trailer staffed by BLM on holiday weekends (BLM 2003b).

3.12.2 Environmental Consequences and Compensation Measures

3.12.2.1 Thresholds of Significance

The Proposed Action or alternatives would have a significant impact if they resulted in any of the following:

- increased the use of existing neighborhood and regional parks or other recreational facilities such that substantial deterioration of the facility would occur to be accelerated; or
- caused the direct and substantial loss or physical degradation of either public recreation uses or public recreational facilities; or
- required the construction or expansion of recreational facilities that could result in an adverse physical effect on the environment.

3.12.2.2 Proposed Action

The Project site is comprised of Reclamation withdrawn lands. Reclamation withdrawn lands, once a part of a project, have no other agency jurisdiction other than Reclamation. BLM however does provide law enforcement and oversight of allowed recreational uses on Reclamation withdrawn lands.

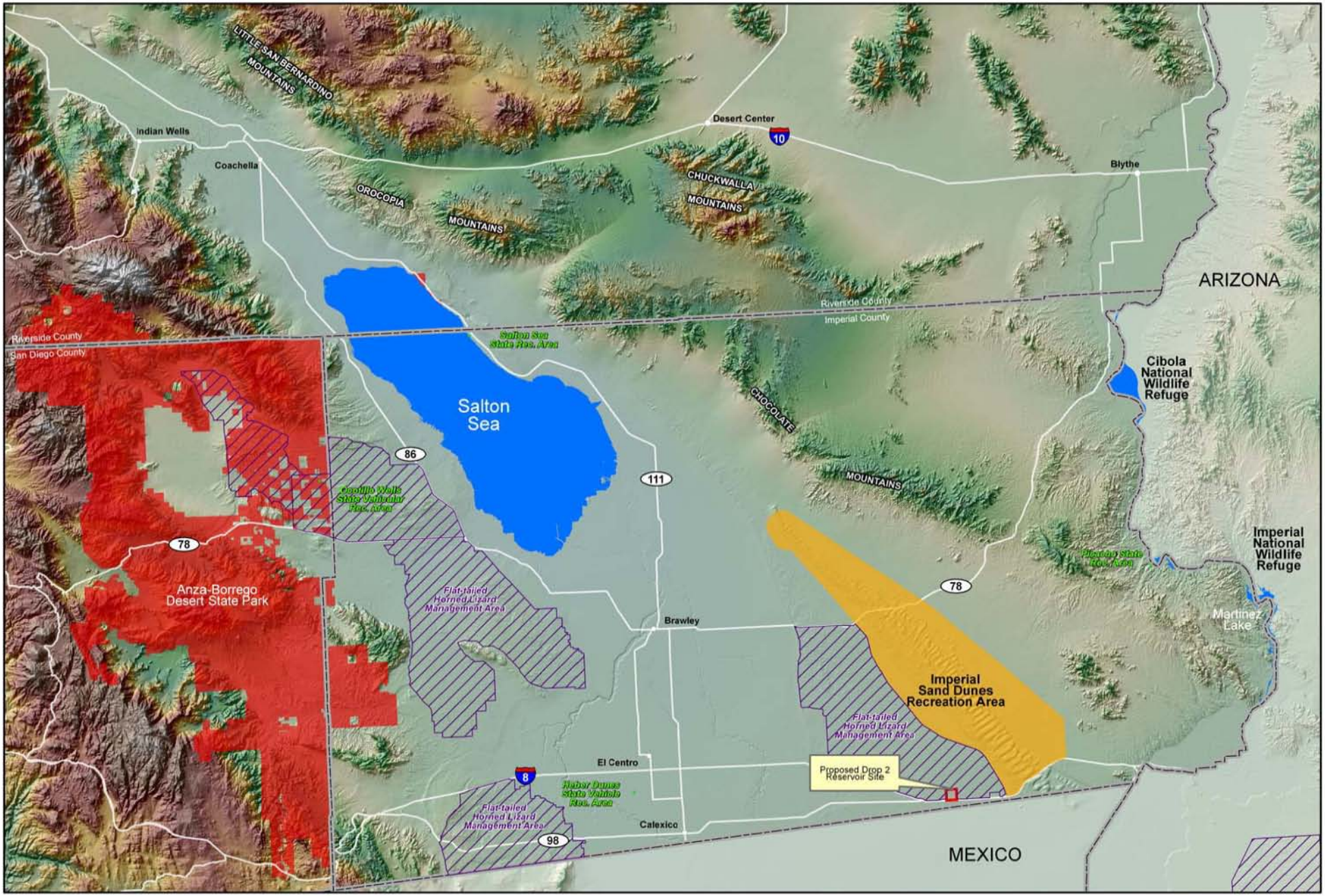


Figure 3.12-1. Regional Recreation and Management Areas

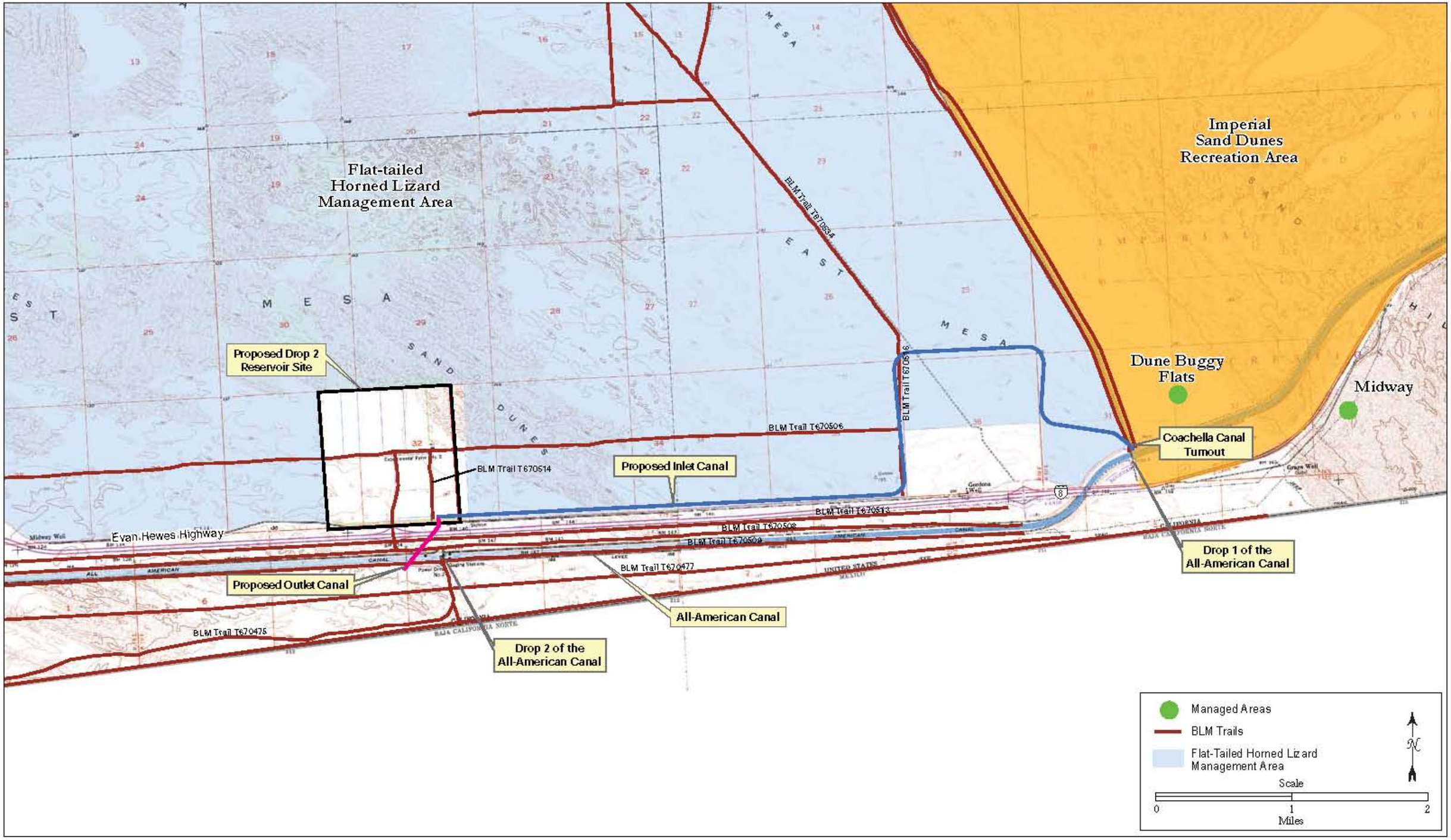


Figure 3.12-2. Recreational Resources within the Project Vicinity

BLM trail T670506, an east west route between the Gordon's Well Area and points west could be disrupted by construction of the inlet canal and would be severed by construction of the Drop 2 Reservoir. However, the Herman Schneider Memorial Bridge and BLM trail system south of I-8 would provide patrons of the recreational facilities and private business in the Gordon's Well Area/Section 36 alternative access to points west. With implementation of the Proposed Action, OHV users traveling from the west, eastward through the Project site would be limited to trails south of I-8. Though the inlet canal would also traverse BLM trail T670516, this trail follows the un-named county road a road which will be retained and enhanced by the Proposed Action. The un-named county road would substitute for BLM trail T670516. Construction of the reservoir also would result in the permanent loss of BLM trail T670514, a short north-south trail within the Brock Ranch area. Given the relative abundance of trails in the Project vicinity, the presence of substitute trails and means of accessing private business in the Gordon's Well Area and the ISDRA, the closure of trails underlying facilities to be built as part of the Proposed Action does not constitute a substantial loss of recreational facilities and would not be a significant impact on recreation.

The Proposed Action would have temporary impacts during the construction period. Evan Hewes Highway, would be affected as it is used to stage equipment and stockpile dirt. However, the road would be affected west of the Gordon's Well exit, and persons traveling eastward from the Gordon's Well exit to the ISDRA or the BLM trail system south of I-8 would not be affected. Interstate 8 could be temporary affected during installation of the outlet canal. However, during project construction I-8 would remain open, albeit with minor delays and short detours. During construction BLM trails users in the immediate vicinity would be subject to temporary noise and dust. These temporary impacts would not be significant.

The Proposed Action is not anticipated to affect access, visitation to, or any other character of any regional recreational resource.

3.12.2.2.1 Compensation Measures No significant impacts to recreation would occur, and no compensation measures are necessary.

3.12.2.2.2 Residual Impacts After Compensation The residual impact on recreational resources would not be significant.

3.12.2.3 No-Action Alternative

No construction would occur under this alternative, resulting in no potential impacts associated with the loss or physical degradation of public recreation uses or public recreational facilities; nor would this alternative result in the increased usage of existing and regional recreation areas and/or facilities.

This page intentionally left blank.

3.13 Socioeconomics

This section addresses the potential socioeconomic impacts associated with the construction and operation of the Proposed Action and alternatives. Employment and income are addressed in this section. Environmental justice (i.e., effects on minority and low-income populations) is addressed in section 3.7.

3.13.1 Affected Environment

The affected area includes Imperial County, California and Yuma County, Arizona. Project construction would take place in Imperial County; however, because of the proximity of proposed facilities to both the City of Yuma, Arizona (approximately 25 miles east of the reservoir site) and the City of El Centro, California (approximately 30 miles northwest of the reservoir site) many construction workers would probably reside in these cities. LCR system users would be the direct beneficiary of additional system storage space by the capture of non-storable flows presently passing uncontrolled to Mexico when flows in the river exceed demands. However, secondary benefits would be derived by the increase in operational flexibility of the AAC.

This section presents pertinent information describing selected economic characteristics of the local area, including the construction and agricultural sectors. For each of the counties, the most recent data regarding farms and cropland is contained in the 2002 Census of Agriculture and the most recent employment information is 2003 data from the Bureau of Economic Analysis.

3.13.1.1 Agricultural Production

Summary information concerning the number, value, and size of farm units in the two counties is presented in Table 3.13-1. The average farm size in Imperial County, California is 957 acres compared to 435 acres in Yuma County, Arizona. The total amount of land in farms is over 514,000 acres in Imperial County and over 231,000 acres in Yuma County. The proportion of farmland harvested for crops is 95 percent in Imperial County and 92 percent in Yuma County.

Table 3.13-1. Agricultural Data by County (2002)

	Imperial, CA	*Yuma, AZ*
Number of farms	537	531
Land in farms (acres)	514,101	231,125
Total harvested cropland (acres)	488,000	213,000
Average Farm Size (acres)	957	435
Market value of agricultural products sold ($1000)	$1,043,279	$802,368
Average market value of agricultural products sold per farm (dollars)	$1,942,971	$1,511,051
Source: US Department of Agriculture, National Agricultural Statistics Service, Census of Agriculture 2002.		

In 2002, the total value of agricultural products in the two county area exceeded $1.8 billion.

3.13.1.2 Economic Activity

3.13.1.2.1 Imperial County Full- and part-time employment in Imperial County increased from 61,974 to 66,672 jobs between 2001 and 2003, for a total increase of 4,698 jobs (approximately 7.6 percent). Farm employment increased from 5,593 to 5,815 jobs between 2001 and 2003, for a total increase of 222 jobs (approximately 4.0 percent). Employment in all sectors of the economy increased, with the exception of three sectors: construction; information; and finance and insurance, which declined by 5.4, 11.6, and 3.5 percent, respectively. The numerically greatest gains were experienced in the manufacturing; government and government enterprises, and retail trade sectors.

3.13.1.2.2 Yuma County Full- and part-time employment in Yuma County increased from 74,896 to 77,858 jobs between 2001 and 2003, for a total increase of 2,962 jobs (approximately 4.0 percent). Between 2001 and 2003, farm employment in Yuma County decreased by approximately 1.8 percent. Employment in all sectors of the county's economy increased, with three exceptions. Wholesale trade declined by 10.9 percent, retail trade by 1.9 percent, and the arts, entertainment, and recreation sector declined by approximately 7.9 percent (Table 3.13-2). The numerically greatest gains were experienced in the following sectors: construction; administrative and waste services; health care and social assistance; and government and government enterprises, especially state and local government.

3.13.2 Environmental Consequences and Compensation Measures

3.13.2.1 Thresholds of Significance

NEPA does not require the use of significance criteria in an analysis of socioeconomic impacts. This analysis addresses whether the Proposed Action and alternatives would have effects on agricultural production and on employment levels within the affected area.

3.13.2.2 Methodology

The Proposed Action would provide additional storage for the capture of non-storable flows that historically have left the US due to insufficient system storage and will be beneficial for system users. Construction and operations effects are discussed. Because the precise amount of non-storable water to be captured on an annual basis would vary, the socioeconomic effects of Project operations are addressed qualitatively in terms of the most likely effects.

A detailed analysis of population and housing was not performed because the Proposed Action and alternatives would not affect population or housing. The Project would not induce substantial population growth in the area, either directly or indirectly but this Proposed Action is expected to bring increased economic revenues to the community through the reward of construction contracts (see section 3.13.2.3). The Project does not propose new homes or businesses. There would be no public road extensions. Temporary roads would be restored when construction is completed. Maintenance roads associated with Project facilities would be closed to the public. The Project would not displace persons or housing. Population demographics of the counties and cities in the vicinity of the Project are discussed in the environmental justice analysis presented in section 3.7.

Table 3.13-2 Total Full-time and Part-time Employment by Industry (number of jobs)

Item or Industry	*Imperial County, California*			*Yuma County, Arizona*		
	2001	2002	2003	2001	2002	2003
Total employment	61974	63858	66672	74896	76869	77858
Wage and salary employment	53265	55005	57532	66505	68150	68857
Proprietors employment	8709	8853	9140	8391	8719	9001
Farm proprietors employment	581	581	572	802	807	806
Nonfarm proprietors employment	8128	8272	8568	7589	7912	8195
Farm employment	5593	6552	5815	3926	3885	3856
Nonfarm employment	56381	57306	60857	70970	72984	74002
Private employment	40805	41001	44449	54938	56526	57057
Forestry, fishing, related activities, and other 3/	(D)	6327	(D)	(D)	(D)	(D)
Mining	(D)	50	(D)	(D)	(D)	(D)
Utilities	276	(D)	356	165	172	170
Construction	2160	2274	2043	3745	4067	4358
Manufacturing	1843	2642	2703	2311	2543	2740
Wholesale trade	2027	1960	2232	2097	1888	1868
Retail trade	7854	7886	8214	7762	7553	7613
Transportation and warehousing	2377	(D)	2460	1261	1325	1321
Information	525	459	464	937	1017	1089
Finance and insurance	1325	1210	1278	1181	1193	1214
Real estate and rental and leasing	1417	1472	1484	1601	1704	1726
Professional and technical services	1334	1410	1501	1389	1486	1652
Management of companies and enterprises	309	442	438	173	167	180
Administrative and waste services	1502	1769	1847	2350	2792	3525
Educational services	366	503	503	248	291	314
Health care and social assistance	3097	3168	3297	5547	5826	6236
Arts, entertainment, and recreation	229	227	239	466	445	429
Accommodation and food services	3016	2997	2795	4721	4715	4765
Other services, except public administration	3315	3579	3566	2865	2970	2988
Government and government enterprises	15576	16305	16408	16032	16458	16945
Federal, civilian	1711	1849	1969	2538	2649	2713
Military	518	544	572	4330	4378	4507
State and local	13347	13912	13867	9164	9431	9725
State government	2596	2791	2777	(D)	(D)	(D)
Local government	10751	11121	11090	(D)	(D)	(D)
(D) Not shown by BEA to avoid disclosure of confidential information, but the estimates for this item are included in the totals.						
Source: BEA, 2003.						

3.13.2.3 Proposed Action

Construction of the Project would provide economic benefits associated with purchases of materials, supplies, and services, and construction jobs. The estimated construction cost (2007 dollars) for the reservoir and associated features is $120 million and for the inlet and outlet canals $26 million, for a pre-appraisal cost estimate of over $146 million. Some portion of the

Project workforce is expected to reside in the cities of Yuma, Calexico, and El Centro; their wages and expenditures would provide benefits to Imperial and Yuma counties. Purchases of materials, supplies, and services for construction would come from either the local area or the larger region, depending upon contractor selection and the locations where material purchases are made.

The Project would have no effect on agricultural production and related revenues within Imperial County. Although the amount of storage could range as high as 8,000 af at any given time, the water stored and released from the new reservoir will be delivered according to established operating criteria. This additional storage will not have an effect on productivity of existing cropland, cultivation of additional cropland and/or reductions in fallowing. The additional storage will allow flexibility in meeting water order changes which will provide for better management of the AAC and in turn results in improved LCR system conservation.

3.13.2.4 No-Action Alternative

Under the No-Action Alternative, no new facilities would be developed. As a result, non-storable flows would continue to be passed to Mexico due to no available storage with a similar frequency and volumes as current conditions. The No-Action Alternative would not create benefits for system users of the Colorado River because there would be no improvement of operational storage or system flexibility and no improvements in ability to maximize the use of the Colorado River within the US.

3.14 Topography, Geology, Soils, and Mineral Resources

This section provides an overview of the topography, geology, and soils within the vicinity of the Proposed Action and alternatives, potentially affected by Project actions.

3.14.1 Affected Environment

The topography along the proposed canal routes and Drop 2 Reservoir site is generally flat, with areas of undulating, northwest-trending sand dunes. The Project area is underlain by Quaternary alluvium and dune sand deposits (Jennings 1977). Surficial soils consist primarily of the Rositas soil series, composed of somewhat excessively drained sand, fine sand, and silt loam, and the Rosita-Superstition soil series, composed of somewhat excessively drained loamy fine sand or fine sand. These soils are generally characterized by high permeability, slow surface water runoff, and slight erosion hazard. The hazard of soil blowing is high (USDA 1981).

Subsurface geotechnical borings, which provide site-specific soil and groundwater information, have been completed at the proposed Drop 2 Reservoir site. These geotechnical borings indicate that the soils consist of poorly graded sand, with a fines content of less than 5 percent and a gravel content of less than 10 percent, resulting in relatively high soil permeability.

The Project site is located in a highly seismic area of southern California. The Imperial Fault, located approximately 14 miles southwest of the Drop 2 Reservoir site, is highly active and was responsible for earthquakes and associated ground rupture in 1940, 1966, 1968, 1971, 1979, and 1981. The most substantial of these earthquakes were the 1940 Richter magnitude 6.9 earthquake and the 1979 magnitude 6.4 earthquake. Earthquakes along this fault with magnitudes similar to the 1940 earthquake can be expected every 700 years, whereas earthquakes similar to the 1979 earthquake can be expected every 30 to 40 years. Other highly active faults in the vicinity of the site include the San Andreas Fault, approximately 54 miles to the northwest of the Project area; the Superstition Hills Fault, 34 miles to the west-northwest; and the Coyote Creek Fault, 58 miles to the northwest. In addition, the potentially active (i.e., Pleistocene) Algodones Fault is approximately 6.5 miles northeast of the east end of the proposed inlet canal (Jennings 1994; Southern California Earthquake Data Center 2005).

Liquefaction is the process in which saturated sandy soil loses strength during moderate to intense earthquake induced ground shaking. The potential for liquefaction to occur is greatest in areas with saturated, loose, granular, low density soils, where the water table is present within the upper 40 to 50 feet of the ground surface. Liquefaction can cause differential settlement of structures, potentially resulting in severe damage. Borings at the site of the proposed reservoir indicate that groundwater is present at a depth of between 30 and 40 feet below ground surface (Reclamation 2005). Geotechnical borings indicate that on-site soils may be susceptible to liquefaction (Reclamation 2004). Further geotechnical analysis will be accomplished to evaluate the liquefaction potential at the site.

3.14.2 Environmental Consequences and Compensation Measures

3.14.2.1 Thresholds of Significance

Impacts would be considered significant if the Proposed Action or alternatives:

- Resulted in substantial alteration of the topography or destruction of any unique topographic features.
- Exposed people or structures to potential adverse effects, including the risk of loss, injury, or death involving seismically induced ground failure.
- Resulted in substantial soil erosion.
- Would be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project.

3.14.2.2 Proposed Action

3.14.2.2.1 Topography The topography in the vicinity of the proposed canals and reservoir is generally flat, with a slight slope in the westerly direction and with areas of undulating dune topography. Project construction would not result in alteration or destruction of any unique topographic features. Canals would be constructed with 2:1 (horizontal to vertical) side slopes, to a height of approximately 5 feet above existing grade. Similarly, the reservoir would be constructed with 4:1 exterior embankment side slopes, to heights varying from 14 to 19 feet above existing ground surface. Although the natural topography would be altered by such slope construction, no indirect geologic impacts, such as slope instability, would result, as these slopes are typical of engineered embankments. Therefore, no significant impacts associated with change in topography would occur.

3.14.2.2.2 Wind and Water Erosion On-site soils are not highly prone to water induced erosion, but are highly prone to wind induced erosion, primarily due to the loose sandy soils and limited vegetation in the Project area. Project grading and construction would disturb on-site soils, temporarily exacerbating the potential for both wind and water erosion. Similarly, periodic (approximately every four to eight years) disposal of sediments adjacent to embankments would result in exposure of soils to wind and water erosion. Reclamation will utilize the appropriate Standard Compensation Measures for construction equipment and fugitive dust control described in the applicable Imperial County Air Pollution Control District CEQA Air Quality Handbook (February 2005). Grading, construction, and desilting operations would be completed in accordance with provisions of General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit No. 99-08-DWQ), for discharges of storm water during construction. The Construction General Permit requires the development and implementation of a SWPPP, which includes erosion related BMPs, such as construction of sediment traps (e.g., hay bales, silt fences, straw wattles) and temporary desilting basins. A SWPPP shall be prepared and BMPs shall be implemented as part of the Project. Wind and water erosion related impacts would not be significant.

3.14.2.2.3 Seismic-Related Impacts The Project site is located in a highly seismic area of southern California. No active or potentially active faults underlie the site; therefore, the

potential for surface fault rupture is low. Soils may be susceptible to liquefaction, due to the presence of shallow groundwater and sandy soils. Groundwater is present at depths of approximately 30 to 40 feet below the ground surface. Due to the high permeability of the proposed foundation and embankment soils, a 60-mil high density polyethylene (HDPE) geomembrane would be constructed on the bottom and side slopes of the canals and reservoir. This action would prevent reservoir water from infiltrating into underlying soils and exacerbating the potential for liquefaction.

In addition to liquefaction, the Project may be subject to other forms of seismically induced ground failure, including differential settlement and lateral spreading. Increased exposure of proposed water distribution and storage facilities to seismic hazards from a major or great earthquake cannot be precluded, even with incorporation of modern construction engineering and safety standards. Therefore, impacts due to seismically induced ground failure under these conditions are potentially significant.

3.14.2.2.4 Compensation Measures

GEO-1 Reclamation will arrange for a site-specific geotechnical report, prepared by a qualified geotechnical engineer or engineering geologist. The report will be based on a comprehensive evaluation of potential seismically induced ground accelerations and associated liquefaction, differential settlement, lateral spreading, and slope failure, which may affect construction of the Proposed Action facilities. The report will make Project- and site-specific recommendations to avoid and minimize potential seismic impacts. Recommendations will be consistent with provisions of Reclamation's Health and Safety Code and Reclamation's Design Standards No. 13 (Embankment Dams), Chapter 13 (Seismic Design and Analysis). Reclamation shall implement the recommendations contained in the site-specific geotechnical report.

3.14.2.2.5 Residual Impacts after Compensation Incorporation of compensation measures from a site-specific geotechnical investigation would reduce potential seismic and slope stability related impacts so that no significant impacts would occur.

3.14.2.3 No-Action Alternative

No ground disturbance would occur under this alternative, resulting in no impacts on the geologic environment. No seismic impacts would result under the No-Action Alternatives, as new water diversion and storage facilities would not be constructed.

This page intentionally left blank.

3.15 Transportation

This section describes existing transportation infrastructure and vehicular traffic within and adjacent to the proposed Project area at a sufficient level of detail to evaluate potential impacts of the Proposed Action and alternatives.

3.15.1 Affected Environment

Interstate 8 is the only freeway providing access to the Project area. Interstate 8 is a four-lane divided highway linking Southern California with Arizona. State Route (SR) 98 is a southern arterial branch of I-8. SR-98 branches from I-8 just west of the Project site and rejoins I-8 in the mountains east of San Diego County, CA.

Table 3.15-1 summarizes the existing traffic conditions for I-8 and SR-98. Level of Service, as used in Table 3.15-1 is a measure of the quality of traffic operations for a given roadway. Level of Service is described by categories A through F, with A being optimal traffic operations (e.g., freedom of movement for the driver, no slowdowns or congestion), and Level of Service F representing the poorest traffic conditions (e.g., severe gridlock). Level of Service C is considered an acceptable operation for rural highways. As shown in Table 3.15-1, roadways in the Project area are operating at Level of Service B or better.

Table 3.15-1. Existing Traffic Conditions of Interstates and State Routes in Project Area

Route	*Segment*	*Peak-Hour Volume*	*Level of Service*	*Notes*
I-8	East of SR-98	1,650 vehicles	B	Highway Capacity Manual, 1999 and 2000 traffic volumes.
SR-98	West of I-8	160 vehicles	A	Assuming a volume to capacity ratio of 0.05, rolling terrain, no passing 80%. Highway Capacity Manual, 1999 and 2000 traffic volumes.

Evan Hewes Highway is a county road that provides access within the Project area. As described in section 3.6, at one time portions of what is now called Evan Hewes Highway were a wooden road between the City of Yuma, Arizona and San Diego, California. The "Plank Road", as it was called, was replaced in 1928 by a permanent paved road, and the roadway became part of trans-continental US 80. The road acted as part of a true trans-continental route until the California section of US 80 was decommissioned. The road was fully bypassed with the construction of I-8 in 1973 and was turned over to the County of Imperial. Today, in the Project area, Evan Hewes Highway is a lightly traveled 2-lane road, classified as a "Local" road by the Imperial County Department of Public Works (Imperial County 2002). The segment of Evan Hewes Highway within the Project area (between the Experimental Farm exit and Gordon's Well exit) consists of an asphalt road surface underlain by what is thought to be a four-inch thick concrete slab (the prevailing standard for roadway construction at the time the road was built) (Schaefer et al. 2005). The portion of the road in the immediate Project area was not a part of the famous Plank Road; the portion of Evan Hewes Highway that was once the Plank Road existed several miles east of the Project area in the Imperial Sand Dunes (Schaefer et al. 2005).

3.15.2 Environmental Consequences and Compensation Measures

3.15.2.1 Thresholds of Significance

Impacts would be considered significant if the Proposed Action or alternatives would:

- Cause a substantial increase in traffic compared to the existing traffic load and capacity of the street system;
- Substantially increase roadway hazards due to a project design feature; or
- Result in inadequate emergency access.

3.15.2.2 Proposed Action

On the western edge of Section 36 (Township 16 South, Range 19 East), construction of the inlet canal would disrupt an un-named north-south trending Imperial County road that connects to Evan Hewes Highway (see Figure 2-2). The un-named county road is graded but unpaved, approximately 30 feet wide. To maintain access to and use of this road, as part of the Proposed Action, approximately 1.15 miles of the road would be relocated to the west of the inlet canal and a road crossing would be provided over the inlet canal to connect the relocated road to Evan Hewes Highway (see Figure 2-2). The road crossing would accommodate two, 9-foot travel lanes each with a two-foot shoulder. The existing unpaved road will be relocated in kind (see Figure 2-2).

The Proposed Action would have temporary impacts to area roadways during the construction period. There would be a temporary increase in trips on the regional freeway network to accommodate equipment and materials delivery. Based on information presented in Chapter 2, Table 2-2, the number of construction trips would be relatively small, consisting of trips by construction workers to and from the site and operations by dump trucks, water trucks, and other miscellaneous trucks. Given the generally good operating conditions of the regional roadway network, the temporary nature of the trips, and the relatively small increase in trips, this impact would not be significant.

Construction of the inlet canal would encroach into the right-of-way for Evan Hewes Highway and may require temporarily closing one or both lanes of the roadway from the Experimental Farm Exit to the Gordon's Well, with traffic detoured onto I-8. The entire construction area for the inlet canal will be fenced and therefore construction vehicles will only be able to access the Project site at a few locations along the Evan Hewes Highway. The limited number of access points will decrease potential for encroachment by construction equipment into active lanes of Evan Hewes Highway.

Use of Evan Hewes Highway by heavy equipment during the construction process could damage the roadway surface thereby creating potentially unsafe driving conditions following construction. This impact is potentially significant because it could substantially increase roadway hazards.

The outlet canal would be installed as a pipe underneath Evan Hewes Highway and I-8. This construction would be accomplished using either a trenchless technology (e.g., tunneling, bore and jack) that would not disturb the paved roadway surface, or the outlet canal would be installed using open trench construction or combined thereof. Construction using trenchless technology is not anticipated to require any lane closures. However, installation of the outlet canal within the Evan

Hewes Highway using the open trench method may require temporarily closing one or both lanes of the roadway (closure of Evan Hewes Highway from Gordon's Well Exit to the Experimental Farm Exit is already anticipated as part of construction for the inlet canal). Open trench construction could also require temporary closure of some travel lanes of I-8 with detour of vehicles onto other travel lanes of I-8. Lane closure and detour could result in inadequate access to the Project vicinity and adjacent areas and this is a potentially significant impact.

With either trenchless or open trench outlet canal pipeline installation it may be necessary to place equipment and excavated material within the right-of-way of I-8. Due to the high vehicular speeds on I-8, encroachment by construction equipment could present a hazard to motorists. This impact is potentially significant because it could substantially increase roadway hazards.

3.15.2.2.1 Compensation Measures

TRAN-1 During Project construction Reclamation will direct the contractor to maintain at least one eastbound travel lane and one westbound travel lane on I-8 (or the functional equivalent using detours).

TRAN-2 Reclamation will direct the contractor to have a qualified traffic engineer prepare and implement a traffic management plan that defines how traffic operations will be managed and maintained on roadways during each phase of construction including any detours, signage, lane closures, or utility relocation work. The traffic management plan will specify necessary lane closures, detours, any signage/lighting, flaggers, and other traffic control measures needed to avoid accidents and provide access to property and emergency response vehicles during construction.

TRAN-3 Reclamation will direct the contractor to comply with the provisions of applicable California Department of Transportation and Imperial County roadway encroachment permits.

TRAN-4 Reclamation will direct the contractor to repair and refurbish to County of Imperial standards for "Local" roadways any portions of Evan Hewes Highway damaged by Project construction.

3.15.2.2.2 Residual Impacts after Compensation Compensation Measures TRAN-1 through TRAN-4 would maintain access to transportation facilities and limit potential for roadway hazards during and after the construction process. With implementation of Compensation Measures TRAN-1 through TRAN-4, no significant impacts on transportation would occur.

3.15.2.3 No-Action Alternative

The No-Action Alternative would result in no changes to area roadways and hence impacts on transportation would not occur.

This page intentionally left blank.