TABLE 3.2-35
Salinity Occurrence and Tolerance Data for Species Inhabiting the Salton Sea

Invertebrates (Scientific/Common Name)	Collection	Life-Stage Survival	Life-Cycle Completion	Population Maintenance
Brachionus plicatilis (rotifer)	76	50	48-50	40
Apocyclops dengizicus (copepod)	75	79	68	51
Cletocamptus deitersi (copepod)	44 [a]	107	80	80
Balanus amphitrite (barnacle)	44 [a]	60	60	50
Nereis succinea (pileworm)	44 [a]	67.5	50	–
Gammarus Mucronatus (amphipod)	50	57	–	–
Trichlcorixa reticulata (waterboatman)	200	100	–	–
Fish (Scientific/Common Name)				
Cynoscion xanthulus (orangemouth corvina)	44 [a]	57.5	40 [b]	–
Bairdiella icistia (Gulf croaker)	44 [a]	55	55	–
Anisotremus davidsonii (sargo)	44 [a]	52.5	50	–
Oreochromis mossambica (tilapia)	120	70	60 [c]	–
Cyprinodon macularius (desert pupfish)	90	70	70	–
Mugil cephalus (mullet)	80	126	–	–
Poecilia latipinna (sailfin molly)	87	80	–	–
Gillichthys mirabilis (longjaw mudsucker)	82.5	–	75	–

Explanation of columns:
Collection. Refers to the salinity at a site where an organism was collected in nature.
Life-Stage Survival. The maximum salinity, in experimental work, at which one or more life stages of a species can survive for an extended time, but where completion of the entire life cycle has not been established.
Life-Cycle Completion. The maximum salinity, in experimental work, at which completion of a species' entire life cycle has been demonstrated. This salinity theoretically should always be lower than the life stage survival salinity.
Population Maintenance . The maximum salinity, in experimental work, at which population growth has been demonstrated and theoretically should be lower than the life cycle and life stage salinity values.

Notes:
Salinity concentrations in g/L
-: no data
a: Based on current conditions of Salton Sea.
b: Juvenile corvina have been observed under current conditions 44 g/L. This may indicate either a higher salinity tolerance than previously recorded, or successful reproduction is occurring in areas with lower salinity levels.
c: Costa-Pierce and Riedel (2000a)

Source: Salton Sea Science Subcommittee (1999).

Potential effects to birds from changes in fish and invertebrate resources were determined based on the changes to these resources expected as a result of increased salinity and the food habits of bird species using the Salton Sea. To assess potential effects to colonial nesting / roosting birds, colonial nest and roost sites at the Salton Sea were identified (Shuford et al. 2000), and the depth of water separating these sites from the mainland was estimated from discussions with biologists knowledgeable of specific sites at and bathymetry data available for the Salton Sea. Water surface elevations predicted with

Reclamation's Salton Sea model were used to determine when colonial nest and roost sites would connect to the mainland under the Proposed Project and Alternatives.

Potential impacts to shorebirds were assessed by evaluating potential changes in the amount of mudflat and shallow water habitat. Two metrics were used to represent the amount of mudflat and shallow water habitat: (1) total shoreline length and (2) acreage of water less than 1 foot deep. These metrics were calculated from bathymetric data from the University of Redlands for the water surface elevations that Reclamation's Salton Sea model predicted under the Proposed Project and Alternatives.

Subregions Excluded From Impact Analysis

No impacts to biological resources would occur in the SDCWA service area geographic subregion because no construction of new facilities or changes in operation of existing facilities would occur. Furthermore, operation of SDCWA service area facilities would not change because the Proposed Project would replace water for the SDCWA service area, and therefore would not change the total amount of water in the SDCWA service area. The SDCWA Service Area is not included in the impact discussions for each of the Alternatives below.

Operation and Maintenance Activities

Activities proposed for coverage under the HCP include IID's operation and maintenance activities associated with its water conveyance and drainage system. IID's operation and maintenance activities would not differ among the Proposed Project and alternatives. These activities and their effects on habitats and special-status species proposed for coverage are described in the HCP (Appendix C). This section focuses on the effects of the implementation of the water conservation and transfer project and associated HCP on biological resources.

3.2.4.2 Significance Criteria

For this analysis, the Proposed Project would have a significant impact if it:

- Causes a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFG or USFWS
- Causes a substantial adverse effect on native riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFG or USFWS
- Causes a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruptions, or other means
- Interferes substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native fish and wildlife nursery sites

- Conflicts with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflicts with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

3.2.4.3 Proposed Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Under the Proposed Project, IID would conserve 300 KAFY of water for transfer to SDCWA, CVWD, and/or MWD. Conservation and transfer of 300 KAFY of water is assumed for the analysis of the Proposed Project to capture the maximum potential impact. At least 200 KAFY and up to 300 KAFY of the water conserved would be diverted at Parker Dam rather than at Imperial Dam. If all conserved water is transferred to SDCWA or MWD, the reduction in flows below Parker Dam would be 300 KAFY. If 100 KAFY is transferred to CVWD, the reduction would be 200 KAFY. This change in the point of diversion for 200 to 300 KAFY of water from Imperial Dam to Parker Dam would reduce the water surface elevation and adjacent groundwater elevation in the LCR between Parker and Imperial Dams. The method of water conservation would not influence the flow levels resulting in the LCR under the Proposed Project; thus, the evaluation focuses on the level of water conservation. Under the Proposed Project, Reclamation would implement a number of conservation measures on the LCR. Thus, combined effects of the flow reductions and conservation measures are considered.

Change in Water Surface Elevations. The flow of the Colorado River between Parker and Imperial Dams generally is set at the amount needed to meet diversion requirements in the United States plus treaty obligation deliveries to Mexico. Exceptions occur during periods of surplus river flow or unanticipated rainstorms, and when delivery requirements are less than 2,000 cfs, the minimum flow rate generally provided.

Post-project analysis of water surface elevations was undertaken, based on modeling performed by Reclamation in 1991 and 2000. The modeling utilized CRSS, a detailed computer model of the entire Colorado River System, used regularly by Reclamation to analyze operation of federal reservoirs. This complex model is the only analytical tool of its kind available to perform this type of impact assessment.

During the spring, summer, and fall, the average monthly flow of the river as it approaches Imperial Dam varies between 9,000 and 11,000 cfs. During winter months, the average monthly flow drops to about 5,000 cfs. River flows are determined by release schedules from the dams, and water levels vary throughout the day. At Parker Dam, this variation is on the order of 5 feet (60-inches) during summer peak irrigation season and about 2.5 feet (30-inches) in winter low demand periods. Flow variations are dampened by channel storage downstream of Parker Dam and average about 0.5 feet daily fluctuation at Imperial Dam.

The 1991 study used the CRSS model to predict LCR discharge and stage for an assumed maximum transfer volume of 480,000 acre-feet. The 2000 CRSS modeling used the updated CRSS for 20 transects at stations throughout the river channel between Parker Dam and

Imperial Dam. Average water levels at each of these transects were determined, based on measured values for existing conditions, and were computed and calibrated for total annual reductions in flow volume in increments of 100,000 acre-feet, ranging from 100 KAF to 1.6 MAF.

For a total annual flow reduction of 400 KAF, average water surface elevations throughout the Parker Dam to Imperial Dam river segment ranged from a low of 0.03 feet (0.5 inch) to a high of 0.37 feet (4.48 inches). This 2000 model result is very consistent with the previous 1991 analyses, which concluded that: "Reduction of the river's discharge below Parker Dam by 480 KAFY…would cause, at most, a 4-inch reduction in average water surface elevations when more or less normal flows occur." (page 2, Findings and Conclusions; *Assessment of Cumulative Impacts on the Colorado River from Water Projects That Would Reduce Releases from Parker Dam*, April 1991, Bureau of Reclamation, Lower Colorado Region, Boulder City, Nevada).

Under terms of the water conservation and transfer agreement, these total depletion levels would occur incrementally over 10 to 20 years or more. Assuming the minimum time of 10 years to estimate maximum potential impacts conservatively, and using the more refined 2000 model data, water surface elevations are predicted to decrease in a range from 0.05-inch to a maximum of 0.45-inch annually over the minimum 10-year period. At completion of full diversion volumes, the change in average water surface elevation would range from 0.5 to 4.48 inches. At this maximum flow depletion condition, exposed shoreline along the river channel would range from about 1 inch (for the 0.5-inch water surface elevation drop) to a maximum of about 10 inches (for the 4.48-inches water surface elevation drop).

The 10 to 20 year implementation time permits substantial adjustment to this change in average water levels, as successional colonization of plants occurs naturally along the new wetted perimeter. Even in backwater and slough areas, plant root systems should be able to adjust to the very minor water levels reductions occurring in minute increments over a prolonged period.

Average monthly flow without the projects would be about 10,000 cubic feet per second (cfs). A reduction of river discharge below Parker Dam of 480,000 acre-feet would reduce the average monthly flow below Cibola Lake (a point between Blythe, California, and Imperial Dam) by about 700 cfs in April and August, critical months from a biological standpoint. The reduction in flow would occur gradually over more than a decade.

The water level in the river downstream from Parker Dam fluctuates in a pattern set by dam releases. Upstream from the Palo Verde Diversion Dam near Blythe, California, the highs and lows are directly influenced by the pattern of releases from Parker Dam, which is high during the day and low at night. Typically, there is a summer fluctuation of 5 feet (winter, 2.5 feet) immediately downstream from Parker Dam. This fluctuation gradually attenuates as the river flows downstream. The river water level upstream from Imperial Dam has a daily fluctuation of about one-half foot, superimposed on monthly and yearly fluctuations of several feet.

With full implementation of the Proposed Project, the daily high and low fluctuations upstream from the Palo Verde Diversion Dam near Blythe would be essentially unaffected in magnitude. The duration of the highs would decrease slightly. Downstream from the Palo Verde Irrigation District, centered near Blythe, the Project would cause a reduction in

average water surface elevations of about 4 inches when more or less "normal" flows occur in the Imperial Division (area of greatest biological concern). This reduction would occur against the background of continually fluctuating river flow and water levels.

The total change in average water surface levels attributable to the IID water conservation and transfer project (4.5 inches) is substantially less than the normal water surface elevation changes of approximately 2.5 to 5.0 feet, which occur under the existing flow regimen between Parker and Imperial Dams. Under these average reduced flows, the new exposed shoreline area along the LCR and in backwater and slough areas is predicted to be approximately 1 inch to a maximum of 10 inches and would occur in small increments over an extended period such that they would be less than 15 percent (maximum) of the baseline daily fluctuation levels in any one year.

Based on all available evidence for determining water surface elevation changes, it is concluded that the transfer could have potentially significant adverse impacts to habitat in riparian and backwater marsh areas along the LCR. As an individual project, this small increment of water level reduction would not substantially diminish the value of habitat for any species, or cause the direct demise of any species associated with those habitats. However, using the 1.574 MAF based model as a worst-case methodology, the reduction of LCR flows by about 400,000 acre-feet annually could contribute to a potentially significant cumulative impact on habitat areas along the LCR corridor between Parker Dam and Imperial Dam.

The federal analysis was not based on standards for cumulative impact assessment prescribed by the California Environmental Quality Act. The CEQA Guidelines provide that the definition of cumulative impacts should be based on reasonably foreseeable related actions (section 15130). The only known and reasonable foreseeable diversions identified at this time are those covered by this transfer and the Quantification Settlement Agreement, totaling up to about 500,000 acre-feet.

The cumulative diversions included in the federal analysis totaled 1.574 million acre-feet based on speculative projections of total water supplies that could be sought by the lower basin states over the next 50 years, and quantified at that speculative level for purposes of a very different biological planning effort (the Lower Colorado River Multi-Species Habitat Conservation Plan).

All agencies party to the transfer desire to meet the required implementation goals for the QSA and California Water Plan. With those goals in mind, and notwithstanding concerns regarding the overestimation of potential impacts and mitigation needs, the transfer parties are prepared to accept the findings of potentially significant impacts to habitat along the Lower Colorado River and implement a host of conservation and habitat enhancement measures to ensure that any potential impacts to the habitat, and to the species reliant on that habitat, are fully offset and mitigated.

Reclamation's Biological Assessment completed in 2000 provided federal assessment of potential river impacts attributable to this transfer and other related transfer actions up to 400,000 acre-feet, and a Biological Opinion was issued by the USFWS (January 2001) which does identify habitat enhancement measures required to mitigate all potential habitat impacts identified for NEPA purposes and to satisfy requirements of the federal Endangered Species Act. These habitat enhancement measures are described below, and

implementation of these measures would effectively reduce all potential habitat and related species impacts below a level of significance (Reclamation 2000; USFWS 2001). (Less than significant; fully mitigated.)

Impact avoidance to habitat and related species can be accomplished by implementing a variety of habitat improvement and species actions, including a mix of:

- Restoration or enhancement of existing degraded or marginal habitat
- Construction of new habitat
- Fish rearing and stocking
- Measures to remove and control exotic species and other pest management measures
- Purchase of conservation easements or fee title lands for long-term preservation
- Construction of nesting boxes and / or platforms

With implementation of suitable mitigation, and particularly as the mitigation actions will be put in place incrementally prior to development of the full transfer volume, potential effects on species and their habitat can be avoided and reduced to levels that are less than significant.

Because this project-specific analysis comes later in time than the federal document for purposes of the BO, consultation has not been completed with the California Department of Fish and Game. Consultation was initiated in fall of 2000, and is ongoing, and the transfer parties acknowledge their obligations under the California Endangered Species Act (CESA). The parties will consult with CDFG to determine the required actions to satisfy applicable requirements of the State Fish and Game Code. The transfer parties goal is to work with CDFG to identify measures that avoid, minimize and mitigate potential significant impacts to California species. If mitigation is necessary to offset impacts, the transfer parties will work with CDFG and USFWS to establish proportionate mitigation acreage in California to the extent feasible and reasonable.

Impact BR – 1. Reduced Flow Levels in the LCR Could Reduce the Acreage of Cottonwood-Willow Communities. Under the Proposed Project, the reduced flows in the LCR between Parker and Imperial Dams would reduce the surface water and adjacent groundwater elevation in this reach of the River. This drop in surface water and groundwater elevation could adversely affect the persistence and future establishment of cottonwood-willow communities between Parker and Imperial Dams. Of the vegetation communities in the study area, cottonwood-willow is the most susceptible to changes in the groundwater elevation. A reduction in the groundwater elevation can cause mortality of established cottonwoods and willows. Further, regeneration of cottonwood and willow can be adversely affected by a drawdown of groundwater, especially when high groundwater provides a moist seedbed during the short period of native seed dispersal.

Occupied southwestern willow flycatcher habitat was used to represent cottonwood-willow habitat. Under the Proposed Project, 186 to 279 acres of cottonwood-willow habitat would experience reduced surface water and groundwater levels, depending on the amount of water transferred to SDCWA and MWD (Table 3.2-36). The response of individual cottonwood-willow stands to this change would vary according to many factors not captured in the analysis. Thus, the actual changes in the cottonwood-willow community that would result from reduced surface water and groundwater elevations cannot be

predicted. Nevertheless, up to 279 acres of occupied southwestern willow flycatcher habitat (predominantly cottonwood-willow) could be lost.

TABLE 3.2-36
Acreage of Cottonwood-Willow/Salt Cedar Habitat Occupied by Southwestern Willow Flycatchers Between Parker and Imperial Dams Affected by the Proposed Project and Alternatives

Habitat Type	Total Acres in Study Area	Proposed + Alt 4[b] (300 KAF[a])	Alt 3 (230 KAF[a])	Proposed + Alt 4[c] (200 KAF[a])	Alt 2 (130 KAF[a])
Occupied Cottonwood-Willow/Salt cedar Habitat	1,529	279	214	186	121

Notes:
[a] Estimated as proportion of impacts from 1.574 MAF.
[b] All 300 KAFY of water conserved is transferred to SDCWA and/or MWD.
[b] 100 KAFY of water conserved is transferred to CVW.D
Source: Reclamation 2000.

Reclamation also estimated that 5,404 additional acres of cottonwood-willow habitat not currently occupied by willow flycatchers occur along the LCR between Parker and Imperial Dams. The lowering of the groundwater predicted between Parker and Imperial Dams under the Proposed Project could further reduce growth and development of some of this habitat. However, as noted, the actual response of individual stands would vary according to many factors not captured in the analysis.

Under the Proposed Project, Reclamation would implement the following measures to address impacts to southwestern willow flycatchers:

- Monitor 372 acres of occupied habitat that could be affected by the change in the point of diversion for 400 KAF of water
- Restore and maintain 372 acres of new replacement willow flycatcher habitat along the LCR within 5 years of execution of the SIA that provides federal approval for the water transfer actions
- Restore and maintain additional habitat (up to 744 acres) if monitored habitat is found to be affected

Through these measures, Reclamation would replace cottonwood-willow habitat occupied by willow flycatchers that is affected by reduced flows and, depending on monitoring results, potentially increase the amount of cottonwood-willow habitat. Thus, impacts to cottonwood-willow habitat along the LCR would be less than significant. (Less than significant impact.)

Impact BR – 2. Reduced Flow Levels in the LCR Could Reduce the Acreage of Honey Mesquite Bosque Communities. Establishment and persistence of honey mesquite communities could be affected by the reduction in surface water and groundwater elevation between Parker and Imperial Dams. Although groundwater is the primary source of water for the maintenance of mesquite bosques, additional water is derived from surface flow (e.g., flooding) and precipitation (Minckley and Brown 1982; Stromberg et al. 1992). Some honey mesquite could be lost because of reduced groundwater levels, but the relative magnitude of the impact would be less than for cottonwood-willow habitat because honey mesquite is less

sensitive to groundwater changes. Because honey mesquite bosque does not provide primary habitat for special-status species, potential changes in the acreage or structural characteristics of honey mesquite under the Proposed Project would be a less than significant impact. (Less than significant impact.)

Impact BR – 3. Reduced Flow Levels in the LCR Could Reduce the Acreage of Screwbean Mesquite Bosque Communities. Under the Proposed Project, establishment of screwbean mesquite bosque could be adversely affected by the decrease in surface water and groundwater elevations. Mesquite seedlings that germinate in areas with low soil moisture have low survivorship (Stromberg 1993), and mortality, stunting, or extremely slow growth occurs at soil moisture levels of less than 2 percent (Reclamation 1988). Thus, changes in surface water or groundwater elevations could reduce the suitability for mesquite in some areas. The amount or structural characteristics of screwbean mesquite could be altered by reduced surface water or groundwater levels. However, because screwbean mesquite bosque does not provide primary habitat for special-status species, these potential changes would be a less than significant impact. (Less than significant impact.)

Impact BR – 4. Reduced Flow Levels in the LCR Could Reduce the Acreage of Backwater Habitat. Because the amount and quality of backwater habitat along the LCR are affected by surface water elevation, the Proposed Project would directly affect backwaters along the LCR between Parker and Imperial Dams. Table 3.2-37 shows the acreage of backwaters (open water and emergent vegetation) affected at the range of water conservation levels under the Proposed Project. Between 22 and 33 acres of backwaters could be affected, depending on the amount of water transferred to SDCWA and/or MWD.

TABLE 3.2-37
Acreage of Backwaters between Parker and Imperial Dams Affected by the Proposed Project and Alternatives

Habitat Type	Proposed + Alt 4[b] (300 KAF[a])	Alt 3 (230 KAF[a])	Proposed + Alt 4[c] (200 KAF[a])	Alt 2 (130 KAF[a])
Backwater – open water	12	9	8	5
Backwater – emergent	21	16	14	9
Backwater Total	**33**	**25**	**22**	**14**

[a] Estimated as proportion of impacts from 1.574 MAF
Source: Derived from USFWS (2001).

The acreage and characteristics of open water and marsh in backwaters would be reduced. The water depth of the backwaters would decrease, and there could be a chemical change to the water with an increase in the concentrations of dissolved salt, fertilizers, and pesticides as the water volume decreases. Water temperature could increase throughout the backwaters as the volume of water is decreased under the Proposed Project.

The vegetated portion of backwaters between Parker and Imperial Dams would be directly affected by the reduced surface water and groundwater levels. Because marsh vegetation zones characteristically occur as a series of concentric rings that follow basin contours and reflect the relative depth and duration of flooding, they would reflect a decrease in surface water and groundwater (Kramer 1988). As marshes dessicate, salt cedar could replace the cattails at the margins. Dense stands of three-square bulrush, which occur in patches under

specific conditions where water is only centimeters deep, could also be adversely affected as those sites dry (Todd 1986). Dessication of marshes also would directly affect the establishment of marsh vegetation. Cattails and bulrush seeds germinate under shallow water or damp soil conditions, and spread into deeper water. Decreased water levels in a marsh could elevate water temperatures and salinity, which could inhibit seed germination (Ungar 1978; Galinato and Van der Valk 1986). The Proposed Project could change the species composition and occurrence of emergent perennials usually found in marshes along the LCR. As marshes dessicate from the edges inward, the conditions for invasion by the common reed (*Phragmites australis*) or giant reed (*Arundo donax*) are created, resulting in a potential indirect impact. Additionally, these two reeds could displace willows that could otherwise become established along the marsh edges.

Under the Proposed Project, Reclamation would restore 44 acres of backwater habitat along the LCR between Parker and Imperial Dams. With this replacement of backwater habitat affected by reduced flows, impacts of the Proposed Project to backwater habitat along the LCR would be less than significant. (Less than significant impact.)

Impact BR – 5. Reduced Acreage of Cottonwood-Willow Vegetation Could Affect Special-Status Species. Based on predicted changes in surface water and groundwater elevations, up to 279 acres of cottonwood-willow habitat could be affected by the Proposed Project. Effects of reduced surface water or groundwater levels could be manifested as reduced total acreage of cottonwood-willow habitat or changes in the species composition or structural characteristics of the habitat. Special-status species associated with cottonwood-willow habitat could be affected by these changes.

Thirteen special-status bird species nest in the cottonwood-willow community (Table 3.2-34). Changes in the structural characteristics and species composition could increase mortality in those nests exposed to higher solar radiation and air temperatures (Walsburg and Voss-Roberts 1983; Serena 1986; Hunter et al. 1987). The loss of cottonwood-willow could affect the species composition and quantity of the insect prey base on which these birds depend during the breeding season. As a result, less offspring could survive. Because these are neotropical migrants, an increased number of adults and juveniles could fail to survive the migration because they did not gain sufficient mass during the summer.

Southwestern willow flycatchers primarily occupy cottonwood willow habitat, but can also use salt cedar (Reclamation 2000). The occupied acreage of habitat is shown in Table 3.2-36. Of those 1,529 acres (Table 3.2-36), up to 279 acres of occupied habitat could be affected by the Proposed Project (Reclamation 2000). Other special-status species similarly affected by the potential loss of cottonwood-willow habitat are:

- Western yellow-billed cuckoo
- Arizona Bell's vireo
- Gila woodpecker
- Gilded flicker
- Elf owl
- Summer tanager
- Yellow warbler
- Long-eared owl
- Cooper's hawk

- Harris hawk
- Mississippi kite
- Red bat
- Colorado River hispid cotton rat
- Yuma hispid cotton rat

As described in Impact BR-1 under the Proposed Project, Reclamation would replace cottonwood-willow habitat occupied by willow flycatchers that is affected by reduced flows, and depending on monitoring results, potentially increase the amount of cottonwood-willow habitat. As a result, impacts to other special-status species associated with cottonwood-willow habitat along the LCR would be less than significant. (Less than significant impact.)

Impact BR – 6. Reduced Acreage of Open Water in Backwaters Could Affect Special-Status Wildlife Species. Special-status wildlife species that could use open water habitat in backwaters are:

- Bald eagles
- California brown pelicans
- Belted kingfishers
- Several bat species (see Table 3.2-34)
- Sonoran mud turtles

Bald eagles, brown pelicans, and kingfishers could forage for fish in open water portions of backwaters, and the bat species could seek out backwaters as a water source. Under the Proposed Project, these species would not be adversely affected by the small change in backwater habitat because they do not depend on backwaters and other aquatic habitats that these species could use and are available and abundant in the LCR Geographic Subregion (e.g., reservoirs).

Backwaters are primary habitat for the highly aquatic Sonoran mud turtle. Changes in water chemistry resulting from less water in backwaters could affect benthic organisms and submergent vegetation on which the turtle feeds. The turtle uses backwaters adjacent to native vegetation that provide the food base for development of aquatic invertebrate biomass and avoids areas lined by salt cedar, which do not provide a suitable food base (Jennings et al. 1994). Also, the turtle could be affected by increased water temperature or changes in the vegetative cover adjacent to backwaters, which removes the places in which the turtles can escape the summer heat. As described in Impact BR-4 under the Proposed Project, Reclamation would restore 44 acres of backwaters. Thus, impacts to this habitat and the Sonoran mud turtle would be less than significant. (Less than significant impact.)

Impact BR – 7. Reduced Acreage of Emergent Vegetation in Backwaters Could Affect Special-Status Species. The zone patterns in vegetation, resulting from variations in water availability, result in different types of wildlife habitat (Weller 1978). Special-status species associated with marsh habitat could be adversely affected by changes in emergent vegetation along the LCR under the Proposed Project.

Between 14 and 21 acres of emergent vegetation habitat (Table 3.2-37) could be affected by the Proposed Project. Effects to emergent vegetation could be manifested as changes in the total acreage of vegetation, water depths, vegetation structure and composition, water

temperature, and other water quality parameters. A reduction in the acreage could directly affect the population size of special-status species. Changes in vegetation structure and composition, water depth, and water quality parameters could affect habitat quality, which could affect survival rates and reproductive success of special-status species. Special-status species associated with marsh habitat along the LCR and that could be affected by these changes emergent vegetation are:

- California black rail
- Yuma clapper rail
- American bittern
- Least bittern
- Colorado River toad
- Lowland leopard frog
- Northern leopard frog

As described in Impact BR-4 under the Proposed Project, Reclamation would restore 44 acres of backwaters. Thus, impacts to this habitat and associated special-status species would be less than significant. (Less than significant impact.)

Impact BR – 8. Reduced Acreage of Aquatic Habitat Could Affect Special-Status Fish Species. Backwaters provide key habitat for the razorback sucker and bonytail chub. The razorback sucker and bonytail chub could be affected by less open water in the River and backwaters. Decreased river elevation could lessen the amount of habitat in transition between terrestrial and aquatic (e.g., submerged tree roots) in which fish forage or escape from predators.

These fish also could be affected by higher water temperature, less dissolved oxygen, and increased contaminant levels (e.g., selenium) in backwaters as water volumes decrease, if connection to the mainstem is not adequate. Historically, fish could navigate the mainstem to escape backwaters as quantity decreases but lower water levels could increase the isolation of backwaters and prevent fish from entering and exiting the mainstem.

Between 22 and 33 acres of backwater habitat could be affected by the flow reductions under the Proposed Project Reduced flows in the LCR also would reduce the amount of open water available to fish in the main river channel. Between 18 and 26 acres of open water habitat could be lost, depending on the amount of water transferred to SDCWA/MWD (Table 3.2-38).

TABLE 3.2-38
Acreage of Open-Water Habitat between Parker and Imperial Dams Potentially Affected by the Proposed Projectand Alternatives

Habitat Type	Acres affected at 300 KAF[a]	Acres affected at 230 KAF[a]	Acres affected at 200 KAF[a]	Acres affected at 130 KAF[a]
Open Water in Main LCR Channel	26	20	18	11

Source: Derived from USFWS (2001).

Critical habitat was designated for the razorback sucker in the LCR below Parker Dam. The loss of 22 to 33 acres of backwater habitat and 18 to 26 acres of open water habitat in the main channel would affect critical habitat for razorback suckers. In addition to the direct loss of habitat, the USFWS (2001) identified other potential adverse effects to critical habitat as follows:

Changes in flows and water surface elevations resulting from those flows can affect habitat values for razorback suckers and any future bonytail population. Increased fluctuations can strand fish or expose spawning areas causing death of eggs and just hatched young fish. This area is critical habitat for the razorback sucker, and changes to constituent elements of water and physical habitat are expected to occur due to declining water levels. Declining water levels force fish into deeper water where there may be less cover and protection from predators. Exposure of shallow areas also reduces the benthos and may affect the ability of fish to feed and remain healthy. Shallow waters also become very hot in the Colorado River, and reduced water quality may make preferred backwaters less able to support fish over the entire day or even season.

Under the Proposed Project, Reclamation will restore or create 44 acres of backwaters (USFWS 2001). Reclamation also will re-introduce and monitor 20,000 sub-adult razorback suckers below Parker Dam and continue the ongoing study of Lake Mead for an additional 4 years to determine reasons for persistence of adult razorback suckers in the reservoir (USFWS 2001). Reclamation will fund the capture of wild-born or F1 generation bonytail chubs from Lake Mohave to be incorporated into broodstock for this species (USFWS 2001). With implementation of these measures, impacts to razorback suckers and bonytail chub under the Proposed Project would be less than significant. (Less than significant impact.)

Impact BR – 9. Reduced Diversions from the LCR Could Benefit Special-Status Fish Species. Razorback suckers potentially could be entrained in canals by water diversion from the LCR. Assuming the potential for entrainment is proportional to the amount of water diverted, the Proposed Project would reduce this potential. Under the Proposed Project, IID would reduce its diversion at Imperial Dam by 200 to 300 KAFY. Water transferred to SDCWA service area or MWD service area would serve as replacement water for these agencies, and the overall amount of water diverted at Parker Dam would not change. However, the reduced diversions by the IID water service area at Imperial Dam would result in a net decrease in the amount of water diverted from the LCR and could reduce the risk of entrainment of razorback suckers, which is a potential beneficial effect. (Beneficial impact.)

Biological Conservation Measures in USFWS' Biological Opinion

Implementation of biological conservation measures, while increasing habitat for the listed species, may also result in temporary impacts to vegetation, fish, and wildlife species through physical activities, such as dredging, removing salt cedar by mechanical or other means, and converting agricultural lands to native habitat. These impacts are addressed generally in the IA EIS because specific areas where these conservation measures would occur have not been identified. Site-specific studies would be conducted as needed and mitigation measures identified prior to the actual implementation of the conservation measures (Reclamation 2001).

Impacts from implementing biological conservation measures in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4 and are not discussed under each Alternative.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact BR – 10. Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under the Proposed Project, between 130 KAFY and 300 KAFY of water would be conserved using a combination of on-farm irrigation system improvements, water delivery system improvements, and fallowing. This combination would reduce flows in the drains by about 28 percent relative to the Baseline. If fallowing is used to conserve water, the percent reduction in flows would be lower. If all fallowing is used to conserve water, then the flows would be reduced 9 percent. Thus, depending on the amount of water conserved through fallowing, the reduction in drain flows would be between 9 and 28 percent relative to the Baseline.

Changes in flow in the drains resulting from the Proposed Project would be manifested as a total reduction in flow volume, with potentially shorter durations of peak flows and reduced frequency of peak flows. Periods of dryness likely would increase in frequency and duration, and potentially a greater number of drains would be dry at any given time. Nevertheless, the level of potential flow reduction in the drains is within the historic range of drain flows.

Most of the drainage system is devoid of vegetation; only about 25 percent of the drainage system supports vegetation. The IID water service area regularly conducts maintenance activities on its drainage system to maintain unimpeded gravity flow of drainage water. Maintenance activities include sediment removal and vegetation control. As a result of these activities, vegetation in the drainage system is limited.

Much of the vegetation in the drainage system is tamarisk and *Phragmites*. These exotic and highly invasive species are tolerant of a wide range of conditions. As such, they would adjust to flow changes in the drains, and their occurrence and distribution of species would not change substantially. Cattails and other wetland plants are limited. Cattails are concentrated in the bottom of the drain. Because of the steep sides of the drains, little difference in water depths would occur with lower flow volumes. If drains were drier for longer periods of time, minor, temporary changes in the extent of cattails would potentially occur. However, because drain maintenance activities probably have a greater influence on the extent of vegetation in the drains and the projected decrease in drain flows would be within the range of historic levels, changes in drain flows would not substantially change the amount or composition of drain habitat. Because drain vegetation would not change substantially, the species and numbers of wildlife using the drains would not be substantially affected. Therefore, changes in drain habitat and effects to associated wildlife resulting from changes in drain flows under the Proposed Project would be less than significant. (Less than significant impact.)

Impact BR – 11. Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife. If system-based and on-farm conservation methods are used, water conservation under the Proposed Project would increase the salinity of water in the drains. Cattails are sensitive to salinity levels. Growth is best when water salinity is less than 3 g/L. Salinity

levels of 3 to 5 g/L stunt the growth of cattails. Above 5 g/L, growth and survival of cattails are limited.

Currently, about 1,412 miles of the drainage system have a salinity below 5 g/L (921 miles < 3 g/L and 491 miles at 3 to 5 g/L). The drainage system is estimated to support about 63 acres of cattail vegetation. Assuming this vegetation is proportionately distributed between areas with a salinity of less than 3 g/L and those with a salinity of 3 to 5 g/L, about 40 acres of cattails are in drains with a salinity less than 3 g/L, and 23 acres are in drains with a salinity of 3 to 5 g/L (Table 3.2-39).

TABLE 3.2-39
Acres of Cattail Vegetation in the Drains Potentially Affected by Increases in Salinity under the Proposed Project and Alternatives

Alternative	Good Growth (salinity < 3 g/L)	Stunted Growth (salinity 3-5 g/L)	Total Cattail Vegetation
Baseline (Alt 1)	40	23	63
130 KAF on-farm (Alt 2)	30	32	62
230 KAF on-farm (Alt 3)	20	39	59
130 KAF on-farm + 100 KAF system (Alt 3)	19	41	60
230 KAF on-farm + 70 KAF system (Proposed Project)	13	46	59

By increasing the ratio of tilewater to tailwater in the drains, the Proposed Project would increase the salinity in the drains. The total amount of cattail vegetation would decline as would the amount with good growing conditions (Table 3.2-39). With conservation of 300 KAFY under the Proposed Project through on-farm and system-based measures, the acreage of cattails supported in the drains would potentially be reduced by 4 acres. Most (46 acres) of the remaining cattail vegetation would be subjected to salinity levels that could stunt growth and reduce vigor of the plant. If all fallowing is used to conserve water, there would be no change in salinity in the drains and therefore no impacts to cattail vegetation. Use of fallowing to meet a portion of the conserved water would result in intermediate effects. Yuma clapper rails, a federally and state listed species, are associated with cattails and have been reported in the IID drainage system. Because cattails in the drainage system provide habitat for Yuma clapper rails, the loss of cattail vegetation is a potentially significant impact of the water conservation and transfer component of the Proposed Project. However, implementation of the HCP-IID component of the Proposed Project would reduce this potential impact to a less than significant level. (Less than significant impact.)

Impact BR – 12. Changes in Water Quality in Drains Could Affect Wildlife. Under the Proposed Project, the primary effect of water conservation would be reduced agricultural drainwater, with the greatest reduction from tailwater rather than tilewater. The relative reduction of these two types of drainwater would vary with the methods used to conserve water, and water quality conditions would reflect the proportional contribution of tailwater and tilewater to the total drainwater.

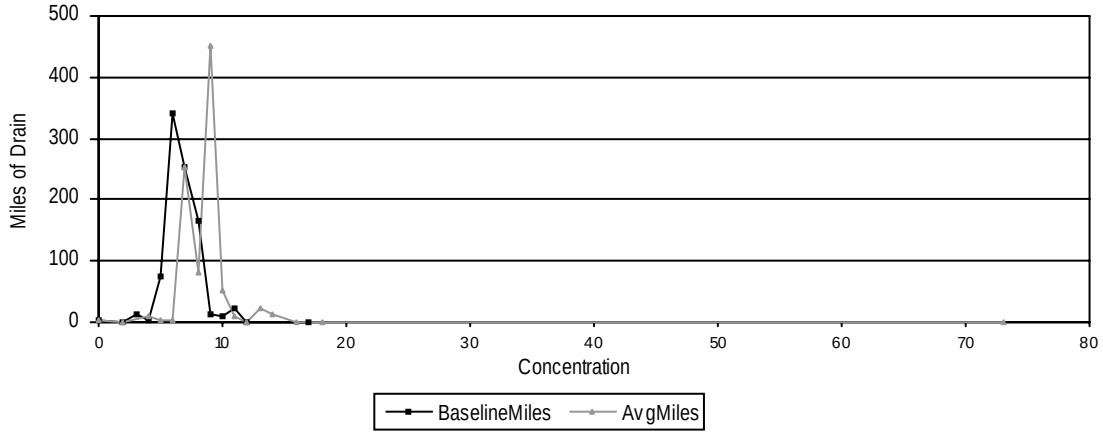
The IID Water Conservation Model predicted the range of water quality changes under the Proposed Project. These water quality effects were evaluated in two ways. First, average monthly concentrations of constituents of concern were compared to the Baseline and to toxicity-based water quality criteria. Second, the miles of drains with different average concentrations of TDS, selenium, and TSS between the Proposed Project and the Baseline were compared. This approach determined the relative extent of aquatic habitat estimated to contain potentially toxic concentrations of constituents of concern. The behavior of TDS and selenium represents water-soluble, dissolved constituents that behave somewhat conservatively in transport characteristics (e.g., TDS, selenium, boron, and nitrogen). TSS is a surrogate for the less water soluble, particulate-associated constituents that deposit with sediments (e.g., TSS, phosphorous, and pesticides). The nutrients behave differently because phosphorous will occur primarily as sediment-adsorbed phosphate, while nitrogen will be primarily transported as soluble, dissolved nitrate.

Of primary concern for evaluating potential water quality impacts to biological resources are selenium, TDS, and TSS. Figures 3.2-14a, b, and c show the miles of drains at average concentrations for selenium, TDS, and TSS under the Proposed Project and Baseline. Based on these modeling results, the Proposed Project would result in no change or a net decrease in the concentrations of TSS, phosphorous, and pesticides relative to the Baseline. Decreases in these constituents would improve water quality conditions for biological resources and, thereby, provide an overall benefit. In contrast, concentrations of dissolved constituents (total salinity, selenium, boron, and nitrogen) would increase under the Proposed Project. This increase is reflected as an overall increase in average concentrations of selenium under the Proposed Project relative to the Baseline and as an increase in the miles of drains at the higher average concentrations. Under both the Proposed Project and Baseline, almost all drains would have an average selenium concentration greater than 5 $\mu g / L$.

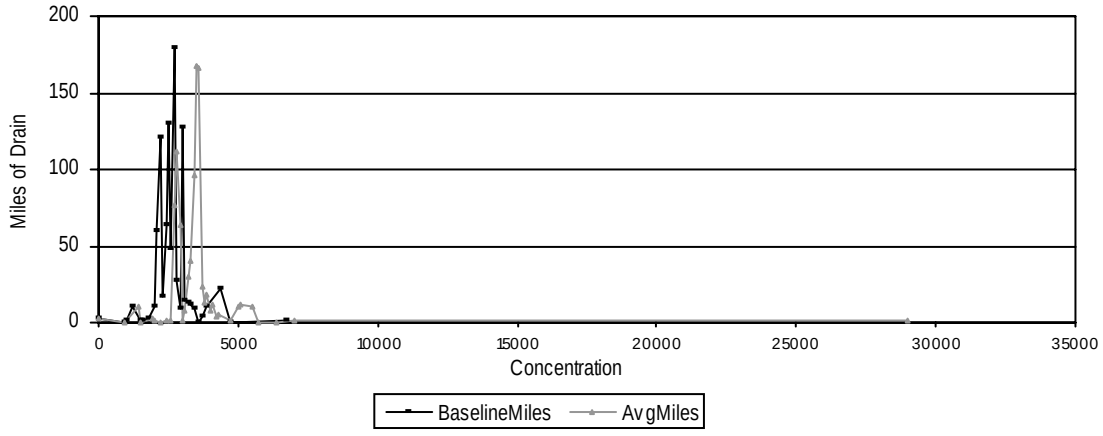
Increased selenium concentrations in drain water would increase the exposure of birds, such as rails, herons, and egrets that feed on invertebrates and fish there. Following the methods described previously in Section 3.2.4.1, the potential effects of increased selenium concentrations in the drains on egg hatchability were predicted for the Proposed Project and Alternatives. The estimated “equivalent” number of miles fully affected by reduced hatchability due to increased selenium concentrations in the drains under the Proposed Project and Baseline is presented in Table 3.2-40. The hatchability effects are presented at the level of the clutch (or hen) rather than at the level of an individual egg. Hens that are affected may still produce viable eggs, but this analysis assumes that the entire clutch is lost, making the estimate of overall effect a conservative measure of potential impacts. It is also important to note that the estimate of hatchability effects is based on the total miles of drain within each selenium concentration category. Only a portion of the total drain mileage is vegetated. While unvegetated portions of the drains could be used, most marsh-associated birds will occur in association with vegetated areas, so the actual amount of habitat in which birds could be exposed to increased selenium is over-represented.

Proposed Project - 200K On-Farm/100K System COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the Alamo River



TDS (mg/L) IID Surface Drain Discharge to the Alamo River



TSS (mg/L) IID Surface Drain Discharge to the Alamo River

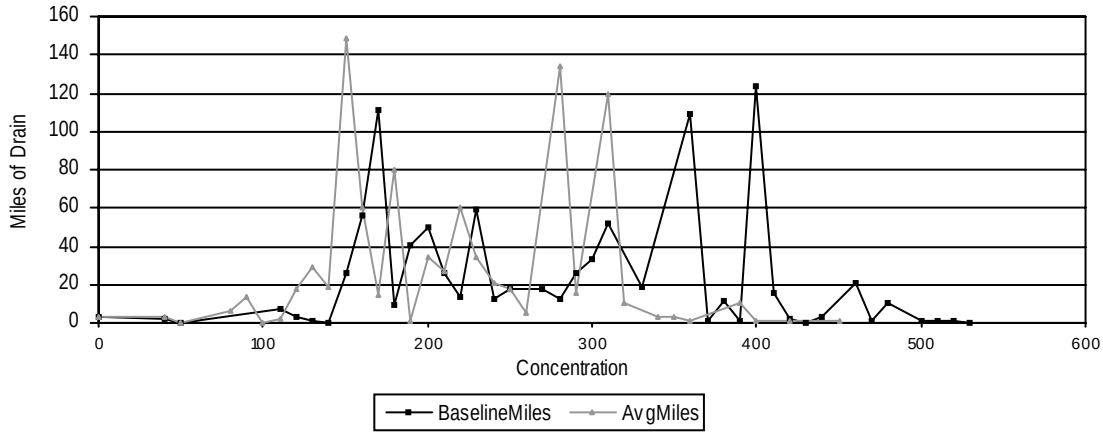
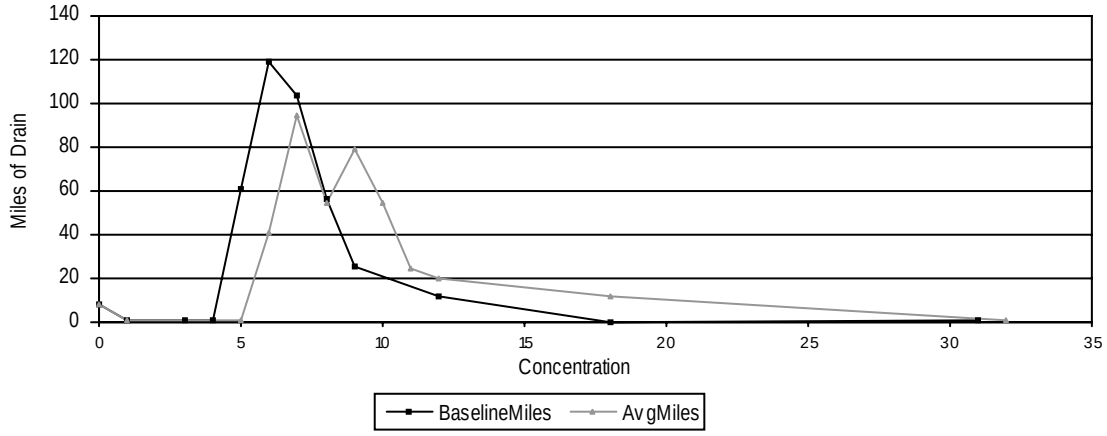


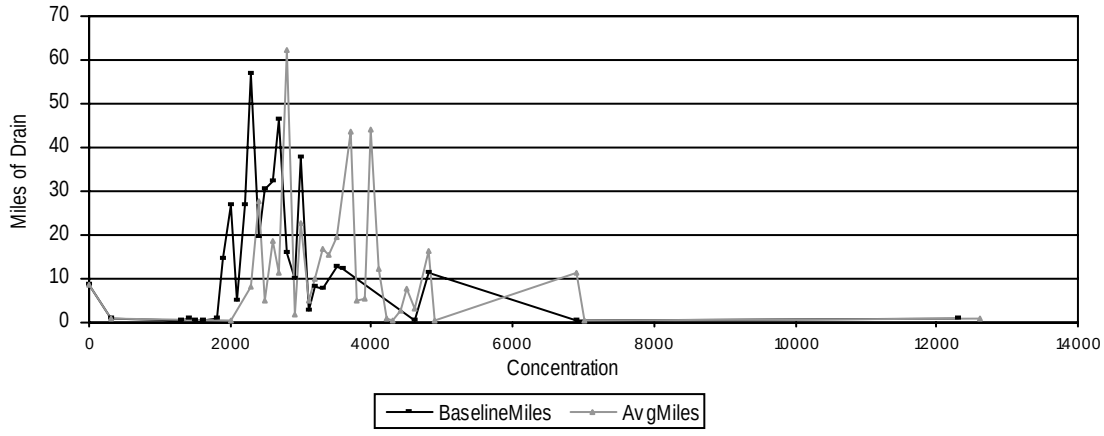
Figure 3.2-14a
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under the Proposed Project for Drains Discharging into the Alamo River

Proposed Project - 200K On-Farm/100K System COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the New River



TDS (mg/L) IID Surface Drain Discharge to the New River



TSS (mg/L) IID Surface Drain Discharge to the New River

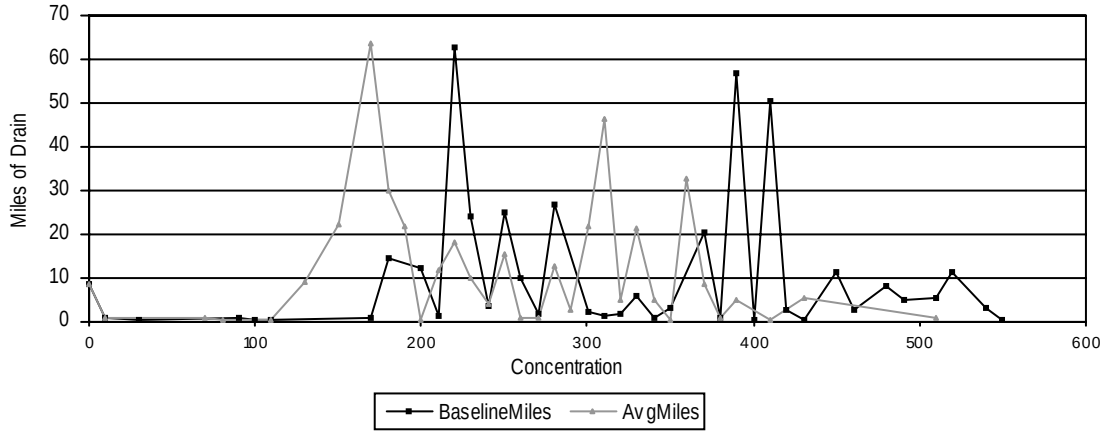
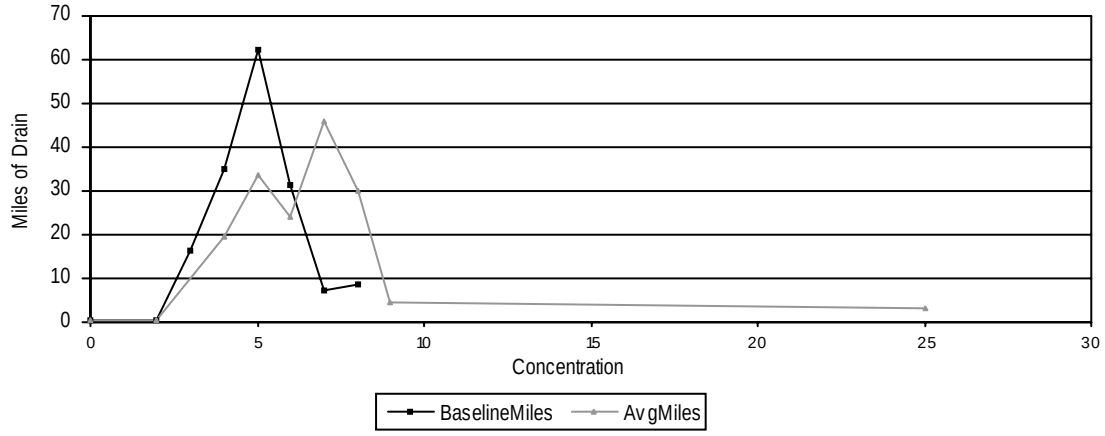


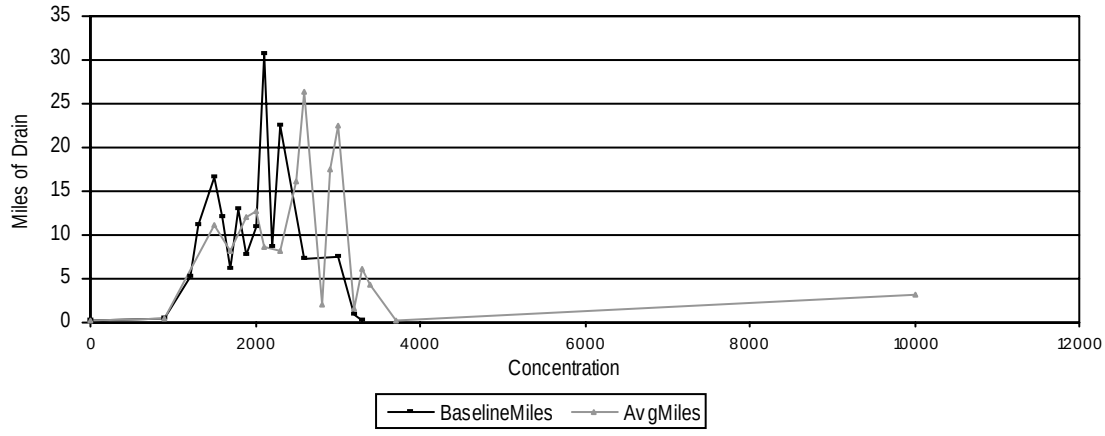
Figure 3.2-14b
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under the Proposed Project for Drains Discharging into the New River

Proposed Project - 200K On-Farm/100K System COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the Salton Sea



TDS (mg/L) IID Surface Drain Discharge to the Salton Sea



TSS (mg/L) IID Surface Drain Discharge to the Salton Sea

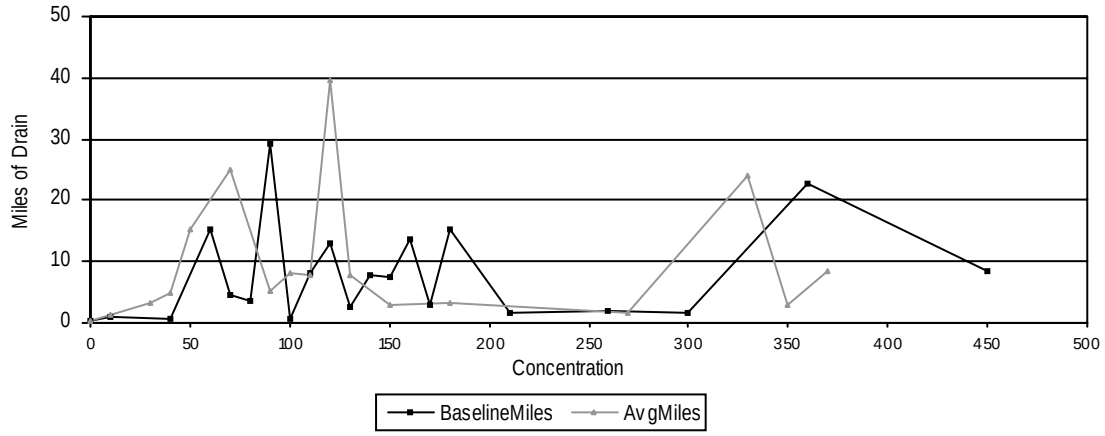


Figure 3.2-14c
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under the Proposed Project for Drains Discharging into the Salton Sea

TABLE 3.2-40
Estimated Number of Miles Potentially Affected by Reduced Hatchability due to Increased Selenium Concentrations Associated with Varying Water Conservation Amounts and Techniques

			Miles of Drain Habitat Fully Affected by Reduced Hatchability				
Maximum Water Se conc. (µg/L)	Egg Se conc. (µg/g)	Probability of >1 inviable eggs in clutch (Corrected)	Baseline (No Project) Alternative 1	300 KAFY (Proposed Project)	130 KAFY On-Farm (Alternative 2)	230 KAFY 130 OF + 100 System (Alternative 3)	300 KAFY All Fallowing (Alternative 4)
5	5.538	0.02767	5.20	1.86	3.30	2.24	5.96
6	5.994012	0.03024	12.45	2.33	7.92	3.90	13.09
7	6.408738	0.03262	14.10	7.88	13.01	9.81	13.58
8	6.791115	0.03485	7.76	11.11	11.02	13.18	7.26
9	7.147287	0.03695	3.60	11.25	6.39	9.81	3.31
10	7.481695	0.03895	1.67	8.19	3.33	5.48	1.37
11	7.797662	0.04086	0.84	4.22	1.44	2.76	0.78
12	8.097756	0.04270	0.56	2.13	0.82	1.39	0.62
13	8.384003	0.04447	0.43	1.30	0.67	0.85	0.42
>13	Variable	Variable	1.27[a]	44.02[b]	2.56[a]	33.15[b]	1.06[a]
		Total	47.89	94.28	50.44	82.56	46.39

[a] Maximum water concentration = 46.5; egg concentration = 14.6; probability of hatchability effects = 0.08768
[b] Maximum water concentration = 2658.8; egg concentration = 84.4; probability of hatchability effects = 0.85940

Results of the analysis indicate that under the Baseline, the equivalent of approximately 48 miles of drain would be fully affected by waterborne selenium through hatchability effects (Table 3.2-40). Under the Proposed Project, up to an equivalent of about 94 miles would be affected depending on the total amount of conservation and methods of conservation (Table 3.2-40). The potential for reduced reproductive success of birds using the drains constitutes a potentially significant impact of the water conservation and transfer component of the Proposed Project. Implementation of the HCP-IID component of the Proposed Project would reduce this impact to less than significant. (Less than significant impact.)

Impact BR – 13. Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife. Under the Proposed Project, water conservation would reduce flows in the New and Alamo Rivers. With conservation of 300 KAFY through on-farm and water delivery system improvements, flows in the Alamo and New Rivers would be reduced relative to the Baseline by 30 percent and 22 percent, respectively (Table 3.2-41). If fallowing is used to conserve water, the percent reduction in flows would be lower. If all fallowing is used to conserve water, then the percent reduction in flows in the Alamo and New Rivers would be 10 and 7 percent, respectively. Thus, depending on the amount of water conserved through fallowing, the percent reduction in Alamo River flows would be between 10 and 30 and in the New River between 7 and 22 percent relative to the Baseline.

TABLE 3.2-41
Annual Average Discharge (thousand acre-feet)) to the Salton Sea from the Alamo and New Rivers under the Proposed Project and Alternatives, without Implementation of the Salton Sea Habitat Conservation Strategy

Conservation Level and Methods	Alamo River	New River
Baseline/No Project (Alt 1)	576	431
130 KAF On-farm irrigation system improvements only (Alt 2)	503	382
230 KAF all conservation measures (Alt 3)	448	346
200 on-farm + 100 KAF all conservation measures (Proposed Project)	401	335
300 KAF Fallowing only (Alt 4 and Proposed Project)	517	399

Vegetation along the New and Alamo Rivers consists predominantly of tamarisk, often in dense stands. Tamarisk is a fairly drought-tolerant and invasive exotic species that has a high tolerance for environmental change (Kerpez and Smith 1987; Brotherson and Field 1987; Deloach et al. 1996). As the flow levels in the New and Alamo Rivers decrease under the Proposed Project, tamarisk would colonize newly exposed ground. Because tamarisk can survive on soil water alone, reductions in the groundwater level potentially resulting from reduced flows in the New and Alamo Rivers are unlikely to change the amount of tamarisk along these two rivers. Because the extent of tamarisk along the rivers would not change substantially, wildlife that use this habitat would not be substantially affected. (Less than significant impact.)

Impact BR – 14. Installation of Seepage Recovery Systems Could Remove Tamarisk Scrub and Affect Associated Wildlife. Under the Proposed Project, IID would conserve between 130 KAFY and 300 KAFY of water using on-farm irrigation system improvements, and/or fallowing.

Potential water delivery system improvements include installing seepage recovery systems along the East Highline Canal. Subsurface recovery systems are proposed where there is not an existing drain adjacent to the canal. These systems consist of an underground, perforated pipeline that collects the water and directs it to a sump. Along the East Highline Canal, the pipelines would be installed close to the outside toe of the canal embankment. Vegetation supported by seepage generally occurs on the embankment where it intercepts seepage water. Because the recovery system would be at the base of the embankment, vegetation would not be lost as a consequence of removing seepage water. However, construction likely would require removal of some seepage-supported vegetation. Construction to install these systems disturbs an area about 70 feet wide along the pipeline installation route. About 13.2 miles of pipeline are anticipated to be installed for the seepage recovery systems, removing about 43 acres of vegetation. This amount constitutes about 10 percent of the estimated 412 acres of tamarisk scrub habitat supported in seepage areas adjacent to the East Highline Canal in the IID water service area.

The plant species composition of the seepage communities adjacent to the East Highline Canal is diverse and varies substantially among the seepage areas. Arrowweed, common reed, and tamarisk are the most common species in the seepage communities, with mesquite, cattails, and cottonwoods in some areas. The reduction in acreage of seepage communities has the potential to affect migratory songbirds that use these habitats. However, most of the vegetation consists of tamarisk, which is of limited value to migratory songbirds, and is present in dense stands along rivers and in other locations throughout the region (Guers and Flannery 2000). Furthermore, the potential loss of seepage community vegetation constitutes only 10 percent of the available seepage community vegetation. Because only a small amount of the seepage community vegetation would be lost, and the habitat is dominated by non-native plant species, the loss of seepage community vegetation is a less than significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact BR – 15. Reservoir Construction Could Remove Tamarisk Scrub and Affect Associated Wildlife. Under the Proposed Project, IID would conserve between 130 KAFY and 300 KAFY of water using on-farm irrigation system improvements, water delivery system improvements, and/or fallowing. Potential water delivery system improvements include lateral interceptors. Locations for 16 lateral interceptor systems have been identified. These systems consist of a canal and a reservoir about 40 surface acres. Some of the reservoirs could be located close to the New or Alamo Rivers, and their construction could remove tamarisk scrub adjacent to these rivers. Up to 15 acres of tamarisk scrub could be removed to construct reservoirs associated with lateral interceptor systems. This effect would occur only if IID installs lateral interceptors. Tamarisk—non-native, highly invasive plant—provides poor quality habitat to wildlife and has colonized many areas throughout the IID water service area. The small loss of tamarisk potentially resulting from installation of reservoirs would not adversely affect wildlife or wildlife habitat. (Less than significant impact.)

Impact BR – 16. Installation of On-farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. Under the Proposed Project, between 130 KAFY and 300 KAFY of water would be conserved using on-farm irrigation system improvements, water delivery system improvements, and fallowing. On-farm irrigation system improvements could generate up to of 230 KAFY. Farmers in the IID water service area could implement a variety of measures to conserve water, including the following:

- Installing tailwater return systems
- Dividing fields into level basins
- Installing drip irrigation systems
- Shortening furrows/border strips
- Narrowing border strips
- Implementing cutback irrigation
- Laser leveling fields
- Changing field slopes to improve water distribution uniformity
- Employing cascading tailwater systems

Installation of tailwater return systems would remove a small amount of agricultural land from production to accommodate tailwater ponds. Tailwater ponds typically have about a

3 to 4 AF capacity and cover 1 to 2 acres. Assuming an average farm is 80 acres, a 2-acre tailwater return pond would eliminate about 2.5 percent of the area from agricultural production. If all farms installed tailwater systems, a 2.5 percent reduction in farmed area throughout the Imperial Valley would amount to about 12,500 acres (2.5 percent of the 500,000 acres of irrigated agricultural land in the IID water service area). Farmers typically locate tailwater return ponds in the least productive portions of their fields, particularly in areas farmed irregularly, so the actual loss in agricultural field habitat likely would be less than 12,500 acres in the extreme case that all farms install tailwater return systems. Tailwater return systems are installed when no crops are produced, typically, during the summer. Because they would be installed when no crops are grown on the field, the potential for disturbance to wildlife would be limited.

Installing drip irrigation systems would require a minor amount of temporary ground disturbance, potentially disturbing wildlife. Drip systems would be installed between crops; therefore, no temporary or permanent changes in the amount of agricultural field habitat would occur.

The remaining water conservation techniques require reconstructing / recontouring an agricultural field. Wildlife using agricultural field habitat could be disturbed during reconstructing / recontouring. However, because reconstructing / recontouring would be conducted when no crops are grown on the field, the potential for disturbance to wildlife is limited. The amount of agricultural field habitat would not change as a result of reconstructing / recontouring agricultural fields to conserve water.

As described previously, installing on-farm irrigation system improvements could remove a small amount of agricultural field habitat, depending on the improvements implemented, and presents a minor potential for disturbance of wildlife. However, because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less than significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact BR – 17. Operation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. The agricultural fields in the Imperial Valley attract many wintering and migrating birds. Many species (e.g., white-faced ibis and cattle egrets) are attracted to fields while they are being irrigated. Birds commonly follow the water line during flood irrigations, preying on insects flushed by the water. Changes in irrigation practices under the Proposed Project have the potential to affect the quality of the foraging opportunities for wintering and migrating birds.

Farmers' water conservation practices would not change irrigation practices in a manner that would reduce habitat suitability for wildlife. A given crop consumes a certain amount of water. This consumptive use would not change with water conservation, and a given crop would need to be irrigated at the same frequency as under existing irrigation practices. The water conservation techniques would reduce the amount of tailwater (i.e., surface water that runs off the field), not the amount of water consumed by the crops. Also, except for drip irrigation systems, the water conservation techniques improve the efficiency of surface irrigation, rather than change how the crop is irrigated. For example, tailwater return systems collect and store water from a flood-irrigated field for use in subsequent flood irrigations. The improved efficiencies would reduce the amount of water leaving the field as

tailwater. Thus, on-farm irrigation system improvements would not change the suitability of agricultural fields as foraging habitat. (No impact.)

Impact BR – 18. Installation of Water Delivery System Improvements Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife. Under the Proposed Project, the IID water service area would conserve between 130 KAFY and 300 KAFY of water using on-farm irrigation system improvements, water delivery system improvements, or fallowing. These improvements with the potential to eliminate agricultural field habitat are installing lateral interceptors and constructing new reservoirs. These activities could remove about 8,630 acres of agricultural field habitat. Relative to the entire irrigated area of Imperial Valley that covers about 500,000 acres, this potential loss constitutes about 1.7 percent of the agricultural land. Construction would not occur in agricultural fields under active production so the potential for disturbance of species using this habitat would be minor. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less than significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact BR – 19. Fallowing Could Reduce the Acreage of Agricultural Fields and Affect Associated Wildlife. Under the Proposed Project, between 130 KAFY and 300 KAFY of water would be conserved using a combination of on-farm irrigation system improvements, water delivery system improvements, or fallowing. Fallowing could reduce the acreage of irrigated agriculture available in the IID water service area at any one time. If only fallowing is used to conserve water, about 50,000 acres of land would be needed. This acreage represents about 10 percent of the irrigated area in the IID water service area. Even with this reduction, agricultural field habitat would remain abundant in the IID water service area, consisting of about 450,000 acres. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less than significant impact to wildlife and wildlife habitat. This potential effect would not occur if only on-farm irrigation system and water delivery system improvements are used to conserve water. (Less than significant impact.)

Impact BR – 20. Fallowing Would Not Change the Amount of Desert Habitat. Fallowing could be used to generate some or all of conserved water. Fallowing could include land retirement for the entire 75-year project duration or for shorter periods, ranging from a single season to several years. Land removed from agricultural production for a long time could be colonized by desert plants. The likelihood of desert plants becoming reestablished would be influenced by the proximity of the retired land to desert habitat, soil conditions, and rainfall among others. Land retired for short periods of time probably would not be colonized by desert plants. Some fields in the Imperial Valley that have been out of agricultural production for many years do not support vegetation. The limited amount of vegetation that has developed consists of ruderal species rather than native desert plant species. Thus, Fallowing would not change the amount of desert habitat or otherwise affect wildlife associated with desert habitats. (No impact.)

Impact BR – 21. Reduced Flows in the Drain Could Affect Fish and Aquatic Habitat. Under the Proposed Project, up to 300 KAFY of water would be conserved. The specific combination of conservation methods implemented under the Proposed Project would have less effect on aquatic resources than the total amount of water conserved.

Water conservation would reduce the amount of water in the drainage system (Table 3.2-42). Relative to the Baseline, with conservation of 300 KAFY through on-farm irrigation system improvements, water delivery system improvements, and/or fallowing, flow in the drains could be reduced by 28 percent. If fallowing is used to conserve water, the percent flow reduction would be less. If all fallowing is used to conserve water, then the percent reduction in flows would be 9 percent. Thus, depending on the amount of water conserved through fallowing, the percent reduction in drain flows would be between 9 and 28 percent, relative to the Baseline. As explained subsequently, reduced flows in the drains would have a less than significant impact on fish and other aquatic resources in the drains.

TABLE 3.2-42
Total Annual Discharge (KAF) from the IID Water Service Area Under the Proposed Project and Alternatives, without Implementation of the Salton Sea Habitat Conservation Strategy

Alternatives	Alamo River	New River	Drains Direct to Sea	Total
No Project/Baseline (Alt 1)	576	431	92	1,099
130 KAF On-farm irrigation system improvements only (Alt 2)	503	382	80	965
230 KAF all conservation measures (Alt 3)	448	346	70	864
200 on-farm + 100 KAF all conservation measures (Proposed Project)	401	335	56	792
300 KAF Fallowing only (Alt 4 and Proposed Project)	517	399	86	1,002

Aquatic habitat in the drains is of poor quality because of silty substrates, poor water quality, and shallow depth. Aquatic habitat in drains depends on drainwater from agricultural fields. As a result, the amount of water (and aquatic habitat) in the drains varies throughout the year in response to the level of irrigation. When the agricultural fields discharging into a drain are not irrigated, the drains dry out and do not provide aquatic habitat. Currently, water volume in drains fluctuates because of seasonal cropping patterns, with some drains or portions of drains drying out.

The quality of aquatic habitat in the drains also could be affected by changes in the vegetation in the drains that support fish and aquatic invertebrates. Because of the artificial nature of drain plant communities and the probable lack of substantial changes in drain plant communities from water conservation, the potential impacts to aquatic communities through changes in vegetation in the agricultural drains, resulting from the Proposed Project would be less than significant.

Reductions in flows (and resulting decreases in water depths) could make fish residing in the drains more vulnerable to predation by fish-eating birds. The overall impact of this potential increase in predation, however, is moderated by the generally high turbidity of drainwater and thus the low visibility of fish in the drains.

Reductions in the amount or quality of aquatic habitat as a result of flow reductions in the drains not emptying to the Salton Sea would affect only aquatic invertebrates and non-

native fish (e.g., tilapia, mosquitofish, and carp) that periodically inhabit these drains. No special-status species inhabit the drains emptying to the New and Alamo Rivers. Desert pupfish (a state- and federal-listed species) inhabit drains emptying directly to the Salton Sea and are not found in the New or Alamo Rivers or their drains. Impacts to desert pupfish, resulting from the Proposed Project, are discussed under Impact BR-24. (Less than significant impact.)

Impact BR – 22. Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat. Under both the Proposed Project and the Baseline, the Alamo River would exhibit concentrations of water-borne selenium over chronic water quality criteria levels (5 µg/L). In contrast, New River discharges to the Salton Sea would remain below this level. The linear miles of drains discharging to the Alamo and New Rivers and directly to the Salton Sea probably exceed the 5-µg/L selenium chronic water quality criteria level; the 4,000-mg/L salinity criterion is shown on Figures 3.2-14a, b, c. The results show that almost all of the drains exceed the 5-:g/L concentration for selenium under both the Proposed Project and Baseline. However, the Proposed Project (assuming water conserved through on-farm irrigation system and water delivery system improvements) would increase the miles of drains at higher selenium concentrations above 5 :g/L (Figures 3.2-14a, b, c). If all the conserved water was generated with fallowing, there would be no change in water quality conditions as explained for Alternative 4. Thus, the magnitude of water quality changes under the Proposed Project would depend on the amount of water conserved through fallowing.

Adverse effects to fish via bioaccumulation can occur at waterborne selenium concentrations as low as 1 to 3 µg/l (DOI 1998). Reproductive and developmental toxicity in fish has been observed at these concentrations. The increase in selenium concentrations could reduce reproductive success of fish in the drains and rivers. The Proposed Project also would increase the miles of drains, with average salinity levels exceeding 4,000 mg/L. Except for desert pupfish, which inhabit drains that discharge directly to the Sea, all the fish in the drains and rivers are introduced species. A potential for reduced reproductive success of fish in the rivers and drains is not considered a significant impact to fish resources, because all the species are introduced species. Impacts to desert pupfish are addressed separately under Impact BR-24 (Less than significant impact.)

Impact BR – 23. Reduced Flows in the Rivers Drain Could Affect Fish and Aquatic Habitat. Water conservation under the Proposed Project would reduce flows in the New and Alamo Rivers. Conservation measures would result in less flow in agricultural drains, with consequently less discharge into rivers. Table 3.2-41 shows the mean annual discharge of the New and Alamo Rivers into the Salton Sea under the Proposed Project. Relative to the Baseline, conservation of 300 KAFY of water through on-farm irrigation system and water delivery system improvements would reduce flows in the Alamo and New Rivers by 30 percent and 22 percent, respectively. If fallowing is used to conserve water, the percent reduction in flows would be lower. If all fallowing is used to conserve water, then the percent reduction in flows in the Alamo and New Rivers would be 10 and 7 percent, respectively. Thus, depending on the amount of water conserved through fallowing, the percent reduction in Alamo River flows would be between 10 and 30 and in the New River between 7 and 22 percent, relative to the Baseline. The reduced volume of water returning to the New and Alamo Rivers through the drainage network would not significantly affect

habitat for fish and other aquatic resources in the New and Alamo Rivers for the reasons that follow.

Aquatic habitat quality in the New and Alamo Rivers is poor because of poor water quality, high turbidity, and unstable substrates that inhibit production of benthic invertebrates and rooted vegetation. The flow reductions anticipated under the Proposed Project would have little effect on the quality of aquatic habitat in these river systems. Fish populations in the New and Alamo Rivers are probably limited by food availability and water quality rather than by flow. The anticipated reductions in flows at the upper level of conservation would not significantly reduce the amount of fish habitat or limit fish productivity in the rivers. Reductions in the amount or quality of aquatic habitat as a result of flow reductions in the New and Alamo Rivers would affect only aquatic invertebrates and non-native fish. Therefore, impacts from flow reductions would be less than significant. (Less than significant impact.)

Impact BR – 24. Reduced Flows in the Drains Could Affect Desert Pupfish. Desert pupfish inhabit drains that discharge directly to the Salton Sea. Under the Proposed Project, water conservation is predicted to reduce flow levels in drains in the IID water service area that discharge directly to the Sea (Table 3.2-42). If water is transferred to CVWD, flows in drains that discharge directly to the Sea in the CVWD service area would increase. It is uncertain to what extent increased flows in drains in the CVWD service area would increase habitat for pupfish because the drains that discharge directly to the Sea are steep, with only a mount drain at the drain outlets with a shallow enough slope to be suitable for pupfish.

With conservation of 300 KAFY through on-farm irrigation-system and water delivery system improvements, flows in the drains that discharge directly to the Sea from the IID water service area, would be reduced by 39 percent, relative to the Baseline. If all fallowing is used to conserve water, then the percent reduction in flows in drains that discharge directly to the Salton Sea from the IID water service area would be 7 percent. Thus, depending on the amount of water conserved through fallowing, the percent reduction in flows would be between 7 and 39. This reduction in flow would potentially decrease the amount of habitat for desert pupfish in the IID water service area, which could increase their susceptibility to interspecific competition/interference and predation and result in a smaller overall population size because of reduced physical space. Because water conservation would reduce the contribution of tailwater to the drainage system, water quality conditions also would worsen. This potential effect is addressed subsequently.

The changes in flow and water quality in the drains discharging directly to the Sea and supporting pupfish constitute a potentially significant impact of the water conservation and transfer component of the Proposed Project. However, implementation of the HCP-IID component of the Proposed Project would reduce this potential impact to less than significant (see Impact BR – 38). (Less than significant impact.)

Impact BR – 25. Construction of Water Delivery System Improvements Could Affect Razorback Suckers. Razorback suckers inhabit portions of the conveyance system and are known to occur in the All American and East Highline Canal systems. The suckers in the IID water service area are composed of old members of a dwindling, non-reproductive, remnant stock (Tyus 1991; Minckley et al. 1991). No recruitment of wild-spawned fish occurs, and they are

isolated from the main razorback sucker population in the Colorado River and its tributaries.

Under the Proposed Project, the amount of water in the conveyance system would be reduced by 300 KAFY. Although the volume of water would be reduced, this reduction would not affect the amount of aquatic habitat in the canal system because the water surface elevation in the conveyance system is tightly controlled to maximize hydroelectric power generation and efficient delivery of irrigation water.

Installation of some water delivery system improvements (e.g., canal lining) would require dewatering the canal. In accord with the HCP, a qualified biologist will be on-site when canals are dewatered. If razorback suckers are found in the canal when it is dewatered, they will be captured and returned to LCR. Thus, adverse impacts to razorback suckers would be avoided. (Less than significant impact.)

Impact BR – 26. Water Quality Changes in the Drains Could Affect Special-Status Species. The primary concern for special-status species associated with drain habitat is changes in water quality in the drains of the Imperial Valley. Special-status bird species associated with drain habitat feed on aquatic invertebrates (e.g., Yuma clapper rail) or fish and can accumulate pesticides or selenium to levels that reduce reproductive success. The desert pupfish inhabits drains that discharge directly to the Salton Sea and are directly exposed to water quality constituents. Assuming water conservation using on-farm irrigation-system and water delivery system improvements, the Proposed Project would decrease the concentration of pesticides in drainwater (as associated with TSS and sediment-associated contaminants), benefiting the special-status species associated with drain habitat, but the concentration of selenium, salinity, and dissolved constituents in the drains would increase relative to the Baseline. If all conserved water was generated with fallowing, there would be no change in water quality conditions, as explained for Alternative 4. Thus, the magnitude of water quality changes under the Proposed Project would depend on the amount of water conserved through fallowing. Nevertheless, the increase in selenium concentration that would occur with conservation using on-farm irrigation system and/or water delivery system improvements is a potentially significant impact of the water conservation and transfer component of the Proposed Project on special-status species. However, implementation of the HCP-IID component of the Proposed Project would reduce this potential impact to less than significant. The HCP (Appendix C) contains a more detailed evaluation of the effects of implementing the HCP on special-status species. (Less than significant impact.)

Impact BR – 27. Changes in Drain Habitat Could Affect Special-Status Species. As described under Impact BR – 10, reduced flow in the drains would not significantly change the amount or species composition of vegetation in the drains. However, increased salinity of drainwater under the Proposed Project would reduce cattail vegetation in the drains. Cattails are preferred habitat for the Yuma clapper rail and provide habitat for other special-status species potentially using the drains. The predicted reduction in cattails could adversely affect Yuma clapper rails and other special-status species using the drains. This effect constitutes a potentially significant impact of the water conservation and transfer component of the Proposed Project. In addition to changes in physical habitat, increased selenium concentration in the drains under the Proposed Project could adversely affect Yuma clapper rails and other special-status species using the drains. These potential effects

are addressed under Impact BR – 26. These water quality changes also are a potentially significant impact of the water conservation and transfer component of the Proposed Project. However, implementation of the HCP-IID component of the Proposed Project would reduce these potential impacts to less than significant (see Impact BR – 32). The HCP (Appendix C) contains a more detailed evaluation of the effects of implementing the HCP on special-status species associated with drain habitat. (Less than significant impact.)

Impact BR – 28. Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species. Special-status species associated with tamarisk scrub habitat consist of species that find optimal habitat conditions in native riparian communities. Tamarisk has invaded riparian areas in the Imperial Valley and become established in other areas with available soil moisture, such as along agricultural drains and in seepage areas. Tamarisk scrub habitat does not represent optimal habitat for the species that use this habitat in the Proposed Project area. Rather, it constitutes the only available tree-dominated habitat in the Proposed Project area. Tamarisk may be used by special-status species, but it provides poor quality habitat. None of the special-status species associated with tamarisk scrub depends on this habitat.

The Proposed Project would not significantly reduce the availability of tamarisk scrub supported by the agricultural drains or along the New and Alamo Rivers as a result of changes in flow or water quality. Installation of seepage recovery systems and lateral interceptors could eliminate about 58 acres of tamarisk scrub habitat. This small reduction in tamarisk scrub would not significantly adversely affect special-status species because (1) tamarisk is common and abundant throughout the project area, (2) tamarisk is of limited habitat quality, and (3) none of the special-status species depend on this habitat.

Construction of water delivery system improvements (e.g., reservoirs) has a minor potential to disturb special-status species using tamarisk scrub habitat. This potential disturbance would not significantly affect special-status species because few species breed in the Proposed Project area when disturbance could cause nest abandonment or interfere with care of the young. During other periods, construction activities could flush special-status birds from tamarisk scrub. Because of the availability of other areas of tamarisk, birds flushed by construction could find alternative habitat, and no significant impacts would occur. The HCP (Appendix C) contains a more detailed evaluation of the effects of implementing various water conservation activities and the HCP on special-status species associated with tamarisk scrub habitat. (Less than significant impact.)

Impact BR – 29. Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields. Many special-status species exploit agricultural fields for foraging, particularly during winter when many birds overwinter in the Imperial Valley. Special-status species frequenting agricultural fields for foraging include mountain plover, sandhill cranes, black terns, and white-faced ibis. Installation of on-farm irrigation system improvements under the Proposed Project would require construction and ground disturbance. Installation of water conservation measures in agricultural fields would not adversely affect special-status species using this habitat because the conservation measures would be installed when crops are not grown, primarily in the summer. Special-status species predominantly occur in the Proposed Project area during the winter or as fall and spring migrants and also predominantly use agricultural fields when they are in active production and being irrigated.

As explained under Impacts BR-16, BR-18, and BR -19, installation of on-farm irrigation system and water delivery system improvements or fallowing would not substantially reduce the availability of agricultural lands in the IID water service area. Thus, the Proposed Project would not significantly affect special-status species associated with agricultural fields. Section 3.8 of the HCP (Appendix C) provides a species-by-species evaluation of the impacts of the Proposed Project on special-status species associated with agricultural fields in the IID water service area. (Less than significant impact.)

Impact BR – 30. Water Conservation Practices Could Affect Special-Status Species Associated with Desert Habitat. In the IID water service area, native desert habitat occurs adjacent to the East Highline, Westside Main, and All-American Canals and portions of the Thistle and Trifolium Extension Canals. These areas represent the only locations where special-status species associated with desert habitat could occur in the Proposed Project area. The only features of the Proposed Project that could affect desert habitat would be water delivery system improvements involving construction (e.g., canal lining, reservoirs) along the canals adjacent to desert habitat. No regulating reservoirs, mid-lateral reservoirs, or canal lining are proposed along these canals. Seepage recovery systems could be installed along the East Highline Canal, but these systems would be constructed on the agricultural field side of the canal. Thus, no construction activities required for the water delivery system improvements would occur in desert habitat, and no significant impacts to special-status species would occur as a result of the water conservation and transfer component of the Proposed Project. (Less than significant impact.)

Impact BR – 31. Water Conservation Practices Could Affect Burrowing Owls. Imperial Valley supports one of the highest populations of burrowing owls in the United States. Burrowing owls commonly inhabit the earthen banks of agricultural canals and drains in the Proposed Project area. Construction activities can adversely affect burrowing owls by trapping owls in their burrows, injuring individuals, or eliminating areas suitable for burrow creation.

Although installation of on-farm irrigation system improvements involves construction, they are not expected to significantly adversely affect burrowing owls. Burrowing owls are concentrated in drain and canal embankments, and construction for these improvements would occur primarily in the fields or field margins. Individual burrowing owls could be disturbed by installing new gates in concrete laterals required under the "shorten furrows/border strip improvement" conservation measure. This potential impact is considered less than significant because of the limited area affected and the low number of owls at risk to this impact. In addition, suitable habitat for burrowing owls would remain abundant in the Proposed Project area as drain and canal embankments, and the Imperial Valley would continue to support high population levels of owls.

The "level basin and shorten furrows/border strip improvement" conservation measures could benefit burrowing owls as these measures include construction of concrete-lined ditches. In the Imperial Valley and elsewhere, burrowing owls often locate their burrows at the base of concrete structures, and additional concrete-lined ditches could increase suitable burrow locations.

Installation of water delivery system improvements would not significantly affect burrowing owls. As part of the Proposed Project, IID could line 1.74 miles of canal. If burrowing owls inhabit burrows in the areas to be lined, they could be displaced or injured.

After the lining is completed, burrowing mammals would create new burrows along the newly lined canal and replace burrows affected during the lining process. Because of the small amount of canal length affected (about 0.1 percent of the entire conveyance system) and the availability of suitable burrowing conditions after completion of the lining, the potential loss or displacement of a small number of owls would be an adverse, but less than significant impact on the burrowing owl population. In addition, the HCP-IID component of the Proposed Project contains measures to further reduce and compensate for potential effects to burrowing owls associated with installation of water delivery system improvements.

Lateral interceptors and reservoirs would be installed in agricultural fields. Burrows used by burrowing owls are along drains and canals, rather than in an agricultural field. Because the new interceptors and canals would be constructed in agricultural fields, the potential for impacts to burrowing owls is low. Construction of these new features could increase nesting opportunities for burrowing owls because additional canals (i.e., the lateral interceptors) would be constructed. Construction of the entire lateral interceptor system identified would result in about 80 additional miles of canals. As burrows are created by burrowing mammals in the new canals, burrow availability for owls would increase. No significant impacts to burrowing owls would occur from installation of lateral interceptors.

Seepage recovery systems are contemplated along the East Highline Canal. Areas where seepage recovery systems would be installed probably provide poor habitat conditions for burrowing owls. The areas proposed for seepage recovery systems contain moist soils because of the seepage and most support dense vegetation. These characteristics are not conducive to burrowing owls, and no owls were observed in May 2001 when the proposed locations were visited. Thus, no significant impacts to burrowing owls would be expected from the installation of seepage recovery systems.

Fallowing could be used to generate a portion of the water conserved under the Proposed Project. As explained in more detail for Alternative 4 under Impact A4-BR-13, fallowing has the potential to reduce the availability of insects on which burrowing owls prey. If fallowed fields are concentrated in a few areas, potentially, owls would abandon territories adjacent to fallowed fields. Because fallowing would be only one of many methods used to conserve water under the Proposed Project and because owls are not limited by prey availability in the Imperial Valley, the amount of land fallowed would not reduce prey populations to a level that would be expected to cause owls to abandon territories. The HCP (Appendix C) contains a more detailed evaluation of the effects of implementing various water conservation activities and the HCP on burrowing owls. (Less than significant impact.)

Inadvertent Overrun and Payback Policy (IOP)

It is estimated that conservation of 59 KAFY would be required with implementation of the IOP. Conservation of 59 KAFY for the IOP can be accomplished via fallowing or other conservation measures. This conservation would be in addition to the up to 300 KAFY for the Proposed Project and is part of the Proposed Project. Hydrologic impacts of the IOP have already been modeled in the Baseline and are reflected in model results. If fallowing is selected as a conservation measure, about 9,800 additional acres would be required.

Even with additional fallowing acres to meet the IOP requirements, agricultural field habitat would remain abundant in the IID water service area. Because agricultural field habitat is

abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less than significant impact to wildlife and wildlife habitat. The additional fallowing associated with the IOP also would not change the amount of desert habitat or otherwise affect wildlife associated with desert habitats and is considered a less than significant impact.

Impacts resulting from the implementation of the IOP in USFWS' Biological Opinion would be the same for Alternatives 2, 3, and 4, and therefore are not discussed under each Alternative.

Habitat Conservation Plan

As part of the Proposed Project, IID would implement an HCP to minimize and mitigate the impacts to special-status wildlife species inhabiting the IID water service area, AAC, and Salton Sea. The HCP consists of five habitat-based conservation strategies and four species-specific strategies:

- Salton Sea Conservation Strategy
- Tamarisk Scrub Conservation Strategy
- Drain Habitat Conservation Strategy
- Desert Habitat Conservation Strategy
- Agricultural Field Habitat Conservation Strategy
- Burrowing Owl Conservation Strategy
- Desert Pupfish Conservation Strategy
- Razorback Sucker Conservation Strategy
- Other Covered Species Strategy

These strategies minimize and mitigate the impacts resulting from the conservation and transfer of water under the Proposed Project and O&M activities on the special-status species associated with these habitats or the individual species addressed by the species-specific strategies. For species associated with each habitat, the impact of the habitat-specific conservation strategy is beneficial. However, implementation of certain elements of each strategy could adversely affect species associated with other habitats. For example, construction of managed marsh under the Drain Habitat Conservation Strategy could reduce the amount of agricultural land and affect species associated with agricultural fields. The beneficial and adverse effects of implementing the elements of the HCP on biological resources in the Imperial Valley and AAC follow. The effects of implementing the Salton Sea Conservation Strategy are described under the Salton Sea section that follows this section.

The Other Covered Species Strategy of the HCP consists of avoidance, minimization, and mitigation measures. Implementation of the avoidance and minimization measures for the other covered sepcies would not result in physcial changes in the environment. Therefore, no impacts would result from this component of the Other Covered Species Strategy. Mitigation measures consist of acquiring and protecting or creating and protecting desert habitat or unique habitat features (e.g. roosts) that cannot be avoided during construction activities. Impacts associated with these actions are encompassed by the Desert Habitat Conservation Strategy.

Impacts resulting from the implementation of the HCP would be the same for Alternatives 2, 3, and 4, and are therefore not discussed under each Alternative.

HCP (IID Water Service Area Portion)

Impact HCP-IID-BR – 32. Creation of Managed Marsh Habitat Would Benefit Wildlife Associated with Drain Habitat. As part of the Proposed Project, IID would implement an HCP that minimizes and mitigates the impacts of the proposed water conservation and transfer project on special-status species. Under the HCP, IID would create an amount of managed marsh habitat equal to the total amount of habitat in the drains plus an additional amount of habitat based on predicted toxicity effects from increases in selenium under the water conservation and transfer program. At least 190 acres of high-quality marsh habitat and up to 652 acres would be created within 15 years. This habitat would be created in large blocks and would consist of native marsh vegetation, such as cattails, bulrush, and sedges.

The HCP would more than double the acreage of habitat for both special-status species associated with drain habitat and species without special status. Composed of cattails and bulrush, the created habitat also would provide substantially greater habitat value than the existing vegetation in the drains that consist of exotic species, such as tamarisk and *Phragmites*. The larger blocks of created habitat also would increase its attractiveness and value to wildlife as compared to the narrow, linear habitat of the drains.

IID would use water with selenium concentrations low enough to avoid adverse reproductive effects to support the managed marsh habitat. The selenium concentration of water used to support the managed marsh is expected to be close to 2 ppb. This selenium concentration is considerably lower than the selenium concentration in most of the drains in the IID water service area. Adverse effects from selenium toxicity would be avoided in the managed marsh, and the quality of the managed marsh habitat would be further enhanced beyond that in the drains.

With implementation of the HCP-IID component, the Proposed Project would have beneficial effects on special-status species associated with drain habitat. Section 3.5 Drain Habitat Conservation Strategy of the HCP (Appendix C) provides additional information on the effects of implementing the Drain Habitat Conservation Strategy on habitat conditions for species associated with drain habitat and the responses of special-status species. (Beneficial impact.)

Impact HCP-IID-BR – 33. Creation of Managed Marsh Could Decrease Agricultural Field Habitat. Under the Drain Habitat Conservation Strategy, IID would create at least 190 and up to 652 acres of managed marsh habitat. This habitat is anticipated to be created on lands used for agricultural production. Thus, up to 652 acres of agricultural land could be converted to managed marsh.

This potential reduction in agricultural field habitat would not significantly affect species using this habitat for two reasons. First, 652 acres constitutes a small amount (about 0.1 percent) of the total agricultural area in the IID water service area. Even with consideration of the potential loss of agricultural field habitat from other aspects of the Proposed Project (e.g., installation of tailwater return systems), agricultural land would remain abundant. Secondly, some of the species using agricultural fields also would use managed marsh habitat (e.g., white-faced ibis), resulting in no net loss of habitat value. (No impact.)

Impact HCP-IID-BR – 34. Creation of Native Tree Habitat Could Benefit Wildlife Associated with Tamarisk Scrub. As described under Impacts BR-14 and BR-15, implementation of several of the water conservation methods (lateral interceptors, seepage recovery systems) could remove tamarisk scrub habitat and disturb species using this habitat. The HCP addresses potential take of special-status species associated with these activities. Under the Tamarisk Scrub Habitat Conservation Strategy, prior to conducting construction activities in tamarisk scrub habitat, IID would survey the habitat to determine if special-status species are breeding in the habitat. IID would avoid removing the habitat until after the breeding season if special-status species are found. This measure would benefit special-status species and species without special status by avoiding disturbance of breeding birds.

In addition to avoiding direct effects to species breeding in tamarisk scrub habitat, IID would create or acquire, and preserve native tree habitat to replace tamarisk scrub habitat permanently lost from construction activities. Tamarisk scrub is poor quality habitat, and most of the species using this habitat find optimal habitat in native riparian plant communities or mesquite bosque. By compensating for tamarisk scrub permanently lost with native tree habitat, species associated with tamarisk scrub would benefit from higher habitat quality. Section 3.4, Tamarisk Scrub Habitat Conservation Strategy of the HCP, provides additional information on the effects of implementing the Tamarisk Scrub Habitat Conservation Strategy on habitat conditions for species associated with tamarisk and the responses of special-status species. (Beneficial impact.)

Impact HCP-IID-BR–35. The Desert Habitat Conservation Strategy Would Avoid Impacts to Wildlife Associated with Desert Habitat. The Desert Habitat Conservation Strategy would avoid impacts on special-status species associated with desert habitat, and therefore would not adversely affect these species or species using other habitats. This strategy consists of IID implementing practices to avoid or minimize the potential for adverse effects to special-status species from O&M activities. If construction activities are required within the rights-of-way of the canals adjacent to desert habitat (AAC, East Highline, Westside Main, Thistle, or Trifolium Extension), additional measures would be implemented to minimize the potential for adverse effects to special-status species and to compensate for decrease in habitat quality or availability. Species not associated with desert habitat would not be affected by measures implemented under the Desert Habitat Conservation Strategy. Section 3.6, Desert Habitat Conservation Strategy of the HCP, provides additional information on the effects of implementing this strategy on desert habitat and the responses of special-status species. (No impact.)

Impact HCP-IID-BR–36. Avoidance Measures Would Benefit Burrowing Owls. The Burrowing Owl Conservation Strategy focuses on minimizing and avoiding direct impacts to burrowing owls during O&M and construction activities. Implementation of the HCP would minimize adverse impacts associated with these activities while perpetuating aspects of the IID water service area's activities that benefit owls. The Burrowing Owl Conservation Strategy would contribute to the persistence of burrowing owls in the Imperial Valley and thereby further benefit the species. Section 3.7.1, Burrowing Owls of the HCP, discusses the effects of implementing this strategy on burrowing owls. (Beneficial impact.)

Impact HCP-IID-BR–37. Avoidance Measures of Burrowing Owl Conservation Strategy Would Benefit Other Special-Status Species. The Burrowing Owl Conservation Strategy does not include measures that would adversely affect habitat for other special-status species, and

some measures could benefit other special-status species. Specifically, the Burrowing Owl Conservation Strategy includes requirements to avoid construction activities and certain earth-disturbing O&M activities along the drains and canals during the owl's breeding period, if occupied burrows would be affected. If other species breed nearby, they would similarly benefit from the avoidance measure for burrowing owls. (Beneficial impact.)

Impact HCP-IID-BR – 38. Desert Pupfish Conservation Strategy Would Increase Habitat for Pupfish. For desert pupfish, the HCP requires IID to maintain the existing amount and quality of desert pupfish habitat and to increase the amount of habitat for pupfish over the life of project. In addition to these habitat measures, IID would implement measures to avoid or minimize direct impacts to desert pupfish from construction activities. With implementation of the HCP-IID component, the Proposed Project would benefit desert pupfish. Section 3.7.2, Desert Pupfish of the HCP, discusses the response of desert pupfish to the HCP measures. (Beneficial impact.)

Impact HCP-IID-BR–39. Increased Habitat from the Desert Pupfish Conservation Strategy Would Benefit Other Special-Status Species. The Desert Pupfish Conservation Strategy does not include measures that would adversely affect habitat for other special-status species, and some measures could benefit other special-status species. Specifically, the Desert Pupfish Conservation Strategy includes maintaining the existing amount of desert pupfish habitat and increasing the amount of pupfish habitat as the elevation of the Salton Sea recedes. So, this Strategy would contribute to maintaining and increasing the amount of drain habitat, benefiting species associated with drain habitat, both those with and without special state or federal status. (Beneficial impact.)

Impact HCP-IID-BR – 40. HCP Measures Would Avoid Impacts to Razorback Suckers. Under the HCP, IID would salvage razorback suckers found when canals are dewatered and transport the fish to the LCR for release. As a result of this action, significant impacts to razorback suckers would be avoided. (No impact.)

Impacts resulting from the implementation of the HCP (IID Water Service Area portion) would be the same for Alternatives 2, 3, and 4, and are therefore not discussed under each Alternative.

Salton Sea Habitat Conservation Strategy (HCP-SS)

The Salton Sea Habitat Conservation Strategy includes generating mitigation water and supplying this water to the Sea so as to maintain the salinity of the Salton Sea below 60 ppt until 2030.

As described in Section 2.2.6.7, the Salton Sea Habitat Conservation Strategy has been evaluated in this Final EIR/EIS with the assumption that mitigation water would be generated by fallowing within the IID water service area. Other sources of water could be used but they have not been evaluated in this EIR/EIS.

Additionally, under the Proposed Project, the implementation of the Salton Sea Habitat Conservation Strategy in concert with the on-farm irrigation system improvement approach to conserving water for transfer was determined not to be feasible due to the number of total acres that would be needed. This is because the "efficiency conservation" measures require a 1 to 1 ratio of mitigation water to the Sea. Therefore, the combination of only on-farm and/or delivery system efficiency conservation measures required to produce 300 KAFY for transfer plus fallowing within the IID water service area as the sole method of providing the

mitigation water associated with the Salton Sea Habitat Conservation Strategy has not been assessed in this Final EIR/EIS.

The amount of land that would need to be fallowed would depend on how water for transfer was conserved. If fallowing was used to generate all of the 300 KAFY of water for transfer, then about 30,500 acres of land would need to be fallowed for mitigation water. Under this implementation scenario, about 50,000 acres would be fallowed to generate water for transfer, and up to a total of 80,500 acres could be fallowed under the Proposed Project. This would reduce the amount of agricultural land by about 16 percent. Even with this reduction, agricultural fields would remain abundant at about 419,500 acres, and no significant adverse effects to biological resources would be expected. Section 3.8.6 of the HCP (Appendix C) provides information on the potential effects of the Salton Sea mitigation approach on special-status species.

As described in the Project Description, how mitigation water would be conveyed to the Salton Sea has not yet been specified. If the mitigation water was transported via drains and rivers in the Imperial Valley, flows in the rivers and drains could approach the level under the Baseline. Alternatively, if mitigition water was conveyed to the Salton Sea through channels other than the drains and rivers, flow levels in the Imperial Valley would not change under the Proposed Project because the water would be generated outside of the valley. Fallowing could be used under the Proposed Project to conserve water for transfer and to generate mitigation water. In this case, changes in flows in the rivers and drains would be the same as under Alternative 4.

Implementation of the Salton Sea Habitat Conservation Strategy could affect water quality in the drains depending on the source of the water and how the water is conveyed to the Salton Sea. If mitigation water is obtained from areas outside of the Imperial Valley, water quality conditions would be the same as described for the Proposed Project without implementation of the Salton Sea Habitat Conservation Strategy. IID also could fallow to conserve water for transfer and to generate mitigation water to the Sea. Under this scenario. water quality conditions would be the same as described for Alternative 4.

SALTON SEA

Water Conservation and Transfer

Under the Proposed Project, IID would conserve between 130 KAFY and 300 KAFY of water using a combination of on-farm irrigation system improvements, water delivery system improvements, and/or fallowing. If all fallowing was used to conserve water, effects to the salinity, surface elevation, and surface area of the Salton Sea would be the least of the methods considered for conserving water. This "best-case" scenario of the Proposed Project is analyzed under Alternative 4. The following analysis addresses the "worst-case" scenario of conservation of 300 KAFY of water using on-farm irrigation system improvements and water delivery system improvements and transfer to SDCWA. Use of fallowing to generate a portion of the conserved water would have effects between those described here and those of Alternative 4. It is important to note that the following impact analyses related to the Proposed Project do not incorporate effects of the Salton Sea Habitat Conservation Strategy. Mitigating effects of implementing the Salton Sea Habitat Conservation Strategy are discussed, as applicable, under "Salton Sea Habitat Conservation Strategy" below.

Impact BR – 41. Reduced Drain Flows Could Affect Adjacent Wetlands Dominated by Cattail/Bulrush Vegetation. The Salton Sea database identifies 217 acres of adjacent wetlands dominated by cattails and bulrushes. In the IID water service area, the Salton Sea database identifies three parcels dominated by cattails: one on the southwestern edge (35 acres) and two on the southern edge (32 acres). A fourth parcel on the eastern edge of the Sea is dominated by bulrushes (17 acres). The remaining 133 acres identified as adjacent wetland dominated by cattail or bulrush are adjacent to the northwestern area of the Salton Sea in CVWD's service area. Because cattails and bulrush cannot tolerate saline water, these areas must be supported by a freshwater source (i.e., drainwater from CVWD or IID). The Proposed Project would increase freshwater flows in drains in the CVWD service area and would potentially increase freshwater flows to the 133 acre adjacent wetland in the CVWD service area.

The remaining three areas identified as adjacent wetlands are misclassified in the Salton Sea database. The first parcel of 35 acres is a managed duck club and does not meet the definition of an adjacent wetland (i.e., unmanaged areas). Of the two parcels totaling 32 acres, one is an IID drain, and the other is a marsh managed by USFWS. The drain parcel is managed by IID as part of its drainage system; impacts to drain vegetation are addressed under Impact BR- 10. The other parcel managed by USFWS does not meet the definition of an adjacent wetland (i.e., unmanaged areas). Habitat values of the parcel managed by USFWS and the duck club would not change with implementation of the Proposed Project; therefore, the two parcels would not be affected. The last parcel encompassing 17 acres is sustained by runoff from CDFG's managed marsh area in the Wister Unit. Because CDFG would not change management of marsh areas in the Wister Unit under the Proposed Project, the amount of water leaving the Wister Unit and supporting the 17-acre parcel would not change. Therefore, this parcel would not be affected under the Proposed Project. (No impact.)

Impact BR – 42. Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. The Salton Sea database (University of Redlands 1999) classifies 6,485 acres along the Sea as adjacent wetlands. Tamarisk is the dominant vegetation on 2,349 acres. Adjacent wetlands dominated by cattail/bulrush were addressed previously. The remaining acres either lack vegetation or are dominated by iodine bush, arrowweed, or other mixed halophytic shrubs. Because these vegetation types provide little wildlife habitat, changes in the acreage of these types would not significantly or adversely affect wildlife or wildlife habitat. Tamarisk is also the primary component of the shoreline strand community. The following analysis addresses potential change in the amount of tamarisk scrub in areas designated as adjacent wetland or shoreline strand.

The water surface elevation of the Salton Sea is projected to decline under the Proposed Project. The magnitude and rate of the elevation decline would depend on the combination of methods used to conserve water. With conservation of 300 KAF through on-farm irrigation system and water delivery system improvements, the water surface elevation would decline rapidly for the first 30 years. After this period, the water surface elevation would stabilize at about –250 feet msl, about 22 feet below the existing level (Figure 3.2-15). Use of fallowing to conserve a portion of the water would reduce the magnitude of the decline in water surface elevation.

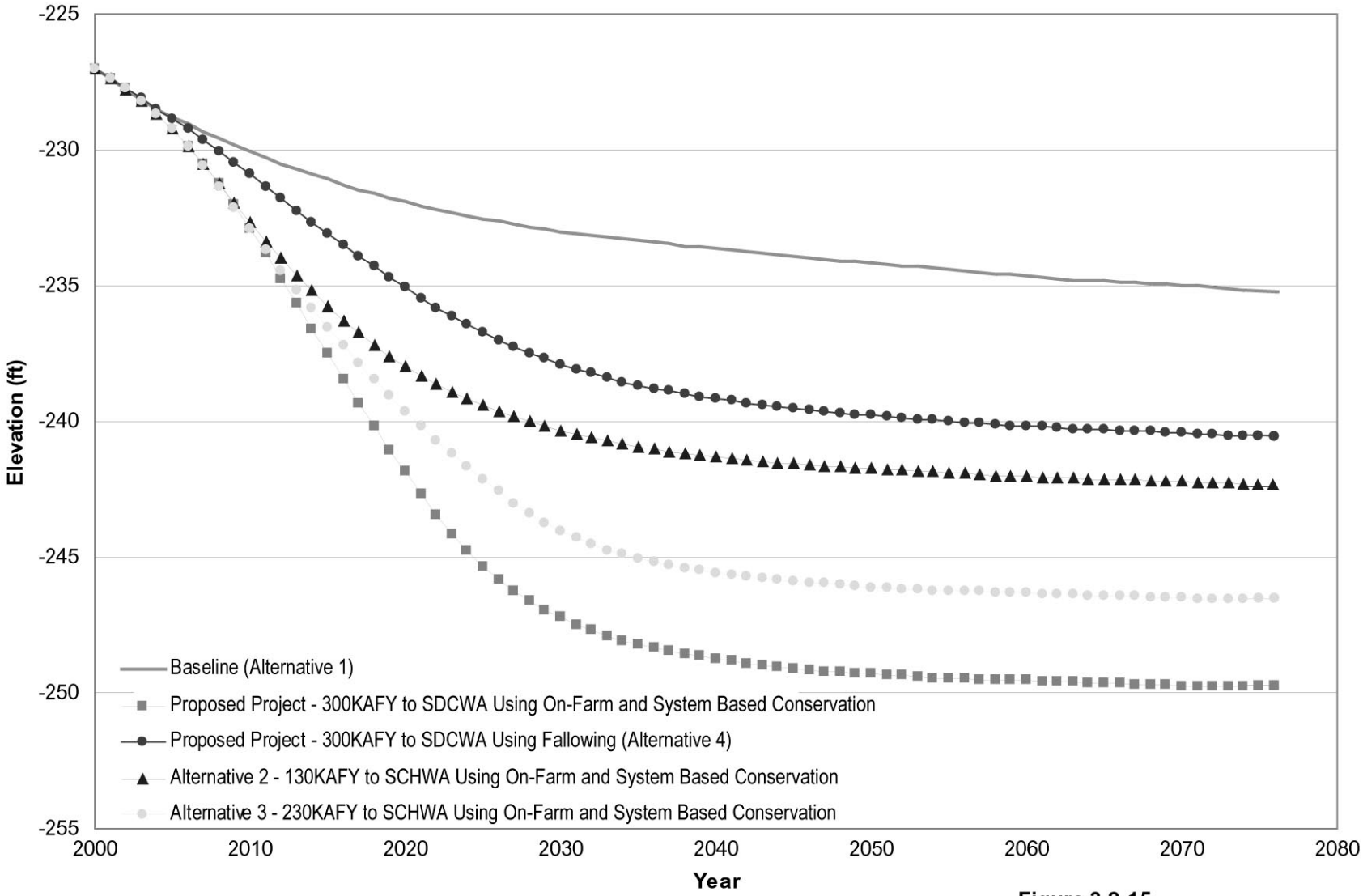


Figure 3.2-15
Salton Sea Water Surface Elevations
Proposed Project and Project Alternatives
(Without Implementation of the Salton Sea Habitat Conservation Strategy)

E082002013CVO (10/11/02)

The source of the water supporting the tamarisk in adjacent wetland and shoreline strand areas is uncertain, but could consist of a combination of shallow groundwater and seepage from the Salton Sea. The extent to which the water surface elevation of the Sea contributes to supporting this community is uncertain. Depending on the relationship between the water surface elevation of the Sea and maintenance of the shoreline strand and adjacent wetlands, water conservation under the Proposed Project could change the amount of tamarisk scrub habitat in shoreline strand and adjacent wetland areas. There is, however, uncertainty about the extent and likelihood of these possible changes. As the Sea recedes, tamarisk could establish at lower elevations, replacing habitat lost at high elevations. Alternatively, it has been suggested that tamarisk will not establish in areas exposed by a receding sea level because of excessive soil salinity (Reclamation and SSA 2000). In areas where drainwater or shallow groundwater is the predominant water source, no change in tamarisk-dominated adjacent wetlands is expected. It is not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas. Although it is not possible to predict the magnitude of change in the tamarisk adjacent to the Salton Sea, a reduction in the amount would not be anticipated to cause a significant impact because (1) tamarisk is an invasive, non-native species of poor habitat quality for wildlife and (2) no special-status species depend on tamarisk. Implementation of the Salton Sea Conservation Strategy under the HCP-SS component of the Proposed Project would further ensure that no significant impacts occur. (Less than significant impact.)

Impact BR – 43. Increased Salinity Would Change Invertebrate Resources in the Salton Sea. As the salinity of Salton Sea increases, the invertebrate community would change. The pileworm, *Neanthes succinea*, is a primary component of the Salton Sea food chain, providing food for several fish species. Reproduction of pileworms is substantially reduced when the salinity reaches about 50 g/L. *Brachionus plicatilis* (rotifer) would not be able to complete its life cycle at 48 g/L. A reduction in the abundance of these species could allow amphipods, such as *Gammarus mucronatus*, to become the dominant benthic invertebrate. At higher salinity levels, the Salton Sea would resemble Mono Lake, which is dominated by highly specialized halotolerant invertebrates, such as brine shrimp and brine flies.

The Proposed Project would accelerate the rate at which the Salton Sea transitions first to an invertebrate-dominated ecosystem, then to a system dominated by halotolerant organisms (e.g., brine shrimp and brine flies) similar to Mono Lake and the Great Salt Lake. Figure 3.2-16 shows the salinity level at which selected invertebrates would not be able to complete their life cycles and would be exceeded under the No Project alternative and the Proposed Project. As shown on Figure 3.2-16, the difference between when a specific salinity level would be exceeded under the Proposed Project and when it would occur under the No Project gets larger as the salinity threshold increases. For example, the modeling predicts only a 1-year difference between the Baseline and Proposed Project, with conservation of 300 KAFY for when the salinity tolerance of pileworms (50 g/L) would be exceeded. But for the copepod (*C. dietersi*), with a tolerance of 80 g/L, this difference increases to 44 years.

As the thresholds of invertebrates are exceeded, the abundance of these species likely would decline. Concurrently, the abundance of brine flies and brine shrimp would increase. These species are tolerant of high salinities. Brine shrimp and brine flies are the dominant invertebrates at Mono Lake, an inland lake with a salinity of about 100 g/L. These species

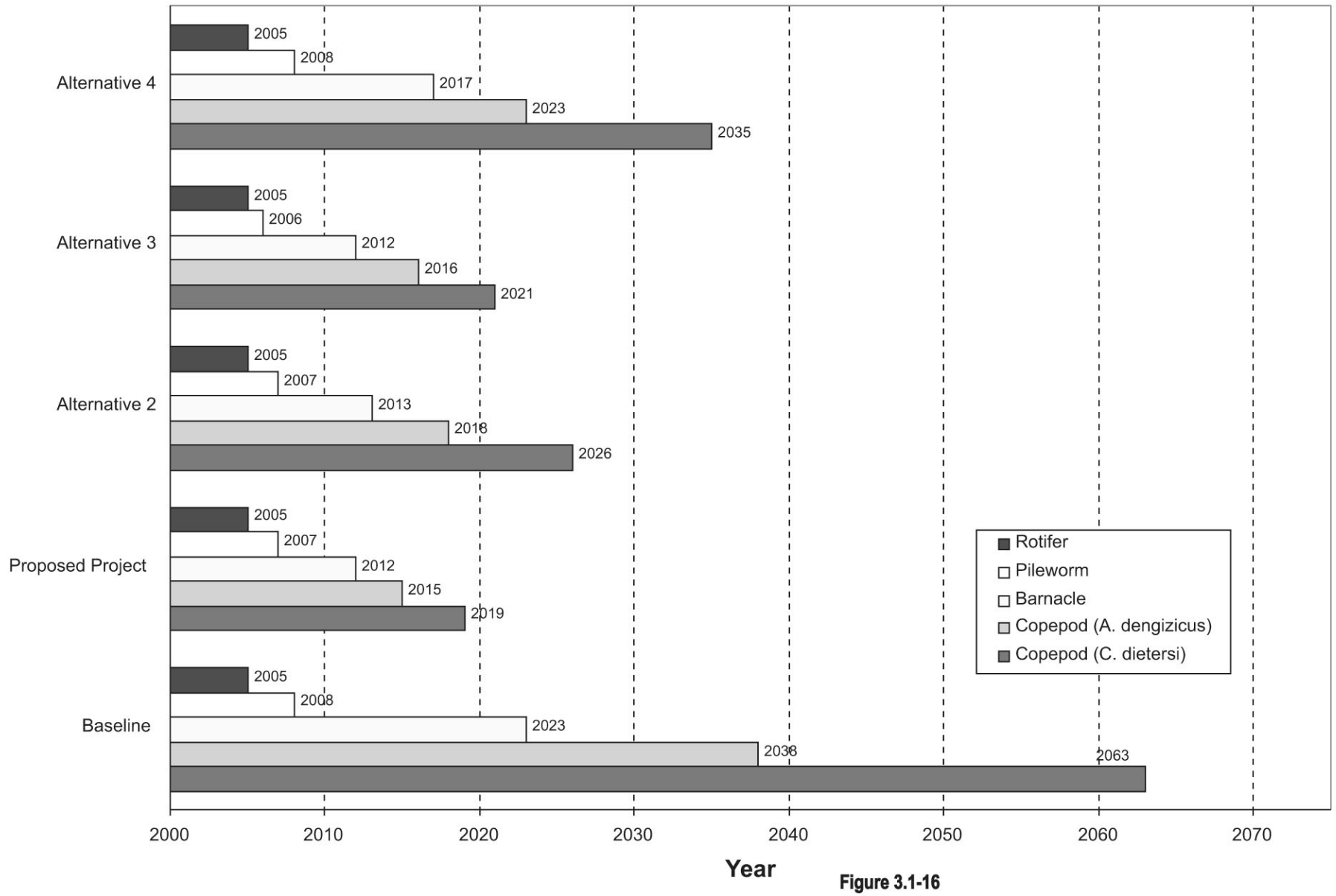


Figure 3.1-16
Projected Year at Which Salinity Would Exceed Tolerances for Invertibrate Species Under the Proposed Project and Alternatives (Without Implementation of the Salton Sea Habitat Conservation Strategy)
IID Water Conservation and Transfer Project Final EIR/EIS

would increasingly dominate the invertebrate community as the salinity of the Sea increases.

In accord with the significance criteria, because no invertebrates are candidate, sensitive, or special-status species, the acceleration in the changes in the invertebrate community of the Salton Sea is not a significant impact (less than significant). Regardless of the Proposed Project, the Salton Sea is naturally transitioning to a more saline system, as has occurred at Mono Lake and the Great Salt Lake. The change in the composition of the invertebrate community in and of itself is not a significant impact but could significantly affect bird or fish resources through reduced food availability. These potential impacts are addressed separately under Impact BR-44. (Less than significant impact.)

Impact BR – 44. Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. Under the Proposed Project and Baseline, the abundance and composition of the invertebrate community would change as the salinity of the Salton Sea increases, as described under Impact BR-43. The changes in the abundance and composition of the invertebrate community could alter the suitability of foraging conditions for birds using the Salton Sea.

The Salton Sea area is a primary wintering area for ducks and geese. Geese at the Salton Sea are predominantly Snow and Ross's geese. Ducks include dabbling ducks (predominantly northern shoveler, northern pintail, green-winged teal, and American wigeon) and diving ducks (predominantly ruddy ducks). Geese and dabbling ducks would not be affected by changes in the invertebrate community of the Salton Sea as a result of increased salinity. Snow and Ross's geese concentrate at the state and federal refuges and private duck clubs (Shuford et al. 2000) that are managed specifically to provide forage (i.e., grain) for these species and attract them. Dabbling ducks, generally intolerant of saline water, are predominantly found in freshwater impoundments on the state and federal refuges and private duck clubs (Shuford et al. 2000). Because they use the main body of the Salton Sea only minimally, and their main habitats (state and federal refuges and private duck clubs) would continue to be available under the Proposed Project, dabbling ducks and geese would not be adversely affected by increased salinity and changes in the invertebrate community at the Salton Sea. Ruddy ducks use the main body of the Salton Sea and could be affected by changes in the invertebrate community. Potential effects to ruddy ducks are evaluated below along with grebes and shorebirds.

Mono Lake provides the best model of what the bird species diversity and abundance likely would resemble as salinity of the Salton Sea increases. Mono Lake is a saline, inland sea like the Salton Sea. On the eastside of the Sierra Nevada Mountains in California, it also lies in the Pacific Flyway. At a salinity of about 100 g/L, the lake does not support fish; brine flies and brine shrimp dominate the invertebrate community and are the primary prey species for birds.

Mono Lake is designated as part of the Western Hemisphere Shorebird Network and is 1 of only 17 sites in the Western Hemisphere with this designation. The lake supports large numbers of migrating shorebirds. Wilson's and red-necked phalaropes are abundant with maximum counts of about 45,000 and 70,000, respectively (Jones & Stokes Associates 1993). Annual counts of eared grebes typically range from 600,000 to 900,000 (Jones & Stokes Associates 1993). Other abundant shorebird species identified by Point Reyes Bird

Observatory during surveys conducted in late August 1989, 1990, and 1991 were American avocet (8,467), western sandpiper (4,043), and least sandpiper (1,408). Ruddy ducks also are common with Christmas bird counts typically in the range of 500 to 900. Other shorebird species in smaller numbers at Mono Lake include black-bellied plover, greater and lesser yellowlegs, long-billed curlews, black-necked stilts, semipalmated plover, and willets.

The species of shorebirds that use Mono Lake also occur at the Salton Sea as migratory birds or winter residents (see Tables 3.2-19 and 3.2-20). Similarly, eared grebes and ruddy ducks are abundant at both Mono Lake and the Salton Sea. Given that the shorebird and waterbird (grebes and ruddy ducks) species that use the Sea also use Mono Lake, in which the brine flies and brine shrimp are the primary prey species, it is reasonable to expect that these species would similarly exploit brine flies and brine shrimp as they become the dominant invertebrate at the Salton Sea. Therefore, changes in the invertebrate community would have less than significant impacts on shorebirds and other waterbirds using this resource. (Less than significant impact.)

Impact BR – 45. Increased Salinity Would Reduce Fish Resources in the Salton Sea. Since its formation, the salinity of the Salton Sea has increased because of high evaporative water loss and continued input of salts from irrigation drainage water. Increasing salinity of Colorado River water delivered at Imperial Dam, which is the sole source for irrigation water in Imperial Valley, also is a factor. The Salton Sea is hypersaline, with salinity greater than the ocean.

Under the Proposed Project, the salinity of the Salton Sea would continue to increase. Fish resources of the Salton Sea are expected to change with the increased salinity. These changes would occur without the Proposed Project, so the effect of the Proposed Project relates only to the rate of salinization. The expected response of the fish resources of the Salton Sea to increased salinity levels is described subsequently. The effect of the Proposed Project on the rate of salinization versus the Baseline is then discussed.

The current salinity level of the Salton Sea is about 46 g/L. Studies have indicated that many fish and invertebrates in the Sea are at risk from this high level. The Salton Sea Science Subcommittee developed the following general sequence of events anticipated as a result of increased salinity.

- Loss of sport fishery: Available evidence indicates that corvina reproduction could fail at any time, and, at a salinity level of 50 g/L, it will fail along with that of the croaker and sargo, leaving tilapia as the only sportfish species. Pileworm production could also fail at this concentration, allowing amphipods to assume increased importance in the benthos.

- Loss of tilapia: By 60 g/L, the salinity tolerance of tilapia reproduction will have been exceeded, leaving only smaller fish as a food source for piscivorous birds.

- Loss of metazoan zooplankton: At about 70 g/L, the cyclopoid copepod will disappear (rotifers will have already disappeared), leaving only protozoan zooplankton. This could affect phytoplankton species composition, with possible implications to nutrient cycling and overall productivity.

- Loss of all fish: This could occur at about 80 g/L, as even desert pupfish and sailfin mollies would reach salinity tolerance limits of reproduction. At this point, the Salton Sea would resemble Mono Lake, which is dominated by highly specialized halotolerant invertebrates, such as brine shrimp and brine flies.

Hagar and Garcia (1988) developed a prediction of the responses of the fish and invertebrate communities in the Salton Sea to increasing salinity (Table 3.2-43). They cautioned that their assessment should be viewed only as a professional opinion (Hager and Garcia 1988).

TABLE 3.2-43
Hypothetical Chronology for Salinity Effects on Salton Sea Biota

Salinity Level (g/L)	Event	Probability
40	Increased importance of environmental stress on all fish	High
	Reproductive failure of croaker, sargo, and tilapia	Moderate
	Declining abundance of primary forage for corvina with resulting lower growth rates, decreased reproduction, and higher mortality	Moderate
45	Declining productivity (standing crop) of pileworm reduces food for croaker and young corvina	Moderate
	Changes in lower trophic levels affecting recruitment success of corvina and other fish	Low
	Reproductive failure of croaker, sargo, and tilapia because of excessive salinity	High
	Loss of reproduction of tilapia because of excessive salinity	Moderate
	Reproduction of pileworm threatened	Moderate
	Declining productivity (standing crop) of pileworm reduces food for croaker, young corvina	Moderate
	Direct mortality to young and/or adult croaker and sargo because of excessive salinity	Moderate
	Declining abundance of primary forage for corvina with resulting lower growth rates, decreased reproduction, and higher mortality	Moderate
	Loss of recruitment of corvina because of reproductive failure at upper salinity tolerance	Moderate
	Changes in lower trophic levels affecting recruitment success of corvina	Low to moderate
50	Reproduction of croaker and sargo no longer possible	High
	Loss of pileworm reproduction	High
	Declining productivity (standing crop) of pileworm reduces food for croaker and young corvina	High
	Upper salinity tolerance for adult sargo exceeded	High
	Total loss of sargo	High
	Total loss of croaker	High
	Loss of corvina recruitment because of reproductive failure at upper salinity tolerance	High
	Loss of forage for corvina; corvina fall to low numbers	High
	Loss of corvina sport fishery	High
	Reproductive failure for tilapia	Moderate to high

TABLE 3.2-43
Hypothetical Chronology for Salinity Effects on Salton Sea Biota

Salinity Level (g/L)	Event	Probability
	Total loss of food source for croaker	Moderate
	Upper salinity tolerance for adult croaker exceeded	Moderate
55	Conditions intolerable for adult corvina because of lack of forage; corvina at very low numbers	Extreme
	Reproductive failure of tilapia	High
	Total loss of corvina	Moderate
	Conditions intolerable for adult corvina because of high salinity	Low to moderate
60	Tilapia success is highly variable from year to year because of interaction of salinity and other environmental factors	Extreme
	Corvina at very low numbers because of lack of forage, environmental stress, and no reproduction	Extreme
	Total loss of corvina	High
65	Total loss of corvina	Extreme
	Tilapia adults can no longer tolerate high salinities (regardless of other environmental factors)	High
	Reproductive failure of desert pupfish	High
	Loss of barnacle	High
	Phytoplankton and zooplankton communities have lost some species, perhaps gained a few new ones; species diversity is lower; no fish from previous community remain, with possible exception of desert pupfish	High

Source: Hagar and Garcia 1988.

The overall outcome of increasing salinity would be the loss of fish. While the demise of corvina, croaker, and sargo has been predicted for many years, they continue to reproduce. The available evidence indicates that corvina reproduction could fail at any time above the current salinity of 46 g/L. Sargo reproduction could cease at approximately 50 g/L. Croaker would not complete its life cycle at about 55 g/L. Above this level, only tilapia would remain as species large enough for sport fishing in the Sea and as prey for piscivorous birds.

Tilapia have a high salinity tolerance. They adapt to high salinity levels, particularly if the increase in salinity is gradual (Phillipart and Ruwet 1982, cited in Costa-Pierce and Riedel 2000a). Costa-Pierce and Riedel (2000a) suggested that tilapia in the Salton Sea could acclimate to and reproduce at a salinity level of 60 g/L. Above a salinity level of 60 to 70 g/L, growth, survival, and reproduction would decline (Costa-Pierce, pers. comm. January 12, 2001). As noted, increased salinity and resultant changes in fish resources of the Salton Sea would occur with or without the Proposed Project. The Proposed Project would accelerate the changes. Based on Reclamation's projections for the Salton Sea, in the absence of the conservation and transfer of water under the Proposed Project, the salinity of the Salton Sea would exceed the level at which sargo, gulf croaker, and tilapia could complete their life cycles (Table 3.2-35) in 2008, 2015, and 2023, respectively (Figure 3.2-17). Under the Proposed Project, the thresholds for sargo, gulf croaker, and tilapia would be exceeded 1, 5, and 11 years earlier than under the Baseline (in 2007, 2010, and 2012, respectively).

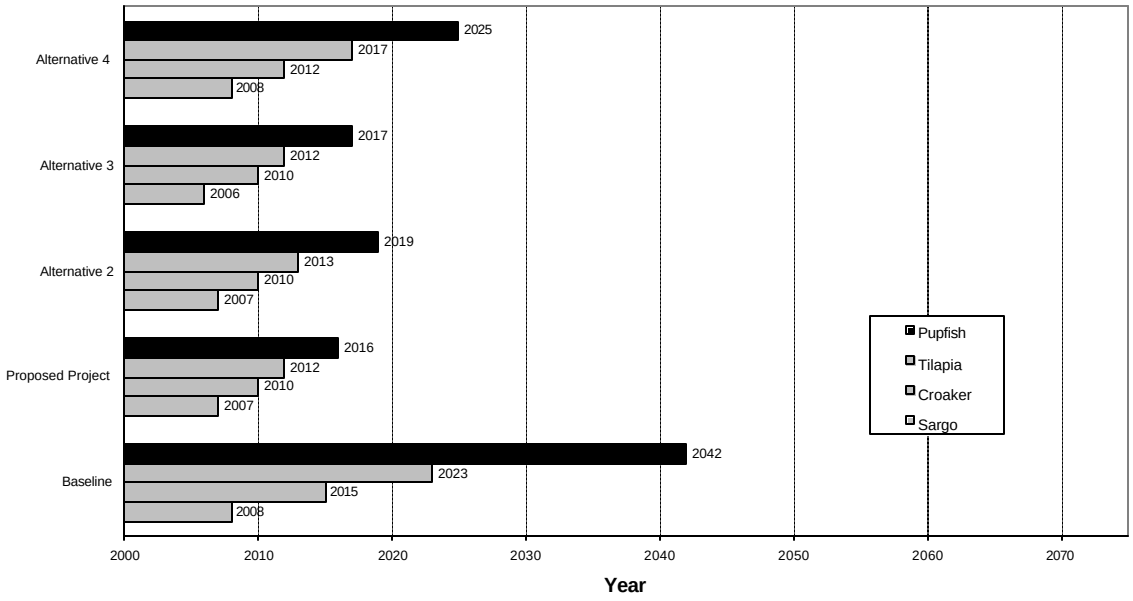


FIGURE 3.2-17

Projected Year that Tilapia, Gulf Croaker, Sargo, and Desert Pupfish Will Not Be Able to Complete Their Life Cycles Because of High Salinity levels in the Salton Sea under Proposed Project and Alternatives (Without Implementation of the Salton Sea Habitat Conservation Plan)

Tilapia abundance likely would decline at salinity levels greater than 60 g/L. However, relatively freshwater inflow from the New and Alamo Rivers creates an estuarine environment in the river deltas where salinity levels are lower than in the main body of the Salton Sea. Under current conditions, Costa-Pierce and Riedel (2000c) reported salinity levels ranging from 10 to 30 g/L in the river deltas. Tilapia could persist if the deltas provide lower salinity environments.

The salinity threshold above which orangemouth corvina cannot complete their life cycle is about 40 g/L. However, young-of-the-year and juvenile corvina have been captured recently in the Salton Sea, indicating successful reproduction (Riedel et al. 2001). The highest catches of corvina were from the river deltas and nearshore areas (Riedel et al. 2001), where salinity levels are lower (Costa-Pierce and Reidel 2000c) and would potentially remain within tolerances of corvina. It is uncertain how much longer corvina will reproduce.

The abundance of gulf croaker could decline sooner than discussed if pileworms decline earlier. Pileworms are an important food source for gulf croaker and have a lower salinity tolerance. Pileworms are not expected to survive at a salinity greater than about 50 g/L, but may persist in the river deltas where salinities could be lower. This level would be exceeded under the Baseline in 2008 and under the Proposed Project in 2007. Because tilapia have a diverse diet (Costa-Pierce and Riedel 2000b), they would not be affected by a decline in pileworms.

Under both the Baseline and the Proposed Project, the salinity of the Salton Sea would rise and exceed levels at which fish species inhabiting the Salton Sea could reproduce. For gulf croaker and tilapia, the thresholds could be exceeded up to 5 and 11 years earlier under the Proposed Project, resulting in earlier declines in these two species. This acceleration is

considered a less than significant impact to fish resources for two reasons. First, the differences between when species-specific salinity thresholds would be exceeded are small (5 to 11 years). Second, based on the significance criteria, only effects to candidate, sensitive or special-status species or certain effects to native fish (e.g., nursery habitat, migratory routes) constitute significant biological impacts. Because all fish species are introduced, non-native species, the impacts are less than significant. Further, with implementation of the Salton Sea Habitat Conservation Strategy, these effects would be avoided. (Less than significant impact.)

Impact BR – 46. Reduced Fish Abundance Would Affect Piscivorous Birds. Tilapia is the most abundant fish species in the Salton Sea (Costa-Pierce and Riedel 2000a; Black 1988) and is the primary forage species for piscivorous birds at the Salton Sea (Molina 1996; S. Johnson, pers. comm. 2000). Because of the importance of tilapia in the diet of piscivorous birds at the Salton Sea, the potential change in the tilapia population of the Salton Sea was the focus of assessing the potential impact to piscivorous bird species. Based on Costa-Pierce and Riedel (2000a), the abundance of tilapia would decline substantially once the salinity of the Sea reaches about 60 g/L.

Modeling by Reclamation (2001) indicates that salinity of the Salton Sea would gradually increase over the next 75 years without the conservation and transfer of water under the Proposed Project. The mean of the salinity projections shows the salinity of the Salton Sea surpassing 60 g/L in 2023 under the Baseline. Tilapia abundance likely would decline after this point, as the increasing salinity impairs reproduction. However, relatively freshwater inflow from the New and Alamo Rivers creates an estuarine environment in the river deltas, where salinity levels are lower than in the main body of the Salton Sea. Under current conditions, Costa-Pierce and Riedel (2000c) reported salinity levels ranging from 10 to 30 g/L in the river deltas. Tilapia could persist if the deltas provide lower salinity environments.

Water conservation under the Proposed Project would reduce inflows to the Salton Sea, which would increase its rate of salinization. With conservation and transfer of 300 KAFY, the rate of salinization would increase relative to the Baseline. The degree to which water conservation would accelerate salinization would depend on the method of conservation. The mean of the salinity projections under the Proposed Project shows the salinity of the Salton Sea surpassing 60 g/L in 2012, 11 years earlier than Baseline projections. Use of fallowing to conserve water would reduce the difference between the Proposed Project and the Baseline.

Under all Alternatives (No Project, Proposed Project, and Alternatives), tilapia could persist in the Salton Sea if low salinity areas persist around the deltas and potentially near drain outlets. Given tilapia's ability to tolerate high salinity levels, the deltas could serve as a breeding population from which individuals could disperse to populate other areas of the Sea. Although tilapia could persist in some areas, the total population supported in the Salton Sea would be reduced relative to existing conditions. This reduction would occur with or without implementation of the Proposed Project. As the abundance of fish decline at the Salton Sea, the level of use by piscivorous birds would decline. If fish persist in the deltas of the New and Alamo Rivers, a smaller level of use by piscivorous birds could be supported at the Salton Sea. The primary piscivorous birds of concern with respect to reduced fish abundance are white pelicans, brown pelicans, black skimmers, and double-

crested cormorants. Large numbers of white pelicans use the Salton Sea; most of the white pelicans of the Pacific Flyway use the Sea as a migratory stopover or overwintering site. Because of this high level of use, they are a focus of the evaluation of potential effects of changes in fish abundance on piscivorous birds. California brown pelicans are a focus of this evaluation because they are a state and federally listed species. Black skimmers are a California species of special concern; the Sea supports the largest and one of the few nesting populations of this species in California. The Salton Sea supports a large population of breeding and overwintering double-crested cormorants and is believed to support the largest breeding colony on the West Coast at Mullet Island. As the abundance of fish declines at the Salton Sea, the level of use of the Sea by these four species would decline. Potential effects to each species follow.

American White Pelican. White pelicans use the Salton Sea as a migratory stopover and wintering area. As a migratory stopover, individual pelicans use the Sea for a few weeks to a few months before migrating to Mexico (Shuford et al. 1999). Some birds probably remain at the Sea throughout the winter rather than continuing on to Mexico.

The number of pelicans using the Salton Sea at any time varies substantially. Winter and migratory use of the Sea is highly variable within and among years. While large numbers of white pelicans stop at the Salton Sea for brief periods of time to migrate or exploit food resources sporadically during the winter, the average wintering population is much lower. Pelicans are at the Salton Sea in the greatest numbers from November to April (Shuford et al. 2000). The USFWS recorded numbers of white pelicans at the Sea for 21 months between December 1999 and August 2001. White pelican numbers were highest (24,110) in February 2000 and lowest (770) in July 2001. In addition to the Salton Sea, pelicans using the Pacific Flyway also overwinter along the California coast south of San Francisco, throughout the San Joaquin Valley, throughout Baja California, and in the Gulf of California (Johnsgard 1993).

Pelicans are highly opportunistic and mobile in selecting foraging sites, and travel long distances to forage even during breeding, an energetically stressful time (Knopf and Kennedy 1980). At Pyramid Lake, Nevada, pelicans have been reported foraging at seven lakes during the breeding season. All the foraging sites were more than 37 miles from Pyramid Lake, where the breeding colony is, with the farthest foraging site (Stillwater NWR) nearly 62 miles away (Knopf and Kennedy 1980). Knopf and Kennedy (1980) found that pelicans nesting at Pyramid Lake switched foraging locations frequently during the nesting season. Changes in foraging location appeared to be linked to the availability of fish. For example, pelicans used Pyramid Lake, the closest foraging location to the breeding colony, at relatively low levels, except in June, when tui chub became available in shoreline areas. Knopf and Kennedy (1980) characterized pelicans as "opportunistic in selecting foraging sites where fish are most readily available." Johnsgard (1993) also notes the great distances that pelicans will travel to forage. Summarizing data from other studies, Johnsgard (1993) reports one-way foraging flights of up to 100 miles (Great Salt Lake), round trips of 60 to 380 miles (Chase Lake, ND), and one-way distances of 90 miles (Harvey and Warner basins).

The reported foraging behavior of white pelicans indicates they seek the most favorable foraging area in a wide area. The availability of an abundant source of fish, tilapia in particular, makes the Salton Sea attractive to pelicans. With increased salinity of the Salton

Sea, the abundance of tilapia could decline if nearshore areas become unsuitable. However, tilapia could persist at the Sea, particularly in the New and Alamo River Deltas. Pelicans forage in the deltas (Shuford et al. 2000). If tilapia persist at the deltas, pelicans would likely continue to use the Salton Sea as a migratory stopover and wintering area. However, if salinity increases substantially, reducing the abundance of tilapia, the level of use of the Salton Sea by white pelicans would decline. A decline in the level of use by pelicans could be manifested as a shorter stopover time, lower numbers of birds, or shorter residence periods of overwintering birds. Given their opportunistic foraging strategy and ability to travel long distances, it is likely that at least some of the pelicans would be able locate other wintering areas, if fish at the Salton Sea became less abundant and if the energetic costs of foraging there became greater than at the other locations in California and Mexico used by white pelicans during migration and winter (i.e., California Coast south of San Francisco, San Joaquin Valley, Baja California, Gulf of California [Johnsgard 1993]). However, it is likely that the level of use of the Sea by white pelicans would decline as tilapia abundance declines. This effect would occur with or without implementation of the water conservation and transfer under the Proposed Project. The Proposed Project would accelerate the rate at which this effect would be manifested.

California Brown Pelican. Brown pelicans probably had little historical use of the Salton Sea (Anderson pers. comm.). Post-breeding pelicans were documented at the Sea in the late 1970s. Use of the Salton Sea by brown pelicans subsequently increased, with the maximum summer usage estimated at 5,000 birds. Nearly 2,000 were recorded in 1999, but a maximum of only 1,000 was recorded in 2000 (Shuford et al. 2000). The USFWS recorded numbers of brown pelicans at the Sea for 21 months between December 1999 and August 2001. Brown pelican numbers were highest (3,990) in July 2001 and lowest (5) in March 2000.

Most use of the Salton Sea is by post-breeding visitors, with more limited use for wintering. These visitors are mostly young birds that disperse northward from breeding areas in the Gulf of California (Hazard, pers. comm.). Shuford et al. (2000) reported that brown pelicans occur at the Salton Sea primarily from mid-June to early October. They observed the highest numbers in August. The primary wintering area in the U.S. is along the California coast (Johnsgard 1993).

Brown pelicans only recently, in 1996, started nesting at the Salton Sea (Shuford et al. 1999). The number of breeding birds has been low, with six pairs nesting in 1996 and several pairs attempting to nest in most years since then (Shuford et al. 1999). Brown pelicans did not nest at the Sea in 1999 (Shuford et al. 2000). Nesting birds have used tamarisk at the Alamo River Delta and attempted to nest at Obsidian Butte (S. Johnson, pers. comm.). Compared to the nearest breeding colonies of brown pelicans in the Gulf of California on San Luis Island (4,000 to 12,000 pairs), Puerto Refugio (1,000 to 4,000 breeding pairs), and Salsipuedes / Animas / San Lorenco area (3,000 to 18,000 pairs), the population nesting at the Salton Sea makes a small contribution to the overall population. Other breeding populations occur off the southern California Coast and the western coast of Baja California (Johnsgard 1993). Dispersing juveniles wander considerably from nesting locations and can travel long distances (Johnsgard 1993). Young eastern brown pelicans can move more than 310 miles from breeding areas (Johnsgard 1993). Similarly in California, most banded birds were recovered within 310 miles of the breeding site, but one was found in Mexico, 1,375 miles away from the banding location (Johnsgard 1993). Adults also become wanderers after

breeding and have been reported to move 280 to 360 miles from nesting areas (Johnsgard 1993).

As previously described, the abundance of tilapia is expected to decline as the salinity of the Sea increases. However, tilapia could persist at the Salton Sea, particularly in the New and Alamo River Deltas. Pelicans forage in the deltas (Shuford et al. 2000). With the continued persistence of tilapia, pelicans would likely continue to visit the Salton Sea as post-breeders. Because post-breeding pelicans wander over large areas, pelicans would likely remain at the Sea for a shorter period of time or seek out more favorable foraging areas in the Gulf of California or along the Pacific Coast, if foraging becomes energetically unfavorable at the Salton Sea. These areas are within the distances that brown pelicans can travel. However, the level of use of the Sea by brown pelicans would likely decline as tilapia abundance declines. This effect would occur with or without the Proposed Project. The Proposed Project would accelerate the rate at which this effect would be manifested.

Depending on the degree to which the tilapia population declines, nesting might not occur again in the future. However, loss of breeding by brown pelicans at the Salton Sea would not affect the overall population. Brown pelicans have attempted to nest only a few times at the Sea and only in small numbers (six pairs or fewer), representing less than 1 percent of the California breeding population (Johnsgard 1993) and a far smaller percentage of the subspecies' entire population.

Black Skimmer. Black skimmers first appeared in California in 1962. Six years later, five skimmers were sighted at the Salton Sea (Collins and Garrett 1996). The first nesting by black skimmers in California occurred in 1972 at the Sea (Collins and Garrett 1996). Since black skimmers were first observed in California, their numbers have steadily increased. New breeding locations have been reported at several locations along the California Coast from San Diego to San Francisco Bay, and the number of birds using these locations has generally increased. In addition to the California nesting sites, black skimmers nest at Montague Island in the Gulf of California (Collins and Garret 1996).

At the Salton Sea, nesting colonies of black skimmers range from 10 to several hundred pairs; most colonies consist of 50 to 200 pairs (Molina 1996). As many as 777 black skimmers have been reported in summer (Shuford et al. 2000). The Sea is the only inland breeding site of this species and supports about 30 percent of the known breeding population in California. Skimmers nest on bare earthen slopes, terraces, and levees adjacent to the Sea. Nesting locations include Mullet Island, the Whitewater River Delta, Morton Bay, Rock Hill, and Obsidian Butte.

After breeding, skimmers move among a number of wintering locations. Gazzaniga (1996) showed wide month-to-month fluctuations in the number of skimmers using five locations on the California coast. The reasons for the fluctuations were unclear, but she suggested that weather and food resources could play a role. Long distance movements by black skimmers also have been reported. Palacios and Alfaro (1992) captured birds banded at Bolsa Chica along the coast of Baja California, and Gazzaniga (1996) observed a bird banded at Bolsa Chica at Princeton Harbor, 160 miles north of Bolsa Chica. Skimmers banded as chicks at Bolsa Chica have also been found breeding at Montague Island in the Gulf of California (Collins and Garret 1996). In combination with the observed colonization of several locations on the California coast since the 1970s, these observations suggest that skimmers

regularly travel long distances during the winter and will establish breeding colonies where suitable nesting conditions exist.

Black skimmers could be adversely affected by the changes predicted at the Salton Sea in two ways. First, the water surface elevation of the Sea is projected to decline and to create a land bridge to Mullet Island. The suitability of this nesting location for black skimmers could decline, if predation or disturbance increases as a result of formation of the land bridge. In addition, other nesting and roosting locations could become less suitable for black skimmers as the Sea elevation declines. Second, the increased salinity would reduce abundance of tilapia. These effects would occur with or without the conservation and transfer of water under the Proposed Project. However, the Proposed Project would accelerate the projected salinity change and decline in tilapia abundance as well as the rate of elevation decline.

Skimmers feed on young tilapia to a large extent at the Salton Sea (Molina 1996). While tilapia would potentially persist at the Sea, their abundance and reproductive rate could decline. Prey availability for skimmers could decline as a result, and nesting might not be sustained or would potentially occur at a lower level than is currently supported at the Sea.

Double-Crested Cormorant. At the Salton Sea, cormorants nest on rocky ledges on Mullet Island or at the deltas of the New and Alamo Rivers. Snags in the Sea are important for providing protected roost sites for double-crested cormorants. Cormorants regularly move between the Sea and the lakes at the Finney-Ramer Unit of the Imperial WA where they forage. Lakes at the Finney-Ramer Unit of Imperial WA also support double-crested cormorant nesting and roosting.

Double-crested cormorants are common and abundant at the Salton Sea, with counts of up to 10,000 individuals (USFWS 1993; IID 1994). Small nesting colonies were documented at the north end of the Sea in 1995 (USFWS 1996a), but recently (1999), more than 7,000 double-crested cormorants and 4,500 nests were counted on Mullet Island. Mullet Island now represents the largest breeding colony of double-crested cormorants in California (Shuford et al. 1999).

With increased salinity of the Salton Sea, the abundance of cormorants there would potentially decline with reduced prey availability (i.e., tilapia). Increased salinity and reduced fish abundance at the Sea would occur with or without the water transfer and conservation programs. However, the Proposed Project could accelerate these changes. The suitability of nest and roost sites would potentially change as the Sea's elevation recedes. As described, the Sea's elevation is projected to decline under the Baseline and the Proposed Project, albeit at a somewhat faster rate under the Proposed Project. As a result, Mullet Island would connect to the mainland, potentially increasing disturbance or predation at the cormorant colony. Cormorants would potentially abandon the colony on Mullet Island as a result of changes in the suitability of the site or changes in prey availability.

Even with changes in the suitability of foraging, roosting, and nesting habitat quality at the Salton Sea, cormorants would still inhabit the Proposed Project area. They nest and roost on the Finney-Ramer Unit of the Imperial WA and forage at lakes on this unit and in agricultural drains, reservoirs, and Fig Lagoon. The New and Alamo River Deltas also would provide nesting, roosting, and foraging opportunities. However, the large colony on Mullet Island probably would not persist. These effects would occur under both the

Proposed Project and the No Project Alternative. The potential effects to the cormorant population if Mullet Island is abandoned as a nesting colony is described in Section 3.2.4.4 Alternative 1: No Project.

Significance Determination. As emphasized, the projected changes in fish abundance would occur under both the Proposed Project and the Baseline. The Proposed Project would accelerate the changes in fish abundance and the subsequent response of piscivorous birds by about 11 years. The earlier occurrence of adverse effects to piscivorous birds is considered a significant, but avoidable, impact of the water conservation and transfer component of the Proposed Project. Implementation of the Salton Sea Habitat Conservation Strategy of the Proposed Project would reduce this impact to less than significant. (Less than significant impact.)

Impact BR – 47. Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds. The Salton Sea has been characterized as containing relatively low concentrations of water column selenium (average of 2 µg/L), with more elevated selenium concentrations in surficial sediment and as bioaccumulated in resident invertebrates and fish (Schroeder et al. 1993). Apparently, natural processes of uptake and sedimentation or precipitation act to remove selenium effectively from the water column of the Sea. Because selenium does not behave conservatively, selenium concentrations in the Sea are not expected to build up in the water column as is predicted for salinity.

The Proposed Project would decrease annual loading of selenium to the Salton Sea relative to the Baseline. However, selenium exhibits unusual behavior in the Salton Sea, concentrating in the sediment rather than the water column. Most selenium in the Sea is in sediments, and the sediments are the dominant source for exposure to aquatic organisms. It is not possible to predict the selenium concentrations in biota or specific environmental media that would occur with implementation of the Proposed Project. However, it is likely that the Sea will continue to maintain waterborne concentrations near the current level of 2 µg/L and would not change exposure of fish and birds to waterborne selenium. The Proposed Project would decrease the amount of selenium entering the Salton Sea relative to the Baseline and in that way reduce the annual accumulation of selenium in sediments. However, because of the large amount of selenium stored in Sea sediments, the slight reduction in selenium loading relative to the Baseline would not substantially change the exposure of fish and birds to selenium in the sea, in general. Therefore, the Proposed Project would have no effect on exposure of fish and birds to selenium in the Salton Sea. (No impact.)

Impact BR – 48. Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. Colonial nest or roost sites are available at the Salton Sea for ground-nesting birds, including black skimmers, terns and gulls, American white pelicans, California brown pelicans, and double-crested cormorants. Mullet Island has historically supported the largest population of ground-nesting birds, including double-crested cormorants, gull-billed terns, black skimmers, and Caspian terns. Mullet Island is isolated from the mainland by less than a few feet of water (K. Molina, pers. comm.). Salton Sea data on bathymetry support this, indicating that water depth between the mainland and Mullet Island is less than –231 feet or less than 4 feet below the existing elevation (University of Redlands 1999). Other nest sites include a small barren islet at Johnson Street, which supports gull-billed tern and black skimmer; a rock and barnacle islet at Obsidian Butte, which supports California gull;

Morton Bay, which has two low-lying nesting islets; and a single levee remnant at Elmore Ranch, which has supported ground-nesting birds. These sites typically have less than 3 feet of water separating them from the mainland.

The surface elevation of the Salton Sea is projected to decline with or without the Proposed Project (Figure 3.2-15). Under the Baseline, the water surface elevation is projected to fall 3 feet by 2010 and 4 feet by 2015. This reduction in surface elevation would connect sites, including Mullet Island, to the mainland. The Proposed Project would accelerate the decline in surface water elevation by a few years. With 300 KAFY of conservation, the water surface elevation would fall by 3 feet and 4 feet, 3 and 7 years earlier than under the Baseline, respectively. The small temporal (3 years for most sites and 7 years for Mullet Island) difference in when the islands would connect to the mainland between the Proposed Project and the Baseline would not result in a substantial adverse affect to colonial, ground-nesting birds at the Salton Sea and is considered a less than significant impact. Furthermore, with implementation of the Salton Sea Habitat Conservation Strategy, this effect would be avoided (see Impact HCP-SS-BR-53).

Western snowy plovers nest on sandy flats on the western edge of the Salton Sea (Shuford et al. 1999). Sandy flats would continue to be available under the Proposed Project, and no changes in nesting habitat availability for this species are expected.

Brown pelicans have nested on the Alamo River Delta and roost at both the New River and Alamo River Deltas. White pelicans also roost at these deltas but do not nest at the Salton Sea. The IID routinely dredges the New River and Alamo River to maintain flow to the Salton Sea. The dredging has extended the river channels 1 to 2 miles into the Salton Sea, where they have formed the deltas of these two rivers. As the Sea recedes under the Proposed Project, IID would allow the river channels to extend into Sea, thus maintaining delta areas. Although the river deltas would continue to provide habitat for pelicans, as described, the suitability of Mullet Island as a roosting area could be compromised with creation of the landbridge.

Herons and egrets, along with other species, nest in communal rookeries in trees, large shrubs, and snags around the Salton Sea. In general, these rookeries are found over water or in trees in marshes or on islands. However, they also occur over land. Like the nesting/roosting islands and islets described, snags probably are in only a few feet of water. As with the nesting/roosting islands, these snags would connect to the mainland under both the Proposed Project and the Baseline, occurring up to 7 years earlier under the Proposed Project. Because of the small temporal difference in the snags connecting to the mainland, and considering that herons and egrets nest and roost in snags that are not surrounded by water, the Proposed Project would not significantly affect communal rookeries in snags or trees at the Salton Sea. Further, with implementation of the Salton Sea Habitat Conservation Strategy this effect would be avoided (see Impact HCP-BR-53). (Less than significant impact.)

Impact BR – 49. Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. Migratory birds, specifically shorebirds and waterfowl, could be affected by the changes in salinity and surface water elevation predicted under the Proposed Project and Baseline in two ways. First, salinity increases could change the abundance or species composition of the invertebrate community supported by the Salton Sea. These potential

changes are described under Impact BR-44. Second, projected declines in the water surface elevation could alter physical habitat availability. These potential effects are described subsequently.

The Salton Sea attracts thousands of migratory shorebirds. Resident and migratory shorebirds include American avocet, black-necked stilt, western sandpiper, whimbrel, and marbled godwit. For shorebirds, suitable foraging habitat ranges from shallow water (up to a few inches deep) to regularly inundated or saturated mudflats.

Under both the Proposed Project and Baseline, surface water elevation of the Salton Sea is projected to decline. The rate of decline would accelerate and be greater under the Proposed Project relative to the Baseline. Under the Baseline, the water surface elevation is projected to decline most rapidly over the first 30 years, but then decline at a lower rate through the end of the modeled period (Figure 3.2-15). The water surface elevation is projected to reach about –235 ft msl (about 7 feet below its current elevation) at the end of the modeling period but is not projected to stabilize. The Proposed Project would result in less inflow to the Sea and result in a more rapid decline in water surface elevation than under the Baseline. With conservation of 300 KAFY, the water surface elevation would decline rapidly for the first 30 years and then decline at a slower rate, finally stabilizing at about –249 ft msl (about 22 feet below its current elevation) toward the end of the modeling period. Use of fallowing to conserve water would reduce the magnitude of surface water reductions.

Reduced water surface elevations are not expected to adversely affect the availability of foraging habitat for shorebirds. As the water surface elevation falls, mudflats saturated by seepage or inundated by wind-driven tides could dry and be lost as habitat. However, new mudflat habitat would be created at lower elevations. At the south end of the Sea, the amount of mudflat and shallow water habitat would potentially increase. Portions of the south edge of the Sea do not contain shallow water or mudflat habitat since the Sea directly abuts dikes with steep, riprapped sides. Because the bathymetry of the south end of the Sea is shallow, as the water pulls away from the dikes, mudflat and shallow water habitat would be created.

Using bathymetry data from the University of Redlands, the 8-foot decline in the surface water elevation under the Baseline would reduce the perimeter of the Salton Sea from about 100 miles to about 95 miles. The amount of shallow water habitat (< 1 foot deep) would increase under the Baseline with a decline in elevation, from 1,100 acres at an elevation of -228 ft msl to about 3,600 acres at –235 ft msl. The Proposed Project would show a similar pattern. Although the perimeter of the Sea would decrease to 79.5 miles, the amount of shallow water habitat would increase to about 3,000 acres at –250 ft msl. The bathymetry analysis indicates that both the Baseline and Proposed Project would increase the amount of shallow water/mudflat habitat to a similar degree relative to existing conditions.

The IID currently pumps water from drains behind the dikes into the Salton Sea. As the Sea recedes, IID will convert these drains into gravity-flow systems and allow water from the drain to flow naturally to the Sea. The drains likely would create “mini-deltas” at each outlet as the water spreads out and meanders to the Sea. Foraging habitat for shorebirds could improve under this situation by (1) an increase in the amount of shallow water/mudflat habitat and (2) creation and maintenance of lower salinity areas where a greater diversity of invertebrates can persist. This effect also would be expected for drains

that discharge to the Sea by gravity flow and the rivers. The rivers could create large mudflat/shallow water areas as the Sea receded beyond the rivers' mouths.

Although shallow water/mudflat habitat likely would be created along the south shore, some habitats could be lost. In areas along the southern portion of the Sea, barnacle bars and other topographic variations back up drainwater and create small, shallow impoundments where shorebirds forage. To the degree that water from the Sea also contributes to determining the extent and depth of these impoundments (i.e., creates a backwater effect), the extent of inundation and characteristics of these areas could change as the Sea recedes. These potential changes would occur under both the Proposed Project and Baseline.

At the north end of the Sea, there could be a net reduction in the amount of shallow water/mudflat habitat. The topography of the seabed is much steeper than at the south end of the Sea. Thus, as the Sea recedes and the total length of shoreline becomes smaller, the amount of mudflat/shallow water habitat would decline. This effect would be greater under the Proposed Project than the Baseline. However, the Whitewater River could create a more extensive delta with greater amounts of shallow water/mudflat habitat as its discharge spreads out as the Sea pulls away from the river mouth.

Under both the Proposed Project and Baseline, shallow water/mudflat habitat could be lost or reduced as the Sea recedes, but under both Alternatives, new areas of shallow water/mudflat habitat also would be created as the Sea recedes. Because the magnitude and likelihood of changes in the amount and characteristics of shallow water/mudflat habitat, either positively or negatively, would not differ substantially between the Proposed Project and the Baseline, the Proposed Project would not significantly affect the availability of shallow water/mudflat habitat. (Less than significant impact.)

Impact BR – 50. Water Quality Changes Could Increase the Incidence of Avian Disease Outbreaks. As described in Section 3.2.3, avian disease outbreaks and die-offs have occurred at the Salton Sea. While pathogens causing avian disease (e.g., botulism) are always present, in recent years, disease outbreaks at the Salton Sea have resulted in large die-offs of some birds (e.g., white pelicans, eared grebes). The relationship between water quality conditions and disease outbreaks is poorly understood. The Salton Sea is warm, shallow, and strongly eutrophic. These conditions, in combination with dense aggregations of water birds that use the Sea, create prime conditions for avian disease outbreaks.

The links between lake enrichment, productivity, and bird disease are weak and ill-defined. Nevertheless, conditions contributing to avian disease outbreaks would persist under both the Baseline and Proposed Project. Relative to the Baseline, the Proposed Project would likely reduce phosphorus and sediment-associated loading, but nitrate loading would increase along with dissolved constituents in general. It is unknown what such a change in the mix of nutrient loads would have on lake productivity. Regardless, the lake is already highly eutrophic, and trophic states are not quantitatively linked to avian disease. As a result, a change in the mix of nutrient loading under the Proposed Project is not expected to increase the incidence of avian disease. (No impact.)

Impact BR – 51. Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Desert pupfish inhabit pools formed by barnacle bars in near-shore and shoreline areas of the Salton Sea. Barnacle bars are deposits of barnacle shells on beaches, near-shore, and at the

mouths of drains that discharge to the Sea. Pools form behind the barnacle bars. These pools provide habitat for pupfish and allow pupfish movement among drains.

Desert pupfish have a high salinity tolerance. Using 90 g/L as the threshold for when pupfish could no longer move among drains via the Salton Sea (Salton Sea Science Subcommittee 1999), the salinity projections for the Baseline show that salinity of the Sea would not exceed 90 g/L in 75 years. Under the Proposed Project, with conservation of 300 KAFY the salinity of the Sea would exceed 90 g/L in 2022. At this salinity, the Sea could become intolerable to pupfish and prevent them from moving among drains. If the Sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Small, isolated populations are at risk of extinction because of environmental and genetic stochasticity. Ultimately, this condition also would occur under the Baseline, but at a later time. However, because of the large difference in when pupfish populations could be isolated between the Baseline and Proposed Project, this is a potentially significant impact of the water conservation and transfer component of the Proposed Project. Implementation of the Salton Sea Habitat Conservation Strategy would reduce this impact to less than significant. (Less than significant impact.)

Salton Sea Habitat Conservation Strategy (HCP-SS)

The Salton Sea Conservation Strategy of the HCP has several components to address potential impacts to biological resources at the Salton Sea. The strategy generally consists of measures to address the following:

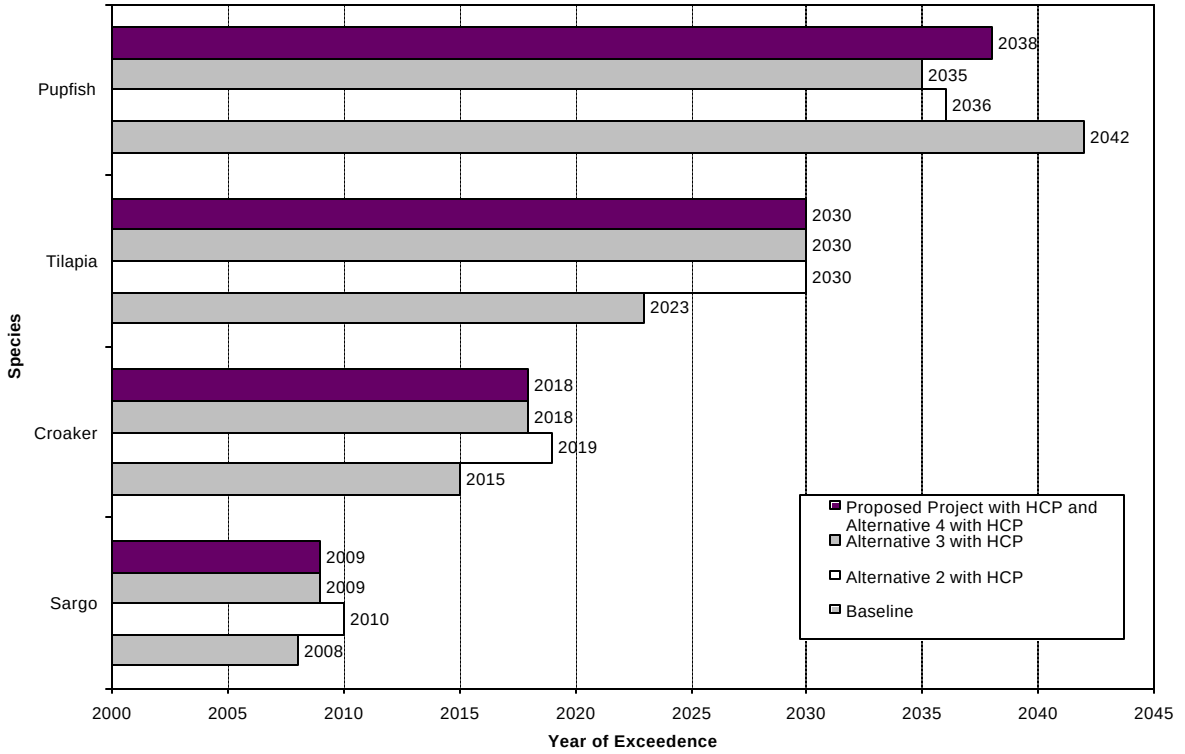
- Effects to piscivorous birds from an accelerated decline in fish abundance
- Effects to nesting/roosting sites from an accelerated decline in water surface elevation
- Effects to species associated with tamarisk scrub from greater magnitude and rate of decline in water surface elevation
- Effects to pupfish from accelerated increase in salinity levels

The Salton Sea Habitat Conservation Strategy consists of three measures to avoid, minimize and mitigate the effects of the water conservation and transfer program on species covered by the HCP. Under Salton Sea-1, IID would provide mitigation water to maintain the salinity of the Sea below 60 ppt until 2030. Salton Sea–2 specifically addresses potential effects to desert pupfish from increased salinity levels, and Salton Sea–3 addresses potential changes in the extent of tamarisk scrub habitat adjacent to the Salton Sea. The effects of implementing the components of the Salton Sea Conservation Strategy on biological resources at the Sea follow.

Impact HCP-SS-BR-52. Implementation of the HCP-SS Would Avoid Conservation-induced Changes in Fish Resources and Impacts to Piscivorous Birds. Under the HCP-SS, IID would avoid or minimize the potential for take of covered piscivorous birds resulting from implementation of the water conservation and transfer project by providing water (generated by IID or from other sources) to the Salton Sea. The amount of water allowed to flow to the Sea would be sufficient to offset the reduction in inflow to the Salton Sea caused by the Proposed Project and to maintain salinity in the Sea at or below 60 ppt until the year 2030. With this additional water provided to the Sea, the salinity thresholds of fish in the Salton Sea would be exceeded in the same year or slightly later than projected under the

Baseline (Figure 3.2-17a). Implementation of the HCP is predicted to avoid the acceleration of declines in fish abundance projected with the water conservation and transfer component of the Proposed Project (see Impact BR–45). As a result, the impacts to piscivorous birds from reduced fish abundance attributable to the Proposed Project (see Impact BR-46) would be offset. (Less than significant impact.)

FIGURE 3.2-17a



Projected Year in Which Salinity Would Exceed the Tolerances for Fish Species Under the Baseline and Each Alternative with Implementation of the Salton Sea Habitat Conservation Strategy

Impact HCP-SS-BR – 53. Implementation of the HCP Would Benefit Colonial Nesting and Roosting Birds. The Salton Sea represents one of only two nesting locations for gull-billed terns in the United States and one of about six nesting locations for black skimmers. Mullet Island currently supports the largest colony of double-crested cormorants on the West Coast. As the water surface elevation of the Salton Sea declines, islands at the Salton Sea currently used by these species would become connected to the mainland so they would be accessible to terrestrial predators and could be subject to human disturbance. As described under Impact BR – 49, the conservation and transfer of 300 KAFY under the Proposed Project would accelerate the rate of decline of surface elevation of the Sea. This acceleration would result in islands and trees used by colonial nesting / roosting birds becoming connected to the mainland several years earlier than under the Baseline.

Implementation of the Salton Sea Habitat Conservation Strategy would benefit colonial nesting and roosting birds by maintaining the water surface elevation of the Sea higher than under the Baseline until after 2030. With implementation of the Salton Sea Habitat

Conservation Strategy, the surface elevation of the Sea is projected to fall 2 feet from its present elevation of -228 feet msl by 2012, and 3 feet by 2024. Under the Baseline, the Sea is projected to fall 2 feet by 2010 and 3 feet by 2015. Thus, islands and trees used by colonial birds for nesting and roosting would remain surrounded by water for a longer period of time than under the Baseline. In particular, Mullet Island would remain separated from the mainland for an additional 11 years under the Salton Sea Habitat Conservation Strategy. The longer period of time that nesting and roosting sites would be surrounded by water under the HCP would benefit colonial nesting and roosting birds. (Beneficial impact.)

Impact HCP-SS- BR – 54. Creation of Native Tree Habitat Could Benefit Wildlife Associated with Tamarisk Scrub. Under the Salton Sea Habitat Conservation Strategy, additional water would be provided to the Sea such that the salinity of the Sea did not exceed 60 ppt until 2030. Provision of this water to the Sea would maintain the surface elevation higher than would occur under the Baseline until 2030, after which the surface elevation would decline at a faster rate and to a greater degree than under the Baseline (Figure 3.2-17b). Relative to the Baseline, implementation of the HCP would reduce the rate and magnitude of decline of the surface elevation until 2030 and therefore would delay the occurrence of changes in the extent of tamarisk scrub adjacent to the Salton Sea resulting from reduced surface elevation. After 2030, the extent of tamarisk scrub adjacent to the Sea could decline to a greater degree than would occur under the Baseline because the surface elevation would decline at a faster rate and to a greater degree than under the Baseline.

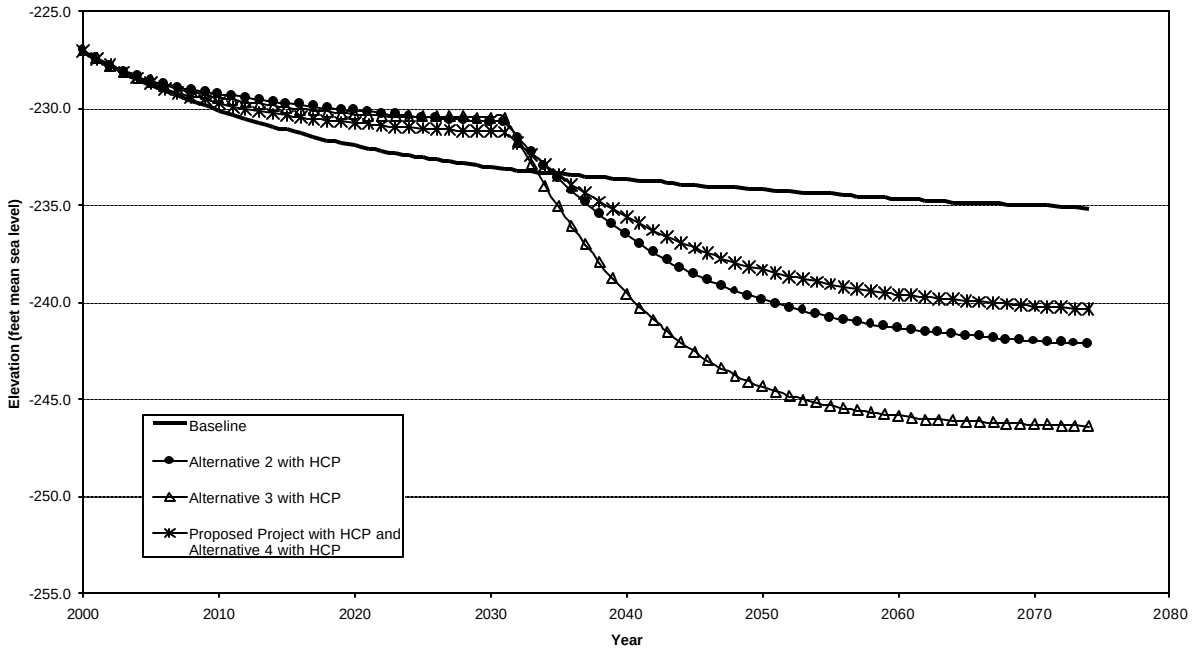


FIGURE 3.2-17b
Projected Surface Elevation under the Baseline and Each Alternative with Implementation of the Salton Sea Habitat Conservation Strategy

As described under Impact BR–42, there is considerable uncertainty regarding changes in the amount of tamarisk scrub habitat adjacent to the Salton Sea, as the elevation of the Sea

declines. To address this uncertainty, under the HCP, IID would monitor the amount of tamarisk scrub adjacent to the Salton Sea. If monitoring shows a net reduction in the amount of tamarisk scrub adjacent to the Sea, IID would create or acquire native tree habitat to replace the net loss of tamarisk. Tamarisk scrub is poor quality habitat, and most of the species associated with tamarisk scrub in the Proposed Project area find optimal habitat in native riparian communities or mesquite bosque. By compensating for net loss in tamarisk scrub with native tree habitat, species associated with tamarisk scrub would benefit from the higher habitat quality of the replacement habitat. (Beneficial impact.)

Impact HCP-SS-BR – 55. Maintenance of Population Connectivity Would Benefit Desert Pupfish. Desert pupfish occupy the drains that discharge directly to the Sea. Individual pupfish use shoreline pools and the Salton Sea to move among the drains. As the Sea becomes more saline and nears the limit of pupfish tolerance, movement among the drains could cease and isolate populations. Small, isolated populations are more susceptible to problems associated with reduced genetic variability and effects of random environmental events. To avoid the potential for isolating pupfish populations in the drains, under the HCP, IID would ensure continued genetic exchange among populations. When the salinity of the Salton Sea reaches 90 g/L (or lower as determined by the HCP Implementation Team), IID would implement actions agreed to by USFWS and CDFG to ensure genetic interchange among the pupfish populations in the drains. In addition to ensuring connectivity among pupfish populations, IID would contribute to the recovery of desert pupfish by constructing and managing a Tier 3 refugium pond to support a population of pupfish consistent with the goals of the Desert Pupfish Recovery Plan (Marsh and Sada 1993). This pond would increase the overall desert pupfish population and decrease the risk of loss of genetic diversity and extinction. (Beneficial impact.)

Impact HCP-SS-BR-56. Implementation of the HCP Would Delay Changes in the Invertebrate Community of the Salton Sea and Responses of the Shorebird and Other Waterbird Communities From Water Conservation and Transfer. Implementation of the Salton Sea Conservation Strategy would delay the changes in the invertebrate community and the responses of the shorebirds and other waterbirds using the Salton Sea described for the water conservation and transfer project (see Impacts BR-43 and BR-44). Figure 3.2-17c shows the years in which the salinity tolerance of invertebrates in the Salton Sea would be exceeded under the Baseline and Proposed Project with the HCP. For invertebrates with salinity tolerances at or below 60 ppt, the HCP would result in their tolerances being exceeded at about the same time as would occur under the Baseline. For invertebrates with higher salinity tolerances, the HCP would delay the exceedence of these thresholds relative to the Proposed Project without the HCP. Implementation of the HCP would have the same qualitative effects as the No Project and Proposed Project on invertebrates and the shorebird and waterbird communities using this resource. For the same reasons as described for the Proposed Project, changes in the invertebrate and bird communities using this resource would be less than significant. (Less than significant impact.)

Impact HCP-SS-BR-57. The Acreage of Mudflat and Shallow Water Habitat Could Change with Implementation of the HCP. As described under Impact BR-49, the acreage of mudflat and shallow water habitat likely will change as the elevation of the Salton Sea declines. Under the HCP, the surface water elevation would decline at a slower rate than projected under the Baseline until 2030, after which the rate of decline would increase (Figure 3.2-17b). The

water surface elevation of the Salton Sea is projected to reach about -240 ft msl with implementation of the HCP, about 5 feet lower than under the Baseline. Based on the bathymetric data from the University of Redlands, under the Baseline, the perimeter of the Salton Sea is projected to fall from the existing length of 100 miles to 95 miles and the acreage of shallow water habitat (< 1 foot deep) is projected to increase from the existing amount of 1,100 acres to about 3,600 acres. At the elevation of –240 ft msl projected at the end of the project with implementation of the HCP, the perimeter of the Salton Sea would be about 87 miles and the acreage of shallow water habitat would be about 4,900 acres.

Changes in the availability of mudflat and shallow water habitat would be the same as described for Proposed Project (Impact BR-49) and would not result in significant impacts. (Less than significant impact.)

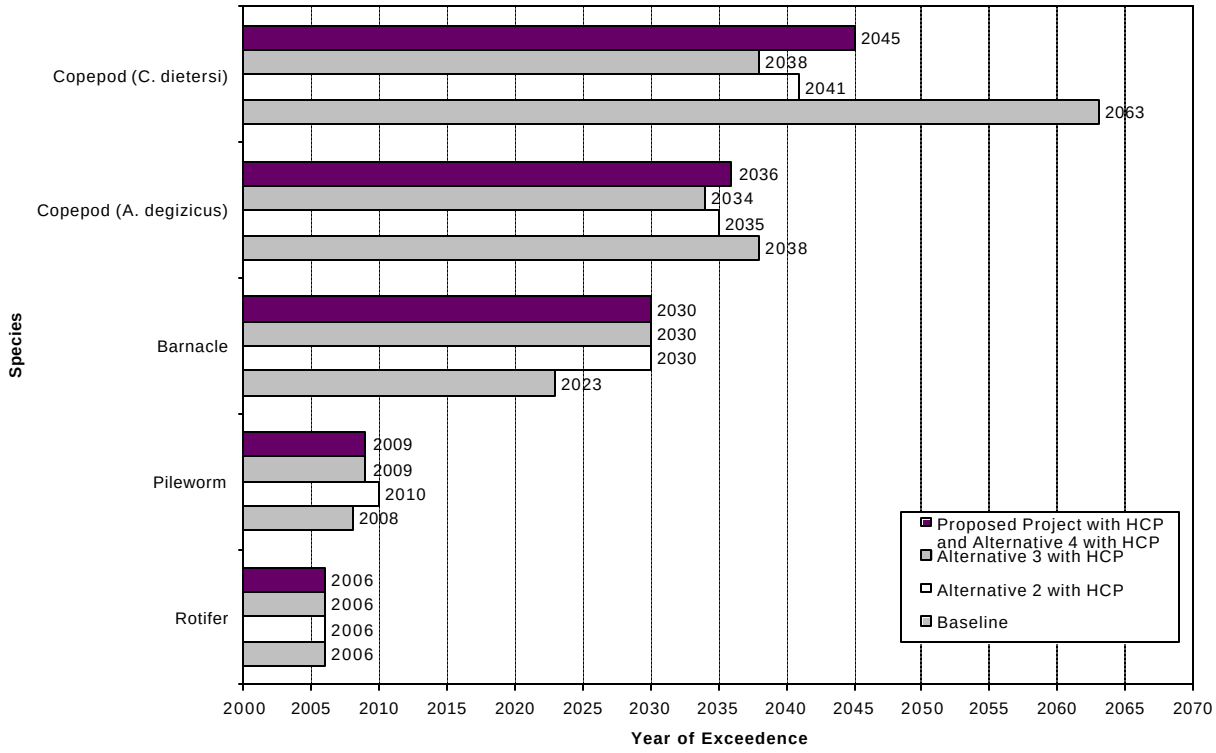


FIGURE 3.2-17C
Projected Year in Which Salinity Would Exceed the Tolerances for Invertebrate Species Under the Baseline and Alternatives with Implementation of the Salton Sea Habitat Conservation Strategy

3.2.4.4 Alternative 1: No Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Under the No Project Alternative, IID would not conserve and transfer water to the SDCWA service area, CVWD service area, or MWD service area. The IID would continue to divert water from the LCR at Imperial Dam in accord with its water right. River flows between Parker and Imperial Dams would continue to fluctuate in accord with reservoir operations. In this stretch of the river, flows would fluctuate within the existing range of flows. Because flows would remain within the existing range, riparian habitat, backwaters, marshes, or the fish and wildlife species that use these habitats would not change relative to existing conditions.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

No Substantial Changes in Wildlife Habitat Are Anticipated. Flows in the drains and rivers in the IID water service area would be expected to decline because IID's diversions from the LCR would be limited to 3.2 MAFY and surplus flows from the LCR are not expected in the future. Future flow reductions in the drains could be manifested as a total reduction in flow volume, shorter duration of peak flows, and reduced frequency of peak flows. Periods of dryness could increase in frequency and duration, and a potentially a greater number of drains could be dry at any given time. The level of potential flow reduction in the drains is within the historic range of drain flows under which vegetation has colonized and persisted in the drains. As explained for the Proposed Project, potential flow reductions in the drains and rivers under the No Project Alternative would not substantially change the amount or species composition of vegetation in the drains.

System-based water conservation measures would not be implemented. Thus, seepage communities along the East Highline Canal would not change. No agricultural land would be taken out of production for the construction of water delivery system improvements, such as reservoirs and lateral interceptors, or for fallowing. The amount of agricultural land in production in the Imperial Valley would continue to fluctuate in response to economic considerations. The amount or characteristics of wildlife habitats would not substantially change under the No Project Alternative.

Under the No Project Alternative, vegetative communities and wildlife habitats in the Imperial Valley would not change from existing conditions. Drain vegetation would remain the same and continue to support wildlife use. Seepage communities would not change and would continue to support wildlife use. Tamarisk would continue to be abundant adjacent to the New and Alamo Rivers. Agricultural habitats would continue to provide foraging habitat for numerous wildlife species.

No Substantial Changes in Fish and Aquatic Habitat are Anticipated. Under the No Project Alternative, flow levels in the drains and rivers are expected to decline. Aquatic habitats in the drains would continue to be influenced by constant changes in water supply and ongoing maintenance activities. For the same reasons as explained for the Proposed Project, fish and aquatic habitat conditions would not change substantially relative to existing conditions. Flows in drains that discharge directly to the Salton Sea would decline by about

9 percent relative to existing conditions, which would potentially reduce habitat for desert pupfish.

Water Quality Conditions Would Continue to Affect Biological Resources. Water quality constituents (primarily selenium) currently occur at levels that could adversely affect biological resources using the drains and rivers. These conditions would continue under the No Project.

Habitat Conservation Plan

The IID would not implement an HCP under the No Project Alternative; it would implement system improvement and modernization programs as needed. For these programs, IID would avoid take of listed species or comply with project-specific consultations for listed species. When conducting drain maintenance activities on the Salton Sea NWR, IID would continue to comply with terms and conditions of the existing Biological Opinion (USFWS 1992) that address Yuma clapper rail and desert pupfish. Because IID would not implement the Proposed Project, the benefits to listed and other special-status species expected from implementation of the HCP would not occur.

SALTON SEA

Water Conservation and Transfer

Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. Under the No Project Alternative, the water surface elevation of the Salton Sea is projected to decline. As described for the Proposed Project, a decline in the water surface elevation of the Sea would not affect adjacent wetland areas dominated by cattail/bulrush vegetation. However, the amount of shoreline strand and adjacent wetlands dominated by tamarisk could be influenced by changes in the water surface elevation.

Under the No Project, the water surface elevation would decline most rapidly over the first 30 years but would then decline at a lower rate through the end of the modeling period (Figure 3.2-15). The water surface elevation would reach about –235 ft msl at the end of the modeling period but would not stabilize.

The source of the water supporting the tamarisk adjacent to the Salton Sea is uncertain but could consist of a combination of shallow groundwater and seepage from the Sea. The extent to which the water surface elevation of the Sea contributes to supporting this community is uncertain. Depending on the relationship between the water surface elevation of the Salton Sea and maintenance of the shoreline strand and adjacent wetlands, the decline in water surface elevation under the No Project Alternative could change the amount of tamarisk scrub habitat in shoreline strand and adjacent wetland areas. There is, however, uncertainty about the extent of these possible changes. As the Sea recedes, tamarisk could establish at lower elevations, replacing habitat lost at high elevations. Alternatively, it has been suggested that tamarisk will not establish in areas exposed by a receding Sea level because of excessive soil salinity (Reclamation and SSA 2000). In areas where drainwater or shallow groundwater is the predominant water source, no change in tamarisk-dominated adjacent wetlands is expected. It is not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas.

Increased Salinity Would Change Invertebrate Resources in the Salton Sea. As the salinity of the Salton Sea increases under the No Project Alternative, the species composition and

abundance of the invertebrate community would change. Expected changes in the invertebrate community are described under the Proposed Project. These changes would occur under the No Project Alternative as well, although at a later date. Figure 3.2-16 shows when the salinity thresholds for selected invertebrates would be exceeded under the Baseline. These results show that pileworms could be lost by 2008. Other invertebrates (e.g., copepods) would persist considerably longer. Ultimately, however, as the salinity thresholds of invertebrates in the Salton Sea are exceeded, the abundance of these species would decline. Concurrently, the abundance of brine flies and brine shrimp would increase. These species are tolerant of high salinities and inhabit the Salton Sea. Brine shrimp and brine flies are the dominant invertebrates at Mono Lake, an inland lake with a salinity of about 100 g/L. These species would increasingly dominate the invertebrate community as the salinity of the Sea increases.

Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. Under the No Project Alternative, the abundance and composition of the invertebrate community would change as the salinity of the Salton Sea increases as described. The changes in the abundance and composition of the invertebrate community could alter the suitability of foraging conditions for birds using the Sea. As described for the Proposed Project, the shorebirds using the Salton Sea would exploit brine shrimp and flies as these species become the dominant invertebrate species. Therefore, changes in the invertebrate community under the No Project Alternative are not expected to substantially change shorebird populations at the Salton Sea.

Increased Salinity Would Reduce Fish Resources in the Salton Sea. The salinity of the Salton Sea has increased since the Sea was formed and would continue to increase under the No Project Alternative. The increased salinity would change fish resources of the Sea. The expected responses of fish resources to increased salinity are described under the Proposed Project. The changes in fish resources described for the Proposed Project also would occur under the No Project, but up to 11 years later, depending on the fish species.

Based on salinity projections, under the No Project, the salinity of the Sea would exceed the level at which sargo, gulf croaker, and tilapia could complete their life cycles in 2008, 2015, and 2023, respectively (Figure 3.2-17). The salinity threshold above which orangemouth corvina cannot complete their life cycle is about 40 g/L. However, young-of-the-year and juvenile corvina have been captured recently in the Salton Sea, indicating successful reproduction (Riedel et al. 2001). The highest catches of corvina were from the river deltas and nearshore areas (Riedel et al. 2001), where salinity levels could be lower and within tolerances of corvina. It is uncertain how much longer corvina will reproduce.

Tilapia abundance would likely decline at a salinity greater than 60 g/L. However, relatively freshwater inflow from the New and Alamo Rivers creates an estuarine environment in the river deltas where salinity levels are lower than in the main body of the Salton Sea. Under current conditions, Costa-Pierce and Riedel (2000c) reported salinity levels ranging from 10 to 30 g/L in the river deltas. Tilapia could persist if the deltas provide lower salinity environments.

The abundance of gulf croaker could decline sooner than discussed if pileworms decline earlier. Pileworms are an important food source for gulf croaker and have a lower salinity tolerance. Pileworms are not expected to survive at a salinity greater than about 50 g/L.

This level would be exceeded under the Baseline in 2008. Because tilapia have a diverse diet (Costa-Pierce and Riedel 2000b), they would not be affected by a decline in pileworms.

Reduced Fish Abundance Would Affect Piscivorous Birds. As described, the increasing salinity of the Salton Sea under the No Project Alternative would reduce the abundance of fish in the Sea. The level of use of the Salton Sea by piscivorous birds would likely decline concurrently with reduced fish abundance. A decline in the level of use by piscivorous birds would coincide with a decline in the abundance of tilapia, which would occur when the salinity of the Salton Sea reaches about 60 g/L. Under the Baseline, the Sea would reach this salinity in 2023. The response of piscivorous birds to reduced fish abundance expected with increased salinity is described for the Proposed Project. The same response would occur under the No Project Alternative.

Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. The Salton Sea provides nest and roost sites for colonial nesting/roosting birds. As described under the Proposed Project, colonial nest/roost sites that are islands or snags surrounded by water are separated from the mainland by only a few feet of water. Under the No Project Alternative, the water surface elevation of the Salton Sea would decline, connecting colonial nest and roost sites to the mainland. Under the Baseline, the water surface elevation is projected to fall 3 feet by 2010 and 4 feet by 2015. This reduction in surface elevation would connect sites used by ground-nesting birds for nesting and roosting, including Mullet Island, to the mainland. Snags used by herons and egrets would no longer be surrounded by water during the same time period (i.e., around 2010). Colonial nesting/roosting birds could abandon islands and snags when they are no longer surrounded by water.

The colony of double-crested cormorants on Mullet Island could be abandoned when the island becomes connected to the mainland. Mullet Island currently supports the largest breeding colony of double-crested cormorants on the West Coast (Point Reyes Bird Observatory 1999). Prior to establishment of this colony, small nesting colonies of double-crested cormorants were present at the north end of the Salton Sea. The origin of the birds forming this colony is uncertain. Further, the reasons for the sudden establishment of this large colony are unclear, particularly considering that the island has been available for many years and food (fish) has been abundant. The potential effect of the loss of the cormorant colony at Mullet Island on the West Coast population of double-crested cormorants is uncertain. Some or all of the birds could move to another location, if available (for example in the Gulf of California). Alternatively, some or all of the birds could fail to find other nesting areas and the West Coast population could be reduced. Given that the colony at Mullet Island only recently became established, it is unlikely that the long-term persistence of the West Coast population of double-crested cormorants would be threatened if cormorants abandoned Mullet Island.

For gull-billed terns and black skimmers, loss of nesting areas at the Salton Sea as the Sea elevation declines could substantially reduce the species' population in the United States. Gull-billed terns nest at only two locations in the U.S., one of which is the Salton Sea. Skimmers nest at several locations along the California Coast, but the Sea supports the largest number of nesting skimmers and is a unique inland nesting location. Great blue heron and great egret rookeries could be abandoned if the snags are not surrounded by water. The colony of double-crested cormorants on Mullet Island could be abandoned. Although the loss of breeding sites for great blue herons, great egrets, and double-crested

cormorants could reduce the populations of these species, because they are abundant and widespread species, such a reduction would not adversely affect the long-term persistence of these species.

Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. As described under the Proposed Project, the Salton Sea attracts thousands of migratory shorebirds that forage on mudflats and in shallow water. Under the Baseline, the water surface elevation is projected to decline most rapidly over the first 30 years, but then decline at a lower rate through the end of the modeling period (2077) (Figure 3.2-15). The water surface elevation is projected to reach about –235 ft msl (about 7 feet below its current elevation) at the end of the modeling period, but is not projected to stabilize. Areas of shallow water/mudflat habitat could be lost or reduced as the Sea recedes, but new areas of shallow water/mudflat habitat would be created. The 8-foot decline in the surface water elevation of the Salton Sea under the Baseline would reduce the perimeter of the Sea from about 100 miles to about 95 miles. However, the amount of shallow water habitat (< 1 foot deep) would increase under the Baseline with a decline in elevation from about 1,100 acres at an elevation of –228 ft msl to about 3,600 acres at –235 ft msl, increasing habitat for shorebirds.

Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Desert pupfish inhabit pools formed by barnacle bars in near-shore and shoreline areas of the Salton Sea. Barnacle bars are deposits of barnacle shells on beaches, near-shore, and at the mouths of drains that discharge to the Sea. Pools form behind the barnacle bars. These pools provide habitat for pupfish and allow pupfish movement among drains.

Desert pupfish have a high salinity tolerance. They have been collected at a salinity as high as 90 g/L. Under the Baseline, the salinity of the Salton Sea would not exceed 90 g/L in 75 years. Thus, pupfish would continue to use the Sea to move among drains under the No Project Alternative.

Habitat Conservation Plan

The IID would not implement the HCP under the No Project Alternative and would not implement actions to maintain fish resources at the Salton Sea over the 75-year project duration. Therefore, fish resources and use of the Sea by piscivorous bird species would decline as the salinity of the Sea increases. Also, no measures would be implemented to maintain nesting sites for black skimmers and gull-billed terns, and breeding by these species at the Sea could be lost as the surface elevation declines.

Because the HCP would not be implemented, IID would not monitor changes in the amount of tamarisk scrub. If the amount of tamarisk scrub declines as the Sea recedes, IID would not create native tree habitat to replace lost habitat value. Thus, this potential benefit of the HCP would not be realized.

3.2.4.5 Alternative 2 (A2): Water Conservation and Transfer of Up to 130 KAFY to SDCWA (On-farm Irrigation System Improvements as Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

Under Alternative 2, IID would conserve 130 KAF of water per year for transfer to SDCWA service area. The conserved water would be diverted at Parker Dam rather than at Imperial Dam, thereby reducing flows between Imperial Dam to Parker Dam. Reduced flow levels would reduce the water surface elevation and adjacent groundwater elevation in the LCR between Parker and Imperial Dams. The potential impacts to cottonwood-willow, honey mesquite, and screwbean mesquite along the LCR from changes in surface water and groundwater elevations are discussed subsequently.

Impact A2-BR–1. Reduced Flow Levels in the LCR Could Reduce the Acreage of Cottonwood-Willow Communities. Under Alternative 2, reduced flows in the LCR would qualitatively have the same effects on cottonwood-willow communities as the Proposed Project, but the magnitude of the effect would be lower. Under Alternative 2, 121 acres of habitat would have reduced surface water and groundwater levels, depending on the level of conservation (Table 3.2-36). The actual changes in the cottonwood-willow community that would result from reduced surface water and groundwater elevations cannot be predicted. Nevertheless, up to 121 acres of cottonwood-willow habitat could be impacted. In addition, as under the Proposed Project, development of suitable habitat conditions in the 5,404 acres of cottonwood-willow habitat between Parker and Imperial Dams could be affected by flow reductions. As explained for the Proposed Project, Reclamation would implement conservation measures to replace cottonwood-willow habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR–2. Reduced Flow Levels in the LCR Could Reduce the Acreage of Honey Mesquite Bosque Communities. As explained for the Proposed Project, honey mesquite bosque could be lost by reduced groundwater levels under Alternative 2, but the relative magnitude of the impact would be less than for cottonwood-willow habitat. Because honey mesquite bosque does not provide primary habitat for special-status species, potential changes in the acreage or structural characteristics of honey mesquite would be a less than significant impact. (Less than significant impact.)

Impact A2-BR–3. Reduced Flow Levels in the LCR Could Reduce the Acreage of Screwbean Mesquite Bosque Communities. As explained for the Proposed Project, the amount or structural characteristics of screwbean mesquite bosque could be altered by reduced groundwater levels under Alternative 2. However, because screwbean mesquite bosque does not provide primary habitat for special-status species, these potential changes would be a less than significant impact. (Less than significant impact.)

Impact A2-BR–4. Reduced Flow Levels in the LCR Could Reduce the Acreage of Backwater Habitat. Under Alternative 2, the reduced flows in the LCR would have the same qualitative effects on backwater and marsh habitats as the Proposed Project, but the magnitude of the effect would be lower. With conservation of 130 KAFY, 14 acres of backwater habitat (5 acres of open water and 9 acres of marsh) would be affected. As explained for the Proposed Project, Reclamation would implement conservation measures to replace

backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR–5. Reduced Acreage of Cottonwood-Willow Vegetation Could Affect Special-Status Species. Based on predicted changes in surface water and groundwater elevations, 121 acres of cottonwood-willow habitat could be affected by Alternative 2. Effects of reduced surface water or groundwater levels could be manifested as reduced total acreage of cottonwood-willow habitat or changes in the species composition or structural characteristics of the habitat. Special-status species associated with cottonwood-willow habitat could be affected by these changes in the same manner as described for the Proposed Project. As explained for the Proposed Project, Reclamation would implement conservation measures to replace cottonwood-willow habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR–6. Reduced Acreage of Open Water Habitat in Backwaters Could Affect Special-Status Wildlife Species. Special-status wildlife species that could use open water portions of backwater habitat are the:

- Bald eagle
- California brown pelican
- Belted kingfisher
- Several bat species (see Table 3.2-34)
- Sonoran mud turtle

For the same reasons described for the Proposed Project, reductions in the open water portion of backwaters under Alternative 2 would not significantly affect bald eagles, brown pelicans, belted kingfishers, or the species of bats potentially occurring along the LCR. However, because of their dependence on backwater habitat, the reduction in backwater habitat under Alternative 2 could adversely affects Sonoran mud turtles. However, as explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR–7. Reduced Acreage of Emergent Vegetation in Backwaters Could Affect Special-Status Species. Up to 9 acres of marsh habitat could be affected by Alternative 2 (Table 3.2-37). Effects to marsh habitat could be manifested as changes in the total acreage of marsh water depths, vegetation structure and composition, water temperature, and other water quality parameters. Special-status species associated with marsh habitat could be adversely affected by these potential changes in marsh habitat along the LCR under Alternative 2. Special-status species associated with marsh habitat along the LCR are the:

- California black rail
- Yuma clapper rail
- American bittern
- Least bittern
- Colorado River toad
- Lowland leopard frog
- Northern leopard frog

The loss of marsh habitat under Alternative 2 would result in potentially significant impacts to these species. However, as explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR – 8. Reduced Acreage of Aquatic Habitat Could Affect Special-Status Fish Species. As explained under the Proposed Project, backwaters provide key habitat for the razorback sucker and bonytail chub. The 5-acre reduction in open water in backwaters along the LCR and 11-acre reduction of open water habitat in the main channel of the LCR under Alternative 2 would potentially result in adverse effects to razorback suckers and their designated critical habitat. As explained for the Proposed Project, Reclamation would implement conservation measures so this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR – 9. Reduced Diversions from the LCR Could Benefit Special-Status Fish Species. Razorback suckers have the potential to be entrained into canals by water diversion from the LCR. Assuming the potential for entrainment is proportional to the amount of water diverted, Alternative 2 would reduce the potential for entrainment of razorback suckers. Under Alternative 2, the IID water service area would reduce its diversion at Imperial Dam by 130 KAFY. This water would be transferred to the SDCWA service area and would serve as replacement water. The overall amount of water diverted at Parker Dam would not change. However, the reduced diversions by the IID water service area at Imperial Dam would result in a net decrease in the amount of water diverted from the LCR and could reduce the risk of entrainment of razorback suckers. No significant impacts to razorback suckers from entrainment would occur under Alternative 2. (Less than significant impact.)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A2-BR – 10. Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 2, 130 KAFY would be conserved using on-farm conservation methods. Annual flow in the drains would be reduced by about 12 percent relative to the Baseline. Changes in flow in the drains resulting from Alternative 2 could be manifested as a total reduction in flow volume, shorter duration of peak flows, and reduced frequency of peak flows. Periods of dryness could increase in frequency and duration, and a potentially a greater number of drains could be dry at any given time. For the same reasons as described for the Proposed Project, which would result in greater flow reductions in the drains, changes in drain flows under Alternative 2 would not substantially change the amount or composition of drain habitat. Because drain vegetation would not change substantially, wildlife using the drains would not be substantially affected. Therefore, changes in drain habitat and the associated wildlife potentially resulting from reduced drain flows would be less than significant. (Less than significant impact.)

Impact A2-BR – 11. Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 2, conservation of 130 KAFY of water through on-farm irrigation system improvements would increase the salinity level in drains. This level of conservation would reduce the acreage of cattail vegetation by about 1 acre and increase the acres of cattail vegetation experiencing stunted growth by 9 acres (Table 3.2-39). Because cattails in the drainage system provide habitat for Yuma clapper rails, the loss of cattail vegetation is a

potentially significant impact of the water conservation and transfer component of Alternative 2. However, implementation of the HCP-IID component of Alternative 2 would reduce this potential impact to a less than significant level. (Less than significant impact.)

Impact A2-BR – 12. Changes in Water Quality in Drains Could Affect Wildlife. Alternative 2 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation under this Alternative. Similar to the Proposed Project, implementation of Alternative 2 would increase average concentrations of dissolved water quality constituents (nitrate, selenium, TDS) and decrease concentrations of sediment-associated constituents (TSS, phosphorus, pesticides) relative to the Baseline. In addition, Alternative 2 would increase the miles of drains with higher average selenium concentrations (Figures 3.2-18a, 3.2-18b, and 3.2-18c).

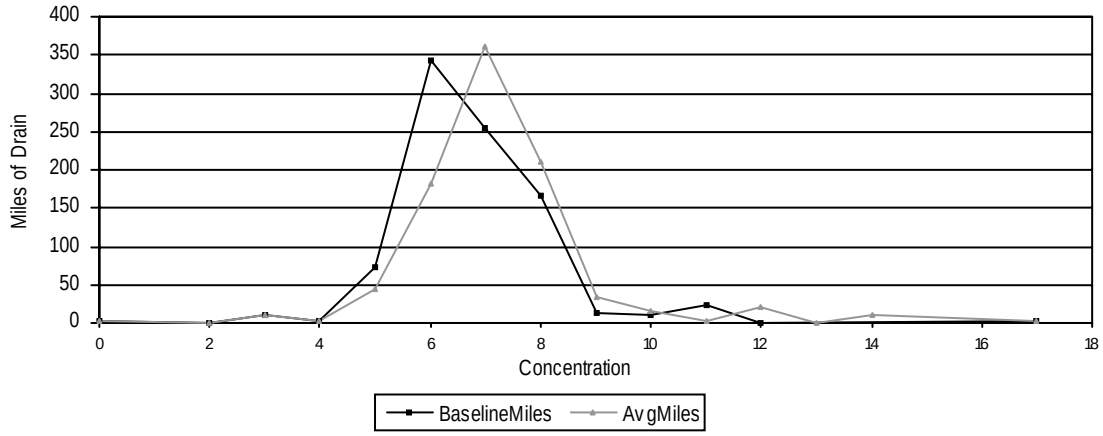
Alternative 2 would increase the miles of drain in which birds could experience selenium-related hatchability effects relative to the Baseline. Conservation of 130 KAFY using on-farm irrigation and system improvements would result in hatchability effects along the equivalent of approximately 50 miles of drain, about 3 more miles than under the Baseline (Table 3.2-40). As under the Proposed Project, potential reductions in reproductive success from increased selenium concentrations constitute a potentially significant impact associated with the water conservation and transfer component of Alternative 2. With implementation of the HCP-IID component of Alternative 2, this potential impact would be less than significant. (Less than significant impact.)

Impact A2-BR – 13. Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife. Under Alternative 2, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 130 KAFY would reduce Alamo River discharge to the Sea by about 13 percent and New River discharge to the Salton Sea by about 11 percent (Table 3.2-41). For the same reasons as described for the Proposed Project (see Impact BR-13), which would result in greater flow reductions in the rivers, changes in river flows under Alternative 2 would not substantially change the amount of tamarisk along the New or Alamo Rivers. Because the extent of tamarisk along the rivers would not change substantially, wildlife that use this habitat would not be substantially affected. Therefore, impacts to tamarisk along the rivers and wildlife potentially using this habitat would be less than significant. (Less than significant impact.)

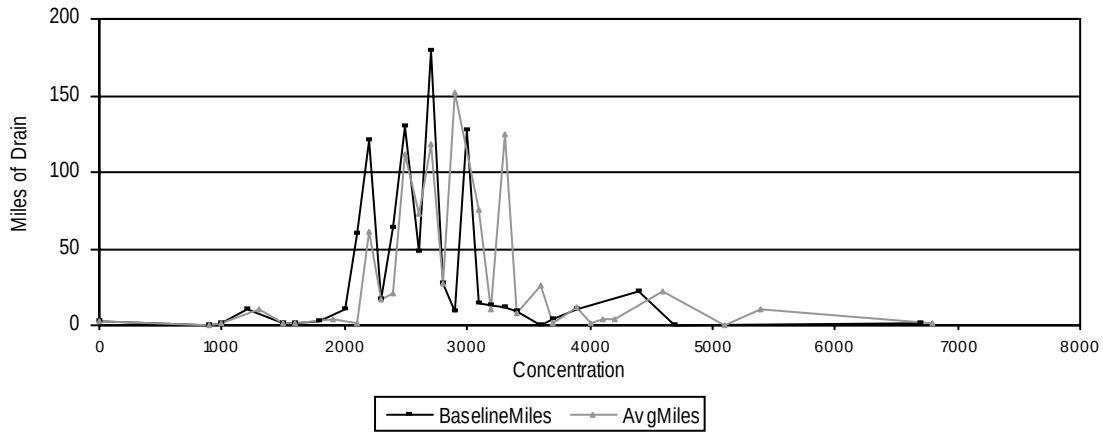
Impact A2-BR – 14. Installation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. Under Alternative 2, potential impacts to agricultural field habitat and wildlife from installation of on-farm irrigation system improvements would be qualitatively the same as under the Proposed Project, but could be of lesser magnitude due to the lower amount of water conserved. Installation of tailwater return systems could remove some agricultural land from production to accommodate tailwater ponds. Assuming that tailwater return systems can conserve about 0.5 acre-foot of water per acre and an average farm is 80 acres, about 3,250 systems would be needed to achieve 130 KAFY of conservation. Tailwater return ponds are typically 1 to 2 acres. Assuming each pond is 2 acres, up to about 6,500 acres of farmland could be removed from production for these systems. Farmers typically locate tailwater return ponds in the least productive portions of their fields, particularly in areas farmed irregularly, so the actual loss in agricultural field

Alternative 2 - 130K On-Farm COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the Alamo River



TDS (mg/L) IID Surface Drain Discharge to the Alamo River



TSS (mg/L) IID Surface Drain Discharge to the Alamo River

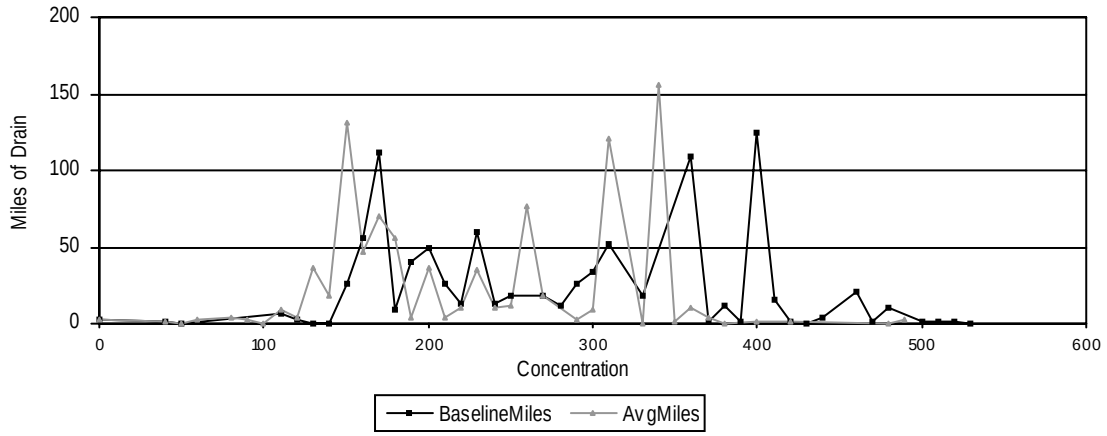
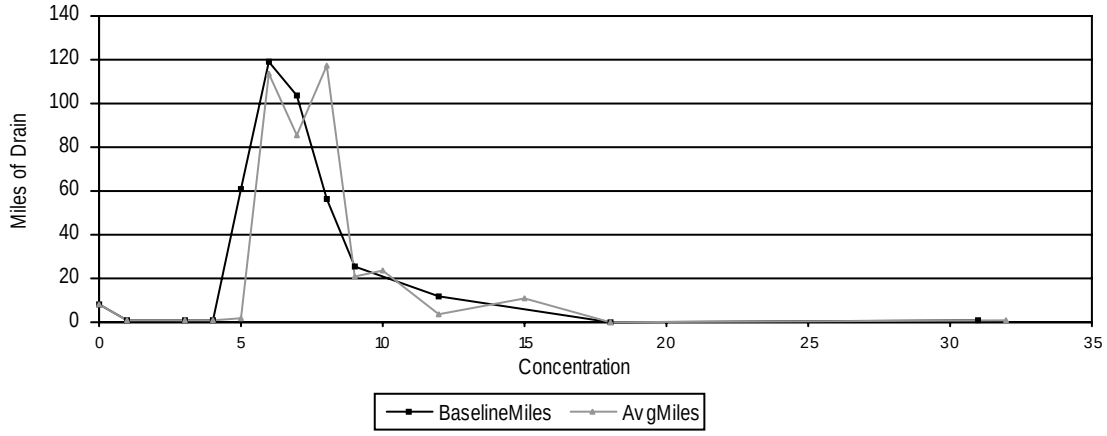


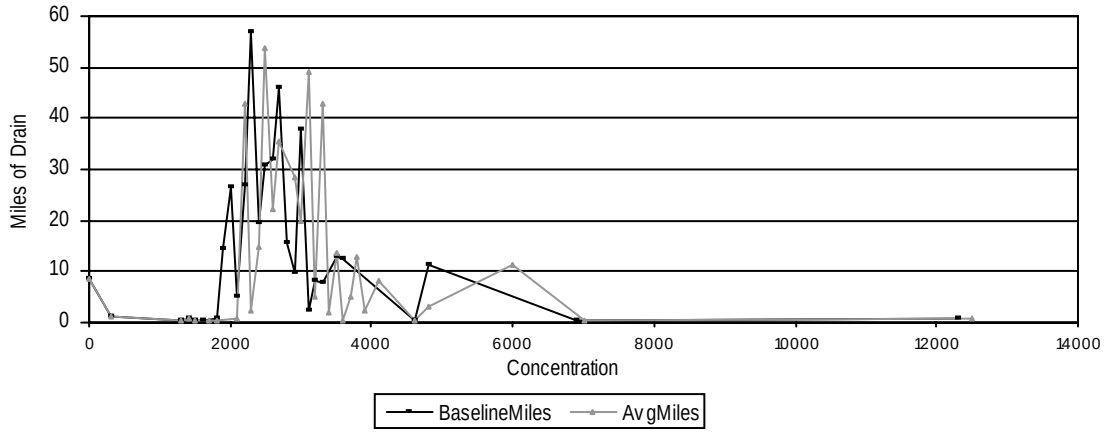
Figure 3.2-18a
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 2 for Drains Discharging into the Alamo River

Alternative 2 - 130K On-Farm COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the New River



TDS (mg/L) IID Surface Drain Discharge to the New River



TSS (mg/L) IID Surface Drain Discharge to the New River

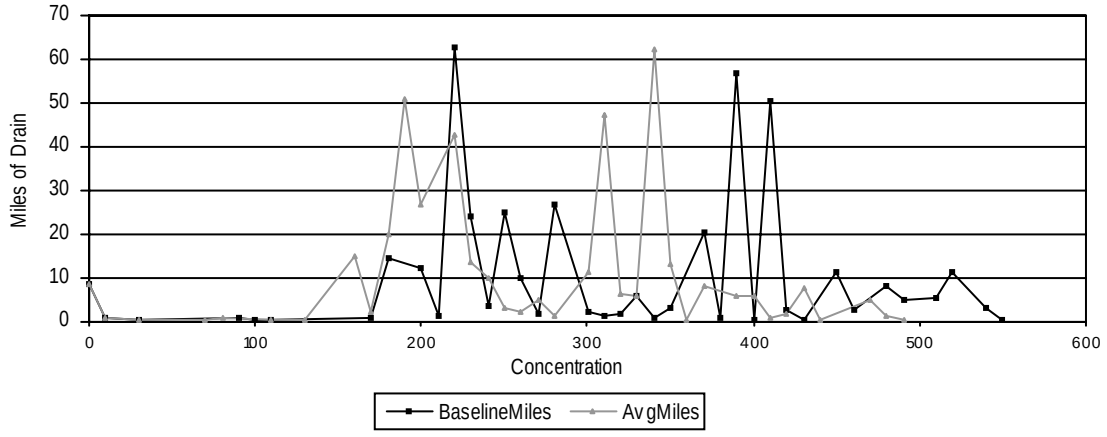


Figure 3.2-18b
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 2 for Drains Discharging into the New River

habitat likely would be less than 6,500 acres in the extreme case that only tailwater return systems are used to conserve water under this Alternative. Tailwater return systems are installed when no crops are produced, typically during the summer. Because they would be installed when no crops are grown on the field, the potential for disturbance to wildlife would be limited.

Installing drip irrigation systems would require a minor amount of temporary ground disturbance, potentially disturbing wildlife. Drip systems would be installed between cultivations; therefore, no temporary or permanent changes in the amount of agricultural field habitat would occur.

Other on-farm techniques require reconstructing / recontouring an agricultural field. Wildlife using agricultural field habitat could be disturbed during the reconstructing / recontouring. However, because reconstructing / recontouring would be conducted when no crops are grown on the field, the potential for disturbance to wildlife is limited. The amount of agricultural field habitat would not change from reconstructing / recontouring agricultural fields to conserve water.

As described, installation of on-farm irrigation system improvements could reduce a small amount of agricultural field habitat and presents a minor potential for disturbance of wildlife. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land under Alternative 2 is considered a less than significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact A2-BR – 15. Operation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. For the same reasons as explained for the Proposed Project (Impact BR-17), implementing on-farm irrigation system improvements would not change the suitability of agricultural fields as foraging habitat for bird species that forage in agricultural fields of the Imperial Valley. (No impact.)

Impact A2-BR – 16. Reduced Flows in Drains Could Affect Fish and Aquatic Habitat. Under Alternative 2, water conservation would reduce the amount of water in the drainage system (Table 3.2-42). Conservation of 130 KAF through on-farm irrigation system improvements would reduce flow in the drains by about 12 percent relative to the Baseline. For the same reasons as described for the Proposed Project (see Impact BR-21), which would result in greater flow reductions in the drains than this Alternative, reductions in drain flows under Alternative 2 would have a less than significant impact on fish and other aquatic resources in the drains. (Less than significant impact.)

Impact A2-BR – 17. Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat. Alternative 2 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation. Similar to the Proposed Project, Alternative 2 would increase average concentrations of dissolved water quality constituents (nitrate, selenium, TDS) and decrease concentrations of sediment-associated constituents (TSS, phosphorus, pesticides) relative to the Baseline. Average salinity concentrations also would increase under Alternative 2 relative to the Baseline. For the same reasons as described for the Proposed Project, the potential for increased selenium or salinity to reduce the reproductive success of fish in the drains and rivers is a less than

significant impact. Impacts to desert pupfish are addressed under Impact A2-BR-20. (Less than significant impact.)

Impact A2-BR – 18. Reduced Flows in the Rivers Could Affect Fish and Aquatic Habitat. Under Alternative 2, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 130 KAFY would reduce Alamo River discharge to the Sea by about 12 percent and New River discharge to the Salton Sea by about 11 percent. For the same reasons as explained for the Proposed Project, under which flow reductions in the New and Alamo Rivers would be greater than under this Alternative, impacts to fish or aquatic resources would be less than significant. (Less than significant impact.)

Impact A2-BR – 19. Reduced Flows in the Drains Could Affect Desert Pupfish. Desert pupfish inhabit drains that discharge directly to the Salton Sea. Under Alternative 2, conservation of 130 KAFY of water is predicted to reduce flow levels in these drains by about 13 percent relative to the Baseline (Table 3.2-42). This reduction in flows in drains inhabited by pupfish would have the same effects qualitatively as those described for the Proposed Project, but the magnitude of potential effects would be less because of a smaller reduction in drain flows. Also, because water conservation would reduce the contribution of tailwater to the drainage system, water quality conditions in these drains would worsen. Changes in flow and water quality in the drains discharging directly to the Sea and supporting pupfish predicted constitute a potentially significant impact on the water conservation and transfer component of Alternative 2. However, implementation of the HCP-IID component of Alternative 2 would reduce this potential impact to less than significant. (Less than significant impact.)

Impact A2-BR – 20. Water Quality Changes in the Drains Could Affect Special-Status Species. Alternative 2 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of changes in water quality would be proportionately less because of the reduced level of water conservation. Therefore, adverse effects to special-status species inhabiting the drains (e.g., Yuma clapper rails and desert pupfish) would be similar to those described for the Proposed Project, but of slightly lesser magnitude. For the same reasons as described for the Proposed Project, potential impacts to special-status species from changes in water quality under Alternative 2 are a potentially significant impact associated with the water conservation and transfer component of this Alternative. Implementation of the HCP-IID component of this Alternative would reduce this impact to less than significant. (Less than significant impact.)

Impact A2-BR – 21. Changes in Drain Habitat Could Affect Special-Status Species. As described under Impact A2-BR – 10, reduced flow in the drains would not significantly change the amount or species composition of vegetation in the drains. However, increased salinity of drainwater with water conservation and transfer would reduce cattail vegetation in the drains by a small amount. Cattails are preferred habitat for the Yuma clapper rail, a state- and federal-listed species, and provide habitat for other special-status species potentially using the drains. A reduction in cattails could adversely affect Yuma clapper rails and other special-status species using the drains. This effect constitutes a potentially significant impact of the water conservation and transfer component of Alternative 2.

In addition to changes in physical habitat, increased selenium concentration in the drains under Alternative 2 could adversely affect Yuma clapper rails and other special-status

species using the drains. These potential effects are addressed under Impact A2-BR-20. These water quality changes also are a potentially significant impact of the water conservation and transfer component of Alternative 2. However, with implementation of the HCP-IID component of Alternative 2, these potential impacts would be less than significant. (Less than significant impact.)

Impact A2-BR – 22. Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species. Alternative 2 would not change the amount of tamarisk in the Imperial Valley, and no construction in tamarisk would occur that could disturb special-status species. Because there would be no change in the amount of potential habitat, Alternative 2 would not affect special-status species associated with tamarisk scrub habitat. (No impact.)

Impact A2-BR – 23. Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields. Many special-status species exploit agricultural fields for foraging, particularly during winter when many birds overwinter in the Imperial Valley. Special-status species frequenting agricultural fields for foraging include mountain plover, sandhill cranes, black terns, and white-faced ibis. Installation of on-farm irrigation system improvements under Alternative 2 would require construction and ground disturbance. Installation of water conservation measures in agricultural fields would not adversely affect special-status species using this habitat because the conservation measures would be installed when crops are not grown, primarily in the summer. Special-status species predominantly occur in the Proposed Project area during the winter or as fall and spring migrants and predominantly use agricultural fields when they are in active production and irrigated.

As explained under Impacts A2-BR-14 and A2-BR-15, installation of on-farm irrigation system improvements would not substantially reduce the availability or crop composition of agricultural lands in the IID water service area. Thus, impacts of Alternative 2 to special-status associated with agricultural fields would be less than significant. (Less than significant impact.)

Impact A2-BR–24. Water Conservation Practices Could Affect Burrowing Owls. Under this Alternative, installation of on-farm irrigation system improvements would not significantly adversely affect burrowing owls. Burrowing owls are concentrated in drain and canal embankments, and construction for the on-farm systems would occur primarily in the fields or field margins. Individual burrowing owls could be disturbed by installing new gates in concrete laterals that would be required under the "shorten furrows/border strip improvement" conservation measure. This potential impact is considered less than significant because of the limited area affected and the low number of owls at risk to this impact. In addition, suitable habitat for burrowing owls would remain abundant in the Proposed Project area as drain and canal embankments, and the Imperial Valley would continue to support high population levels of owls.

The "level basin and shorten furrows/border strip improvement" conservation measures could benefit burrowing owls as these measures include construction of concrete-lined ditches. In the Imperial Valley and elsewhere, burrowing owls often locate their burrows at the base of concrete structures, and additional concrete-lined ditches could increase suitable burrow locations. No significant adverse effects to burrowing owls would occur under

Alternative 2, and minor benefits could be realized if additional concrete-lined ditches are constructed that could increase nesting opportunities. (Less than significant impact.)

Salton Sea Habitat Conservation Strategy (HCP-SS)

The Salton Sea Habitat Conservation Strategy includes supplying water to the Sea so as to maintain the salinity of the Salton Sea below 60 ppt until 2030. As described above and in Section 2.2.6.7, the Salton Sea Habitat Conservation Strategy has been evaluated in this Final EIR/EIS with the assumption that mitigation water would be generated by fallowing within the IID water service area. Other sources of water could be used but they have not been evaluated in this EIR/EIS.

Additional details of the Salton Sea Habitat Conservation Strategy can be found in Section 2.2.6.7. If fallowing within the IID water service area was the sole method of providing mitigation water, about 40,600 acres of land would need to be fallowed. This would reduce the amount of agricultural land by about 8 percent. Even with this reduction, agricultural fields would remain abundant at about 459,400 acres, and no significant adverse effects to biological resources would be expected. Section 3.8.6 of the HCP (Appendix C) provides information on the potential effects of the Salton Sea mitigation approach on special-status species.

As described in the Project Description, how mitigation water would be conveyed to the Salton Sea has not yet been specified. Potentially, the mitigation water, if created by fallowing within the IID water service area, could be transported via drains and rivers in the Imperial Valley. In this case, flows in the rivers and drains used to convey the water could approach levels under the Baseline. Alternatively, mitigation water generated through conservation in the Imperial Valley could be conveyed to the Salton Sea through channels other than the drains and rivers in the Imperial Valley. In this case, flows in the drains and rivers in the Imperial Valley would be reduced relative to Alternative 2 without implementation of the Salton Sea Habitat Conservation Strategy. Flow reductions relative to Baseline conditions would be greater with the Salton Sea Habitat Conservation Strategy. However, the response of biological resources to reduced flow levels in the rivers and drains would be the same as that described for Alternative 2 without the Salton Sea Habitat Conservation Strategy (see Impacts A2-BR-10, A2-BR-13, A2-BR-16, A2-BR-18, and A2-BR-19). For the same reasons as described for the Proposed Project without implementation of the HCP, the impacts to vegetation and wildlife along the drains and rivers (see Impacts A2-BR-10 and A2-BR-13), and to fish and aquatic habitat in the drains and rivers (see Impacts A2-BR-16 and A2-BR-18), would be less than significant. However, like the Proposed Project without implementation of the Salton Sea Habitat Conservation Strategy, potentially significant impacts to desert pupfish could result from decreases in flow levels in drains that discharge directly to the Sea. Implementation of the Desert Pupfish Conservation Strategy under the HCP would reduce this potential impact to less than significant.

Fallowing to generate mitigation water would not be expected to change the tail and tile water percentages in the drains. Therefore, water quality conditions in the drains (i.e., salinity and selenium concentrations) would not change substantially with implementation of the Salton Sea Habitat Conservation Strategy relative to Alternative 2 without the Salton Sea Habitat Conservation Strategy.

Salton Sea

Water Conservation and Transfer

Impact A2-BR–25. Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. With conservation of 130 KAFY through on-farm irrigation system improvements and transfer to SDCWA service area, inflow to the Salton Sea would be reduced by the 130 KAFY relative to the Baseline. With this reduced inflow, the water surface elevation of the Sea is projected to decline. Under Alternative 2, the water surface elevation would decline rapidly for the first 30 years, after which the rate of decline would slow. The water surface elevation is projected to reach about –242 feet msl at the end of the modeling period, about 7 feet lower than under the Baseline.

As described for the Proposed Project, there is uncertainty regarding changes in the amount of tamarisk adjacent to the Salton Sea as the water surface elevation declines, and it is not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas. Nevertheless, a reduction in the amount of tamarisk would not be a significant impact because (1) tamarisk is an invasive, non-native species of poor habitat quality for wildlife, (2) no special-status species depend on tamarisk, and (3) the magnitude of changes would be the same under Alternative 2 and the Baseline because the reduction in surface elevation would be similar under the two Alternatives (see Figure 3.2-15). (Less than significant impact.)

Impact A2-BR–26. Increased Salinity Would Change Invertebrate Resources in the Salton Sea. The effects on invertebrate resources in the Salton Sea from increased salinity are described under the Proposed Project. Under Alternative 2, salinity would increase and result in the same effects as described for the Proposed Project and the No Project Alternative. The exceedance of salinity thresholds for invertebrates in the Salton Sea under Alternative 2 are shown on Figure 3.2-16. For species with a low salinity tolerance, the species' threshold would be exceeded only 1 year earlier (or less) under Alternative 2 relative to the Baseline (e.g., pileworms and rotifers). For species with higher salinity tolerances, the predicted difference between Alternative 2 and the Baseline increases. For the copepod (*C. dietersi*) with a tolerance of 80 g/L, the difference between Alternative 2 and the Baseline increases to 37 years.

For the same reasons as described for the Proposed Project, the acceleration in the changes in the invertebrate community of the Salton Sea is not a significant impact. Regardless of implementation of Alternative 2, the Salton Sea is naturally transitioning to a more saline system, as has occurred at Mono Lake and the Great Salt Lake. The change in the composition of the invertebrate community in and of itself is not a significant impact, but could significantly affect bird or fish resources through reduced food availability. These potential impacts are addressed separately. (Less than significant impact.)

Impact A2-BR – 27. Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. As described for the Proposed Project and No Project Alternative, shorebirds using the Salton Sea also use Mono Lake, where brine flies and shrimp provide the primary invertebrate food source. Because shorebirds would exploit brine flies and shrimp at the Salton Sea, the acceleration of the transition to an invertebrate community dominated by these species under Alternative 2 would have a less than significant impact on shorebirds. (Less than significant impact.)

Impact A2-BR – 28. Increased Salinity Would Reduce Fish Resources in the Salton Sea. The effects on fish resources in the Salton Sea from increased salinity were described under the Proposed Project. Under Alternative 2, salinity would increase and result in the same effects as described for the Proposed Project and the No Project Alternative. Conservation of 130 KAFY of water through on-farm irrigation system improvements and transfer to SDCWA would reduce inflow to the Salton Sea by about 130 KAFY and accelerate the rate of salinization relative to the No Project Alternative. With conservation of 130 KAF, the salinity threshold for sargo would be exceeded in 2007, 1 year earlier than it is predicted to be exceeded under the Baseline (Figure 3.2-17). For gulf croaker and tilapia, their reproductive salinity thresholds would be exceeded in 2010 and 2013, respectively, which are 5 and 10 years earlier than under the Baseline. As explained for the Proposed Project, it is uncertain how much longer corvina will reproduce, and gulf croaker could be lost earlier than suggested by the exceedance of their life-cycle salinity tolerance, if pileworm abundance declines.

Under both the Baseline and Alternative 2, the salinity of the Salton Sea would rise and exceed levels at which fish species inhabiting the Sea could reproduce. The thresholds for sargo, gulf croaker, and tilapia could be exceeded 1 to 10 years earlier, respectively, under Alternative 2, resulting in earlier declines in these two species. For the same reasons as described for the Proposed Project, this acceleration is considered a less than significant impact to fish resources of the Salton Sea. (Less than significant impact.)

Impact A2-BR – 29. Reduced Fish Abundance Would Affect Piscivorous Birds. Alternative 2 would have the same effects on piscivorous birds as described for the Proposed Project. With 130 KAFY of conservation through on-farm irrigation system improvements, the mean salinity would exceed 60 g/L in 2013, 10 years earlier than under the Baseline. Adverse impacts to piscivorous birds could occur earlier under Alternative 2 relative to the Baseline. Although the projected changes in fish abundance would occur under both Alternative 2 and the No Project Alternative, the earlier occurrence of adverse effects to piscivorous birds is considered a potentially significant impact of the water conservation and transfer component of Alternative 2. With implementation of the HCP-SS component of Alternative 2, this potential impact would be reduced to a less than significant level. (Less than significant impact.)

Impact A2-BR – 30. Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds. Alternative 2 would qualitatively have the same effects on selenium loading to the Salton Sea as the Proposed Project. For the same reasons as described for the Proposed Project (Impact BR-47), Alternative 2 would have no effect on exposure of fish and birds to selenium in the Salton Sea. (No impact.)

Impact A2-BR – 31. Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. Under the Baseline, the water surface elevation is projected to fall 2 feet from the current elevation of -228 feet msl by 2010 and 34 feet by 2015. This reduction in surface elevation would connect islands, including Mullet Island, used by ground-nesting birds for nesting and roosting to the mainland (Figure 3.2-15). Alternative 2 would accelerate this effect slightly. With conservation of 130 KAFY through on-farm irrigation system improvements, the surface water elevation would drop by 3 feet and 4 feet, 3 and 7 years earlier than under the Baseline, respectively. Snags used by herons and egrets would be similarly affected. For the

same reasons as described for the Proposed Project, effects to nesting sites of colonial-nesting birds would be less than significant. (Less than significant impact.)

Impact A2-BR – 32. Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. Alternative 2 would generally have the same effects on mudflat and shallow water habitat for shorebirds as described for the No Project Alternative. Under Alternative 2, the water surface elevation would decline rapidly for the first 30 years, after which the rate of decline would slow. The water surface elevation would not stabilize during the 75-year modeling period but would reach about –242 feet msl at the end of the modeling period. The water surface elevation would be about 7 feet lower than the Baseline. The 15-foot decline in water surface elevation predicted under Alternative 2 would reduce the perimeter of the Salton Sea to about 87 miles, but the amount of shallow water habitat (<1 foot deep) would increase to about 3,400 acres from the existing level of about 1,100 acres.

Under both Alternative 2 and the Baseline, existing areas of shallow water/mudflat habitat could be lost or reduced as the Sea recedes, but new areas of shallow water/mudflat habitat would be created. For the same reasons as explained for the Proposed Project, Alternative 2 would not significantly affect the availability of shallow water/mudflat habitat. (Less than significant impact.)

Impact A2-BR – 33. Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Under Alternative 2, the salinity of the Salton Sea is projected to exceed 90 g/L in 2060. At this salinity pupfish might not be able to move among drains via the Salton Sea. The salinity of the Sea is not projected to exceed this salinity level in 75 years under the No Project Alternative. As explained for the Proposed Project, if the Sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Although, this condition also would eventually occur under the No Project Alternative, but at a later time, the acceleration of the occurrence of the condition by about 40 years is a potentially significant impact of the water conservation and transfer component of Alternative 2. With implementation of the HCP-IID component of Alternative 2, this impact would be less than significant. (Less than significant impact.)

Salton Sea Habitat Conservation Strategy (HCP-SS)

The Salton Sea Habitat Conservation Strategy of the HCP implemented under Alternative 2 would be the same as under the Proposed Action except that the volume of water supplied to the Sea under Salton Sea-1 would be lower because of the lower level of water conservation and transfer. Measures to address isolation of desert pupfish because of increased salinity (i.e., Salton Sea–2) and potential effects to tamarisk scrub habitat adjacent to the Sea because of a decline in Sea elevation (i.e., Salton Sea–3) would be the same as under the Proposed Project. Thus, the following evaluation addresses effects of providing mitigation water to the Salton Sea (i.e., Salton Sea–1) under Alternative 2.

Impact A2-HCP-SS-BR-34. Implementation of the HCP Would Avoid Conservation-induced Changes in Fish Resources and Impacts to Piscivorous Birds. As with implementation of the HCP under the Proposed Project, implementation of the HCP under Alternative 2 would avoid or minimize the potential for take of covered piscivorous birds resulting from implementation of the water conservation and transfer project by providing mitigation water and allowing that water to flow to the Salton Sea. The amount of water allowed to

flow to the Sea would be sufficient to maintain salinity in the Sea at or below 60 ppt until the year 2030. The effects on fish resources and piscivorous birds with implementation of the HCP under Alternative 2 would be the same as those described for implementation of the HCP under the Proposed Project (see Impact HCP-SS-BR-52), but with slight differences in the years in which the salinity tolerances of the fish in the Salton Sea would be exceeded (see Figure 3.2-17a). With the HCP, the impacts to piscivorous birds from reduced fish abundance attributable to the Alternative 2 (see Impact A2-BR-29) would be offset. (Less than significant impact.)

Impact A2-HCP-SS-BR-35. Implementation of the HCP Would Benefit Colonial Nesting and Roosting Birds. As described for the Proposed Project, implementation of the Salton Sea Conservation Strategy of the HCP under Alternative 2 would benefit colonial nesting and roosting birds by maintaining the water surface elevation higher than under the Baseline until about 2035 (see Impact HCP-SS-BR-53). With implementation of the Salton Sea Habitat Conservation Strategy under Alternative 2, the surface elevation of the Sea is projected to fall 2 feet from its current elevation of -228 feet msl by 2018 and 3 feet by 2032. Under the Baseline, the Sea is projected to fall 2 feet by 2010 and 3 feet by 2015. Thus, islands and trees used by colonial birds for nesting and roosting would remain surrounded by water for a longer period of time (up to 17 years) than under the Baseline. (Beneficial impact.)

Impact A2-HCP-SS-BR-36. Implementation of the HCP Would Delay Changes in the Invertebrate Community of the Salton Sea and Responses of the Shorebird and Other Waterbird Communities From Water Conservation and Transfer. Implementation of the Salton Sea Conservation Strategy would delay the changes in the invertebrate community and the responses of the shorebirds and other waterbirds using the Salton Sea described for the water conservation and transfer project (see Impacts A2-BR-26 and A2-BR-27). Figure 3.2-17c shows the years in which the salinity tolerance of invertebrates in the Salton Sea would be exceeded under the Baseline and Alternative 2 with the HCP. For the same reasons as described for the Proposed Project (see Impacts BR-43 and BR-44), changes in the invertebrate and bird communities using this resource would be less than significant. (Less than significant impact.)

Impact A2-HCP-SS-BR-37. The Acreage of Mudflat and Shallow Water Habitat Could Change with Implementation of the HCP. As described under Impact A2-BR-32, the acreage of mudflat and shallow water habitat likely will change as the elevation of the Salton Sea declines. Under the HCP, the surface water elevation would decline at a slower rate than projected under the Baseline until 2030, after which the rate of decline would increase (Figure 3.2-17b). The water surface elevation of the Salton Sea is projected to reach about -242 ft msl with implementation of the HCP, about 7 feet lower than under the Baseline. Based on the bathymetric data from the University of Redlands, under the Baseline, the perimeter of the Salton Sea is projected to fall from the existing length of 100 miles to 95 miles, and the acreage of shallow water habitat (< 1 foot deep) is projected to increase from the existing amount of 1,100 acres to about 3,600 acres. At the elevation of –242 ft msl projected at the end of the project with implementation of the Salton Sea Habitat Conservation Strategy, the perimeter of the Salton Sea would be about 86 miles and the acreage of shallow water habitat would be about 3,400 acres. Changes in the availability of mudflat and shallow water habitat would be the same as described for Proposed Project (Impact BR-49) and would not result in significant impacts. (Less than significant impact.)

3.2.4.6 Alternative 3 (A3): Water Conservation and Transfer of Up to 230 KAFY to SDCWA, CVWD, and/or MWD (All Conservation Measures)

LOWER COLORADO RIVER

Water Conservation and Transfer

Under Alternative 3, IID would conserve 230 KAF of water per year for transfer to SDCWA service area, CVWD service area, or MWD service area. Conserved water transferred to the SDCWA service area or MWD service area would be diverted at Parker Dam rather than at Imperial Dam, thereby reducing flows between Imperial Dam to Parker Dam. Reduced flow levels would lower the water surface elevation and adjacent groundwater elevation in the LCR between Parker and Imperial Dams. The potential impacts to cottonwood-willow, honey mesquite, and screwbean mesquite along the LCR from changes in the surface water and groundwater elevations are discussed below subsequently.

Impact A3-BR – 1. Reduced Flow Levels in the LCR Could Reduce the Acreage of Cottonwood-Willow Communities. Under Alternative 3, reduced flows in the LCR would qualitatively have the same effects on cottonwood-willow communities as the Proposed Project, but the magnitude of the effects would be lower. If 100 KAFY is transferred to CVWD service area, the flow reduction between Parker and Imperial Dams would be 130 KAFY. If all the 230 KAFY of conserved water is transferred to the SDCWA service area or MWD service area, the flow reduction below Parker Dam would be 230 KAFY. These reductions would affect 121 or 214 acres of cottonwood-willow habitat, respectively (Table 3.2-36). The actual changes in the cottonwood-willow community that would result from reduced surface water and groundwater elevations cannot be predicted. Nevertheless, an estimated 121 to 214 acres of cottonwood-willow habitat occupied by southwestern willow flycatchers could be affected. In addition, as under the Proposed Project, further development of 5,404 acres of cottonwood-willow habitat between Parker and Imperial Dams could be affected by flow reductions under Alternative 3. As explained for the Proposed Project, Reclamation would implement conservation measures to replace cottonwood-willow habitat so this potential impact would be less than significant. (Less than significant impact).

Impact A3-BR – 2. Reduced Flow Levels in the LCR Could Reduce the Acreage of Honey Mesquite Bosque Communities. As explained for the Proposed Project, honey mesquite bosque could be affected by reduced groundwater levels under Alternative 3, but the relative magnitude of the impact would be less than for cottonwood-willow habitat. Because honey mesquite bosque does not provide primary habitat for special-status species, potential changes in the acreage or structural characteristics of honey mesquite under Alternative 3 would be a less than significant impact. (Less than significant impact.)

Impact A3-BR – 3. Reduced Flow Levels in the LCR Could Reduce the Acreage of Screwbean Mesquite Bosque Communities. As explained for the Proposed Project, the amount or structural characteristics of screwbean mesquite bosque could be altered by reduced groundwater levels under Alternative 3. However, because screwbean mesquite bosque does not provide primary habitat for special-status species, these potential changes under Alternative 3 would be a less than significant impact. (Less than significant impact.)

Impact A3-BR – 4. Reduced Flow Levels in the LCR Could Reduce the Acreage of Backwater Habitat. Under Alternative 3, the reduced flows in the LCR would have the same qualitative effects on backwater and marsh habitats as the Proposed Project, but the magnitude of the

effect would be lower. With conservation of 230 KAF and transfer to the SDCWA service area, 25 acres of backwater habitat (9 acres of open water and 16 acres of marsh) would be affected. If 100 KAFY of the conserved water is transferred to CVWD service area, 14 acres of backwater habitat (5 acres of open water and 9 acres of marsh) would be affected. As explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 5. Reduced Acreage of Cottonwood-willow Vegetation Could Affect Special-Status Species. Based on predicted changes in surface water and groundwater elevations, 121 to 214 acres of cottonwood-willow habitat could be affected by Alternative 3, depending on the amount of water transferred out of the basin. Effects of reduced surface water or groundwater levels could be manifested as a reduction in the total acreage of cottonwood-willow habitat or changes in the species composition or structural characteristics of the habitat. Special-status species associated with cottonwood-willow habitat could be affected by these changes in the same manner as described for the Proposed Project. As explained for the Proposed Project, Reclamation would implement conservation measures to replace cottonwood-willow habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 6. Reduced Acreage of Open Water Habitat in Backwaters Could Affect Special-Status Wildlife Species. Special-status wildlife species that could use open water habitat in backwaters are the:

- Bald eagle
- California brown pelican
- Belted kingfisher
- Several bat species (see Table 3.2-34)
- Sonoran mud turtle

For the same reasons described for the Proposed Project, reductions in the open water portion of backwaters under Alternative 3 would not significantly affect bald eagles, brown pelicans, belted kingfishers, or the species of bats potentially occurring along the LCR. However, because of their dependence on backwater habitat, the reduction in backwater habitat under Alternative 3 could have adverse effects on Sonoran mud turtles. As explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 7. Reduced Acreage of Emergent Vegetation in Backwaters Could Affect Special-Status Species. Up to 16 acres of marsh habitat could be affected by Alternative 3 (Table 3.2-36). Effects to marsh habitat could be manifested as changes in the total acreage of marsh water depths, vegetation structure and composition, water temperature, and other water quality parameters. Special-status species associated with marsh habitat could be adversely affected by these potential changes in marsh habitat along the LCR under Alternative 3. Special-status species associated with marsh habitat along the LCR are the:

- California black rail
- Yuma clapper rail

- American bittern
- Least bittern
- Colorado River toad
- Lowland leopard frog
- Northern leopard frog

The loss of marsh habitat under Alternative 3 could result in significant impacts to these species. As explained for the Proposed Project, Reclamation would implement conservation measures to replace backwater habitat so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 8. Reduced Acreage of Backwater Habitat Could Affect Special-Status Fish Species. As explained under the Proposed Project, backwaters provide key habitat for the razorback sucker and bonytail chub. If 230 KAFY of water is transferred to the SDWCA service area or MWD service area, 9 acres of open water in back waters along the LCR and 20 acres of open water in the main channel of the LCR could be lost. If 100 KAFY is transferred to the CVWD service area, potential impacts would be reduced to 5 acres of open water in backwaters and 11 acres of open water in the main channel. These reductions would potentially have adverse affects to razorback suckers and their critical habitat. The bonytail chub does not inhabit the mainstem below Parker Dam, but is likely to be introduced in the future, and they could be similarly affected as razorback suckers. However, as explained for the Proposed Project, Reclamation would implement conservation measures for these fish species so this potential impact would be less than significant. (Less than significant impact.)

Impact A3-BR – 9. Reduced Diversions from the LCR Could Benefit Special-Status Fish Species. Razorback suckers have the potential to be entrained into canals by water diversion from the LCR. Assuming the potential for entrainment is proportional to the amount of water diverted, Alternative 3 would reduce the potential for entrainment of razorback suckers. Under Alternative 3, the IID would reduce its diversion at Imperial Dam by 130 to 230 KAFY. Water transferred to the SDCWA service area or MWD service area would serve as replacement water for these agencies, and the overall amount of water diverted at Parker Dam would not change. However, the reduced diversions by the IID at Imperial Dam would result in a net decrease in the amount of water diverted from the LCR and could reduce the risk of entrainment of razorback suckers. No significant impacts to razorback suckers from entrainment would occur under Alternative 3. (Less than significant impact.)

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Impact A3-BR – 10. Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 3, between 130 KAFY and 230 KAFY of water would be conserved using a combination of on-farm irrigation system improvements, water delivery system improvements, and fallowing. The total flow reduction in the drains would be about 21 percent relative to the Baseline, assuming only on-farm and water delivery measures were used to conserve water. If only fallowing was used to conserve water, then the percent reduction in flows would be 9 percent. Thus, depending on the amount of water conserved through fallowing, the percent reduction in drain flows would be between 9 and 21 percent relative to the Baseline. For the same reasons as described for the Proposed Project, which

would result in greater flow reductions in the drains, changes in drain flows under Alternative 3 would not substantially change the amount or composition of drain habitat. Because drain vegetation would not change substantially, wildlife using the drains would not be substantially affected. Therefore, changes in drain habitat and associated wildlife potentially resulting from reduced flows in the drains would be less than significant. (Less than significant impact.)

Impact A3-BR – 11. Increased Salinity in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 3, conservation of 230 KAFY of water through on-farm irrigation system improvements, water delivery system improvements, and fallowing would increase the salinity level in drains. Assuming all water is conserved through on-farm and water delivery methods, this level of conservation would reduce the acreage of cattail vegetation by about 4 acres and increase the acres of cattail vegetation experiencing stunted growth by 16 acres (Table 3.2-39). If all fallowing was used to conserve water, these effects would not occur because there would be no change in salinity. Depending on the amount of fallowing, effects to cattails would be intermediate to these two situations. Because cattails in the drainage system provide habitat for Yuma clapper rails (a federal and state listed species), the loss of cattail vegetation is a potentially significant impact of Alternative 3. However, implementation of the HCP-IID component of this Alternative would reduce this impact to a less–than-significant level. (Less than significant impact.)

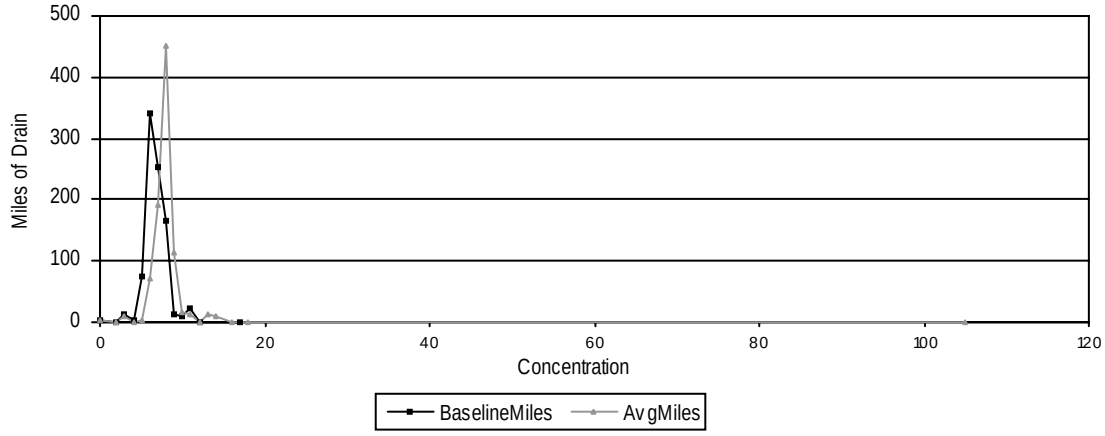
Impact A3-BR – 12. Changes in Water Quality in Drains Could Affect Wildlife. Alternative 3 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation under this Alternative. Similar to the Proposed Project, implementation of Alternative 3 (assuming water is conserved using on-farm irrigation system and water delivery system improvements) would increase average concentrations of dissolved water quality constituents (nitrate, selenium, TDS) and decrease concentrations of sediment-associated constituents (TSS, phosphorus, pesticides) relative to the No Project Alternative. In addition, Alternative 3 (assuming water is conserved using on-farm irrigation system and water delivery system improvements) would increase miles of drains with higher average selenium concentrations (Figures 3.2-19a, 3.2-19b, and 3.2-19c). If all the conserved water was generated with fallowing, there would be no change in water quality conditions as explained for Alternative 4. Thus, the magnitude of water quality changes under the Proposed Project would depend on the amount of water conserved through fallowing.

Alternative 3 would increase the miles of drain in which birds could experience selenium related hatchability effects relative to the No Project Alternative. Conservation of 230 KAFY using on-farm irrigation system (assumed to be 130 KAFY in this evaluation) and water delivery system improvements (assumed to be 100 KAFY) would result in hatchability effects along the equivalent of approximately 83 miles of drain, about 35 more miles than under the Baseline (Table 3.2-40). As under the Proposed Project, potential reductions in reproductive success from increased selenium concentrations constitute a potentially significant impact associated with the water conservation and transfer component of

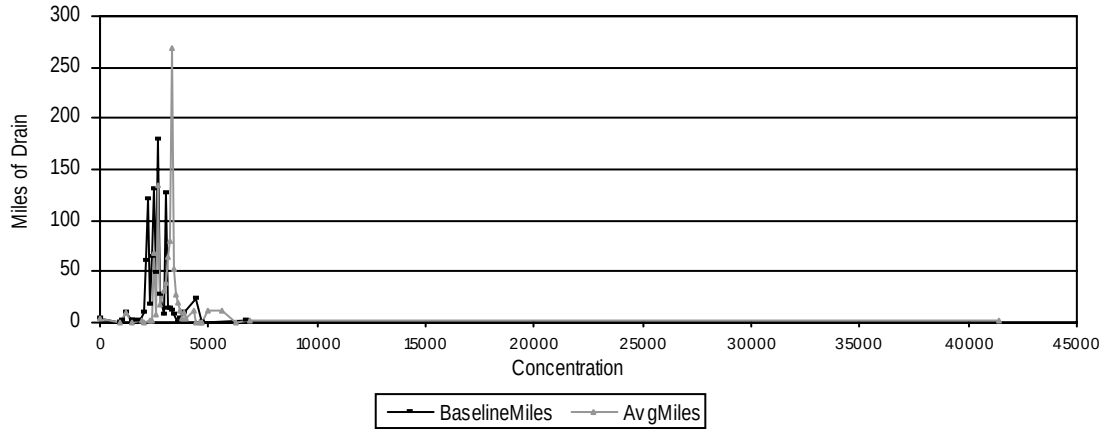
Alternative 3. With implementation of the HCP-IID component of Alternative 3, however, this potential impact would be less than significant. (Less than significant impact.)

Alternative 3 - 230K All Conservation Measures COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the Alamo River



TDS (mg/L) IID Surface Drain Discharge to the Alamo River



TSS (mg/L) IID Surface Drain Discharge to the Alamo River

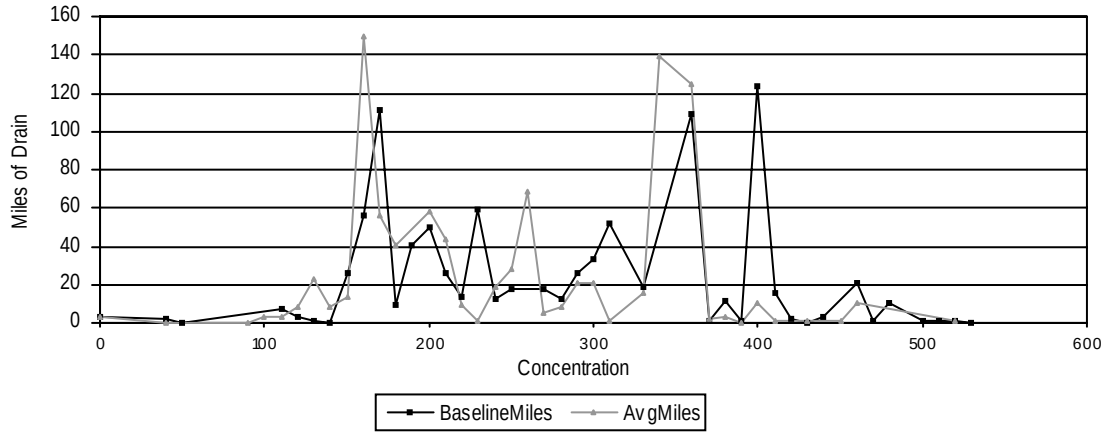
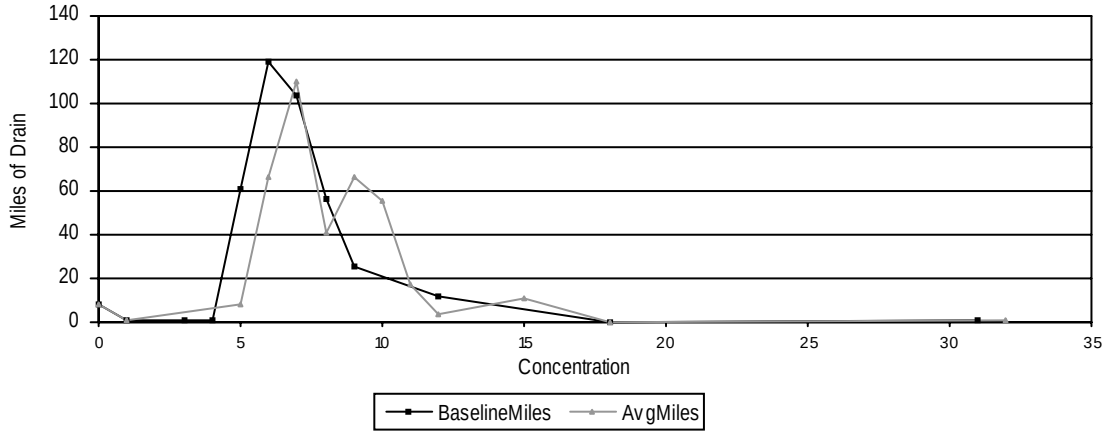


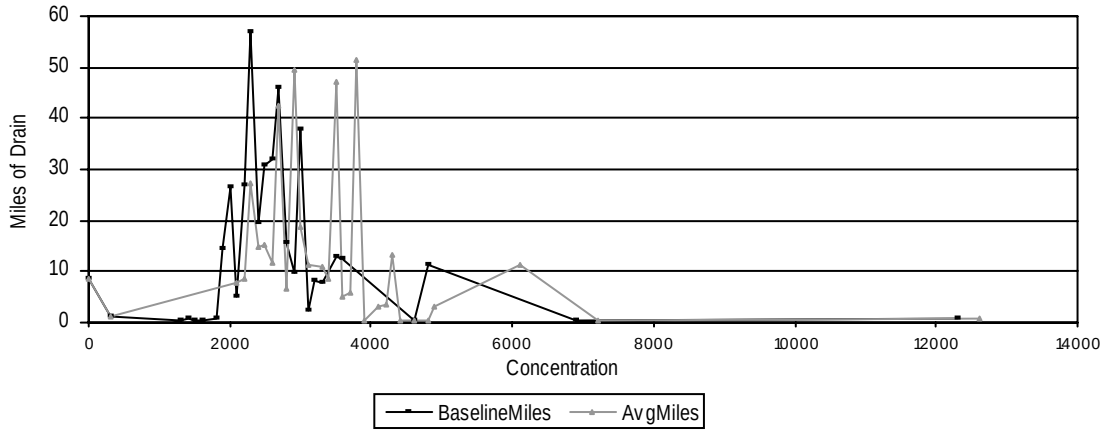
Figure 3.2-19a
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3 for Drains Discharging into the Alamo River

Alternative 3 - 230K All Conservation Measures COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the New River



TDS (mg/L) IID Surface Drain Discharge to the New River



TSS (mg/L) IID Surface Drain Discharge to the New River

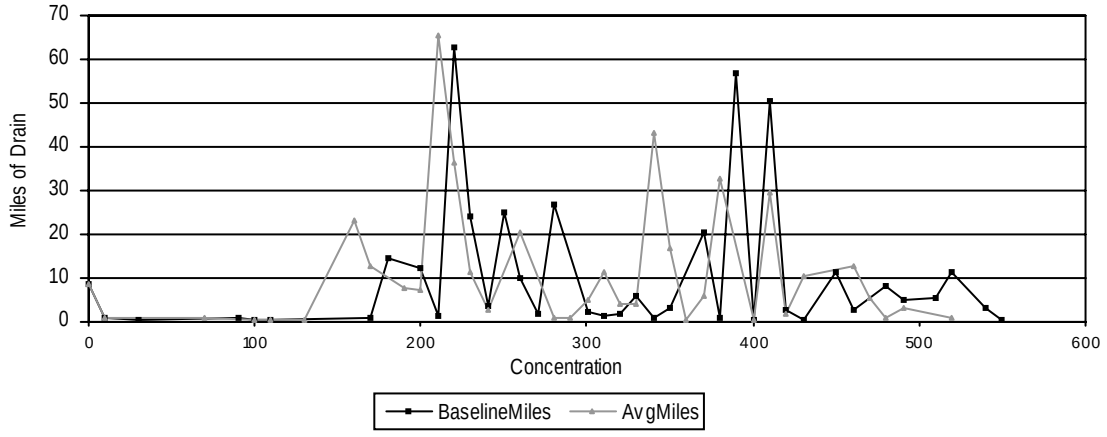
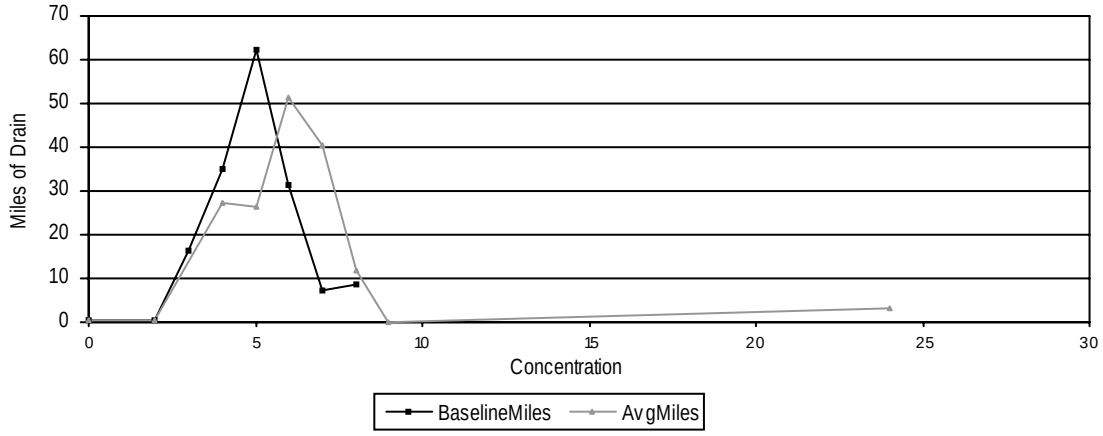


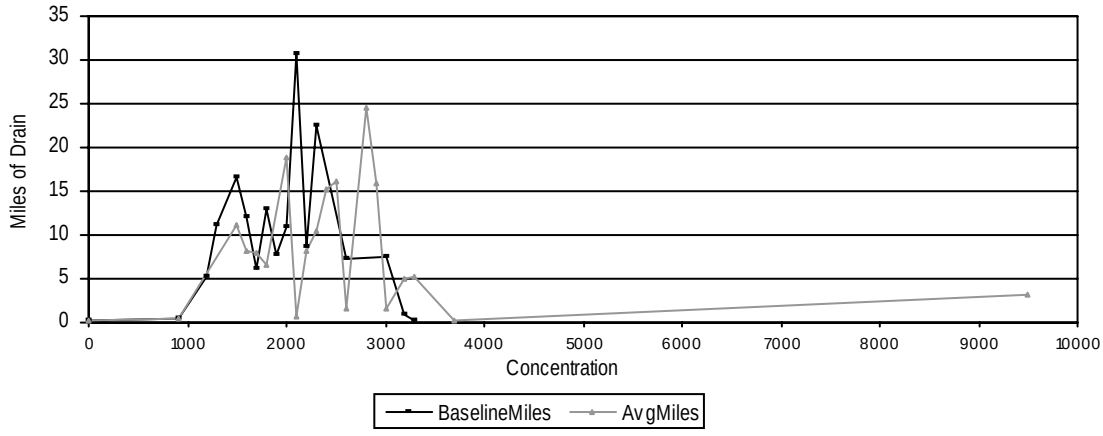
Figure 3.2-19b
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3 for Drains Discharging into the New River

Alternative 3 - 230K All Conservation Measures COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the Salton Sea



TDS (mg/L) IID Surface Drain Discharge to the Salton Sea



TSS (mg/L) IID Surface Drain Discharge to the Salton Sea

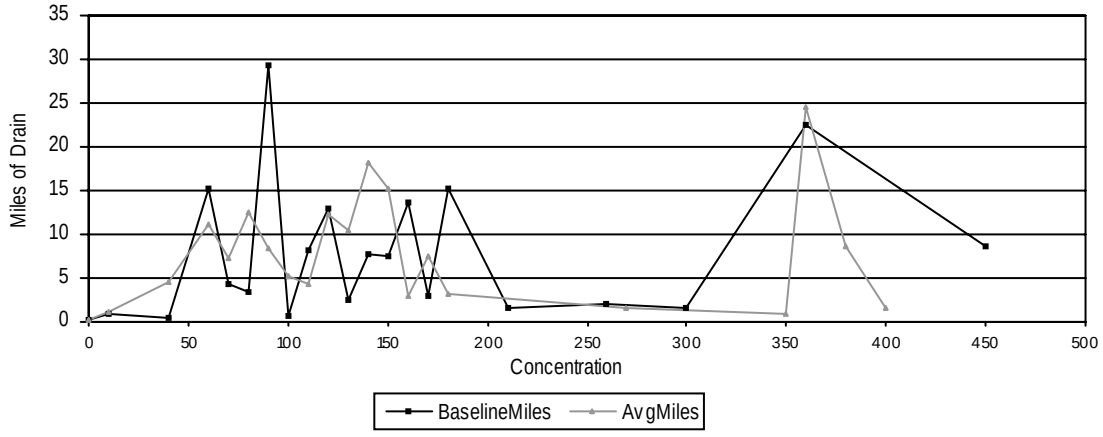


Figure 3.2-19c
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 3 for Drains Discharging into the Salton Sea

Impact A3-BR – 13. Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife. Under Alternative 3, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline condition, conservation of 230 KAF through only on-farm irrigation system and water delivery system improvements would reduce Alamo River discharge to the Sea by about 22 percent and New River discharge to the Salton Sea by about 20 percent (Table 3.2-41). If all fallowing is used to conserve water, then the percent reduction in flows in the Alamo and New Rivers would be 10 and 7 percent, respectively. Thus, depending on the amount of water conserved through fallowing, the percent reduction in Alamo River flows would be between 10 and 22 and in the New River between 7 and 20 percent relative to the Baseline. For the same reasons as described for the Proposed Project (see Impact BR-13), which would result in greater flow reductions in the rivers, changes in river flows under Alternative 3 would not substantially change the amount of tamarisk along the New or Alamo Rivers. Because the extent of tamarisk along the rivers would not change substantially, wildlife that use this habitat would not be substantially affected. Therefore, impacts to tamarisk along the rivers and wildlife potentially using this habitat would be less than significant. (Less than significant impact.)

Impact A3-BR –14. Installation of Seepage Recovery Systems Could Remove Tamarisk Scrub and Affect Associated Wildlife. Under Alternative 3, IID would conserve between 130 KAFY and 230 KAFY of water using on-farm irrigation system improvements, water delivery system improvements, or fallowing. Potential water delivery improvements include installation of seepage recovery systems along the East Highline Canal. As explained for the Proposed Project (see Impact BR – 14), subsurface recovery systems are proposed along the East Highline Canal where there is not an existing drain adjacent to the canal. About 13.2 miles of pipeline would be necessary if all of subsurface systems under consideration are installed, thus removing about 43 acres of vegetation. This amount constitutes about 10 percent of the estimated 412 acres of tamarisk scrub habitat supported in seepage areas adjacent to the East Highline Canal in the Proposed Project area. As explained for the Proposed Project, the loss of seepage community vegetation is a less than significant impact to wildlife habitat and wildlife. This potential effect would not occur if only on-farm irrigation system improvements or fallowing is used to conserve water under this Alternative. (Less than significant impact.)

Impact A3-BR – 15. Reservoir Construction Could Remove Tamarisk Scrub and Affect Associated Wildlife. Under Alternative 3, IID would conserve between 130 KAFY and 230 KAFY of water using on-farm irrigation system improvements, water delivery system improvements, or fallowing. Potential water delivery measures include installation of lateral interceptors. Locations for 16 lateral interceptor systems have been identified. These systems consist of a canal and a reservoir about 40 surface acres. Some of the reservoirs could be located close to the New or Alamo Rivers, and their construction could remove tamarisk scrub adjacent to these rivers. Up to 15 acres of tamarisk scrub could be removed to construct reservoirs associated with lateral interceptor systems. Tamarisk, a non-native, highly invasive plant, provides poor quality habitat to wildlife and has colonized many areas throughout the Proposed Project area. The small loss of tamarisk from installation of reservoirs would not adversely affect wildlife or wildlife habitat. (Less than significant impact.)

Impact A3-BR – 16. Installation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. Under Alternative 3, potential impacts to agricultural field habitat and wildlife from installation of on-farm Irrigation System Improvements would be similar to those under the Proposed Project. Installation of tailwater return systems could remove some agricultural land from production to accommodate tailwater ponds. Assuming that tailwater return systems can conserve about 0.5 acre-foot of water and an average farm is 80 acres, about 5,750 tailwater return systems would be needed to achieve 230 KAFY. Tailwater return ponds are typically 1 to 2 acres. Assuming each pond is 2 acres, up to about 11,500 acres of farmland could be removed from production for these systems.

Farmers typically locate tailwater return ponds in the least productive portions of their fields, particularly in areas farmed irregularly, so the actual loss in agricultural field habitat likely would be less than 11,500 acres in the extreme case that only tailwater return systems are used to conserve water under this Alternative. Tailwater return systems are installed when no crops are produced, typically during the summer. Because they would be installed when no crops are grown on the field, the potential for disturbance to wildlife would be limited.

Installing drip irrigation systems would require a minor amount of temporary ground disturbance, potentially disturbing wildlife. Drip systems would be installed between crops; therefore, no temporary or permanent changes in the amount of agricultural field habitat would occur.

Other on-farm Irrigation System Improvements require reconstructing / recontouring of an agricultural field. Wildlife using agricultural field habitat could be disturbed during the reconstructing / recontouring. However, because reconstructing / recontouring would be conducted when no crops are grown on the field, the potential for disturbance to wildlife is limited. The amount of agricultural field habitat would not change from reconstructing / recontouring agricultural fields to conserve water.

As described, installing an on-farm Irrigation System Improvement could reduce a small amount of agricultural field habitat and presents a minor potential for disturbance of wildlife. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land under Alternative 3 is considered a less than significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact A3-BR – 17. Operation of On-Farm Irrigation System Improvements Could Affect Wildlife Using Agricultural Fields. For the same reasons as explained for the Proposed Project (Impact BR-17), implementing on-farm Irrigation System Improvements would not change the suitability of agricultural fields as foraging habitat for bird species that forage in agricultural fields of the Imperial Valley under Alternative 3. (No impact.)

Impact A3-BR – 18. Installation of Water Delivery System Improvements Could Reduce the Acreage Agricultural Fields and Affect Associated Wildlife. Under Alternative 3, IID would conserve between at least 130 KAFY and 230 KAFY using on-farm irrigation system improvements, water delivery system improvements, or fallowing. Water delivery system improvements with the potential to eliminate agricultural field habitat are installation of lateral interceptors and construction of new reservoirs. These activities could remove about 8,630 acres of agricultural field habitat. Relative to the entire irrigated area of Imperial Valley that covers about 500,000 acres, this potential loss constitutes about 1.7 percent of the

agricultural land. Construction would not occur in agricultural fields under active production, so the potential for disturbance of species using this habitat would be minor. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less than significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact A3-BR – 19. Fallowing Could Reduce the Acreage Agricultural Fields and Affect Associated Wildlife. Under Alternative 3, between 130 KAFY and 230 KAFY of water would be conserved using on-farm irrigation system improvements, water delivery system improvements, or fallowing. Fallowing could reduce the acreage of irrigated agriculture available in the IID water service area at any one time. If only fallowing is used to generate the additional 230 KAFY of conserved water, about 38,300 acres of land would be needed. This acreage represents about 8 percent of the irrigated area in the IID water service area. Even with this reduction, agricultural field habitat would remain abundant in the IID water service area, consisting of about 483,000 acres remaining in agricultural production. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less than significant impact to wildlife and wildlife habitat. This potential effect would not occur if only on-farm irrigation system improvements and water delivery system improvements are used to conserve water. (Less than significant impact.)

Impact A3-BR – 20. Fallowing Would not Change the Amount of Desert Habitat. Fallowing could be used to generate some or all conserved water. Fallowing could include land retirement for the entire 75-year project duration or for shorter periods, ranging from a single season to several years. Land removed from agricultural production for a long time could be colonized by desert plants. The likelihood of desert plants becoming reestablished would be influenced by the proximity of the retired land to desert habitat, soil conditions, and rainfall, among others. Land retired for short periods of time probably would not be colonized by desert plants. Some fields in the Imperial Valley that have been out of agricultural production for many years do not support vegetation. The limited amount of vegetation that has developed consists of ruderal species, rather than native desert plant species. Thus, fallowing would not change the amount of desert habitat or otherwise affect wildlife associated with desert habitats. (No impact.)

Impact A3-BR – 21. Reduced Flows in Drains Could Affect Fish and Aquatic Habitat. Under Alternative 3, water conservation would reduce the amount of water in the drainage system (Table 3.2-42). Relative to the Baseline, conservation of 230 KAF through on-farm irrigation system improvements would reduce flow in the drains by about 21 percent. If all fallowing was used to conserve water, then the percent reduction in flows would be 9 percent. Thus, depending on the amount of water conserved through fallowing, the percent reduction in drain flows would be between 9 and 21 percent relative to the Baseline. For the same reasons as described for the Proposed Project (see Impact BR-21), which would result in greater flow reductions in the drains than this Alternative, reductions in drain flows under Alternative 3 would have a less than significant impact on fish and other aquatic resources in the drains. (Less than significant impact.)

Impact A3-BR – 22. Water Quality Changes in the Drains and Rivers Could Affect Fish and Aquatic Habitat. Alternative 3 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be

proportionately less because of the reduced level of water conservation. Similar to the Proposed Project, if all water was conserved using on-farm irrigation system and water delivery system improvements, Alternative 3 would increase average concentrations of dissolved water quality constituents (nitrate, selenium, TDS) and decrease concentrations of sediment-associated constituents (TSS, phosphorus, pesticides) relative to the No Project Alternative. Average salinity concentrations also would increase under Alternative 3 (assuming all water is conserved using on-farm irrigation system and water delivery system improvements) relative to the No Project Alternative. If all the conserved water was generated with fallowing, there would be no change in water quality conditions as explained for Alternative 4. Thus, the magnitude of water quality changes under Alternative 3 would depend on the amount of water conserved through fallowing. For the same reasons as described for the Proposed Project, the potential for increased selenium or salinity to reduce the reproductive success of fish in the drains and rivers is a less than significant impact. Impacts to desert pupfish are addressed under Impact A3-BR24. (Less than significant impact.)

Impact A3-BR – 23. Reduced Flows in the Rivers Drain Could Affect Fish and Aquatic Habitat. Under Alternative 3, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 230 KAF would reduce Alamo River discharge to the Sea by about 22 percent and New River discharge to the Salton Sea by about 20 percent. If all fallowing is used to conserve water, then the percent reduction in flows in the Alamo and New Rivers would be 10 and 7 percent, respectively. Thus, depending on the amount of water conserved through fallowing, the percent reduction in Alamo River flows would be between 10 and 22 and in the New River between 7 and 20 percent relative to the Baseline. For the same reasons as explained for the Proposed Project, under which flow reductions in the New and Alamo Rivers would be greater than under this Alternative, no significant impacts to fish or aquatic resources would result from flow reductions in these rivers under Alternative 3. (Less than significant impact.)

Impact A3-BR – 24. Reduced Flows in the Drains Could Affect Desert Pupfish. Desert pupfish inhabit drains that discharge directly to the Salton Sea. Under Alternative 3, conservation of 230 KAFY of water is predicted to reduce flow levels in these drains by 24 percent relative to the Baseline if only on-farm irrigation system and water delivery system improvements were used (Table 3.2-42). If all fallowing is used to conserve water, then the percent reduction in flows in drains that discharge directly to the Salton Sea from the IID water service area would be 7 percent. Thus, depending on the amount of water conserved through fallowing, the percent reduction in flows would between 7 and 24. As described for the Proposed Project, transfer of water to CVWD would increase flows in drains discharging directly to the Sea from CVWD's service area. The changes in flows in drains inhabited by pupfish would have the same effects qualitatively as those described for the Proposed Project, but the magnitude of potential effects would be less because of the smaller reduction in drain flows. Also, because water conservation would reduce the contribution of tailwater to the drainage system, water quality conditions in drains from the IID water service area would worsen. Changes in flow and water quality in the drains discharging directly to the Sea and supporting pupfish constitute a potentially significant impact of the water conservation and transfer component of the Alternative 3. However, implementation of the HCP-IID component of Alternative 3 would reduce this potential impact to a less than significant level. (Less than significant impact.)

Impact A3-BR – 25. Construction of Water Delivery System Improvements Could Affect Razorback Suckers. As explained for the Proposed Project, reduced flow volumes in the conveyance system would not adversely affect habitat for razorback suckers because the elevation of water in the canals is tightly controlled. However, under the Proposed Project, installation of some water delivery system improvements (e.g., canal lining) under Alternative 3 would require dewatering canals. If razorback suckers are in canals that are dewatered, they could be adversely affected. This is a potentially significant impact of the water conservation and transfer component of Alternative 3. However, implementation of the HCP-IID component of the Alternative 3 would avoid this potential effect. (Less than significant impact.)

Impact A3-BR – 26. Water Quality Changes in the Drains Could Affect Special-Status Species. Alternative 3 would have qualitatively similar effects on water quality as the Proposed Project, but the magnitude of the changes in water quality would be proportionately less because of the reduced level of water conservation. Therefore, adverse effects to special-status species inhabiting the drains (e.g., Yuma clapper rails and desert pupfish) would be similar to those described for the Proposed Project, but of slightly lesser magnitude. For the same reasons as described for the Proposed Project, potential impacts to special-status species from changes in water quality under Alternative 3 are a potentially significant impact associated with the water conservation and transfer component of this Alternative. However, implementation of the HCP-IID component of this Alternative would reduce this impact to a less than significant level. (Less than significant impact.)

Impact A3-BR – 27. Changes in Drain Habitat Could Affect Special-Status Species. As described under Impact A3-BR – 10, reduced flow in the drains would not significantly change the amount or species composition of vegetation in the drains. However, increased salinity of drainwater with water conservation and transfer would reduce cattail vegetation in the drains by a small amount. Cattails are preferred habitat for the Yuma clapper rail and provide habitat for other special-status species potentially using the drains. A reduction in cattails could adversely affect Yuma clapper rails and other special-status species using the drains. This effect constitutes a potentially significant impact of the water conservation and transfer component of Alternative 3. In addition to changes in physical habitat, increased selenium concentration in the drains under Alternative 3 could adversely affect Yuma clapper rails and other special-status species using the drains. These potential effects are addressed under Impact A3-BR – 26. The water quality changes also are a potentially significant impact of the water conservation and transfer component of Alternative 3. However, implementation of the HCP-IID component of Alternative 3 would reduce these potential impacts to less than significant levels. (Less than significant impact.)

Impact A3-BR – 28. Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species. Alternative 3 is not expected to substantially reduce the availability of tamarisk scrub supported by the agricultural drains or along the New and Alamo Rivers as a result of changes in flow or water quality. Installation of seepage recovery systems and lateral interceptors could eliminate about 58 acres of tamarisk scrub habitat. This small reduction in tamarisk scrub would not significantly adversely affect special-status species because (1) tamarisk is common and abundant throughout the project area, (2) tamarisk is of limited habitat quality, and (3) none of the special-status species depends on this habitat.

Construction of water delivery system improvements (e.g., reservoirs) has a minor potential to disturb special-status species using tamarisk scrub habitat. This potential disturbance

would not significantly affect special-status species because few species breed in the Proposed Project area when disturbance could result in nest abandonment or interfere with care of the young. During other periods, construction activities could flush special-status birds from tamarisk scrub. Because of the availability of other areas of tamarisk, birds flushed by construction could find alternative habitat, and no significant impacts would occur. (Less than significant impact.)

Impact A3-BR – 29. Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields. Many special-status species exploit agricultural fields for foraging, particularly during winter when many birds overwinter in the Imperial Valley. Special-status species frequenting agricultural fields for foraging include mountain plover, sandhill cranes, black terns, and white-faced ibis. Installation of on-farm irrigation system improvements implemented under Alternative 3 would require construction and ground disturbance. Installation of water delivery system improvements in agricultural fields would not adversely affect special-status species using this habitat because the conservation measures would be installed when crops are not grown, primarily in the summer. Special-status species predominantly occur in the Proposed Project area during the winter or as fall and spring migrants and predominantly use agricultural fields when they are in active production and irrigated.

As explained under Impacts A3-BR-16, A3-BR-17, A3-BR-18, and A3-BR-19, installation of on-farm irrigation system and water delivery system improvements or fallowing would not substantially reduce the availability of agricultural lands in the IID water service area. Thus, Alternative 3 would not significantly affect special-status species associated with agricultural fields. (Less than significant impact.)

Impact A3-BR – 30. Water Conservation Practices Could Affect Special-Status Species Associated with Desert Habitat. In the IID water service area, native desert habitat occurs adjacent to the East Highline, Westside Main, and AAC and portions of the Thistle and Trifolium Extension Canals. These areas represent the only locations where special-status species associated with desert habitat could occur in the Proposed Project area. The only features of the Alternative 3 that could affect desert habitat would be water delivery system improvements potentially involving construction (e.g., canal lining, reservoirs) along the canals adjacent to desert habitat. No regulating reservoirs, mid-lateral reservoirs, or canal lining are proposed along these canals. Seepage recovery systems could be installed along the East Highline Canal, but these systems would be constructed on the agricultural field side of the canal. Thus, no construction activities required for the water delivery system improvements would occur in desert habitat, and no significant impacts to special-status species would occur as a result of the water conservation and transfer component of Alternative 3. (Less than significant impact.)

Impact A3-BR – 31. Water Conservation Practices Could Affect Burrowing Owls. Alternative 3 would have similar effects on burrowing owls as the Proposed Project because similar water conservation practices would be used. For the same reasons as explained for the Proposed Project, Alternative 3 would not significantly affect burrowing owls (less than significant).

Fallowing could be used to generate a portion of the water conserved under Alternative 3. As explained in more detail for Alternative 4 under Impact A4-BR-13, fallowing could reduce the availability of insects on which burrowing owls prey. If fallowed fields are

concentrated in a few areas, some owls could abandon territories adjacent to fallowed fields. Because fallowing would be only one of many methods used to conserve water under Alternative 3 and because owls are not believed to be limited by prey availability in the Imperial Valley, it is not expected that a large enough acreage of fields would be fallowed to cause large numbers of owls to abandon territories. (Less than significant impact.)

Salton Sea Habitat Conservation Strategy (HCP-SS)

The Salton Sea Habitat Conservation Strategy includes supplying water to the Sea so as to maintain the salinity of the Salton Sea below 60 ppt until 2030.

As described above and in Section 2.2.6.7, the Salton Sea Habitat Conservation Strategy has been evaluated in this Final EIR/EIS with the assumption that mitigation water would be generated by fallowing within the IID water service area. Other sources of water could be used but they have not been evaluated in this EIR/EIS.

Additional details of the Salton Sea Habitat Conservation Strategy can be found in Section 2.2.6.7.

The amount of land that would need to be fallowed would depend on how water for transfer was conserved. If on-farm and/or system based conservation measures are used to conserve water for transfer, about 67,300 acres of land would need to be fallowed for mitigation water. This would reduce the amount of agricultural land by about 13 percent. Even with this reduction, agricultural fields would remain abundant at about 432,700 acres, and no significant adverse effects to biological resources would be expected. Section 3.8.6 of the HCP (Appendix C) provides information on the potential effects of the Salton Sea mitigation approach on special-status species.

As described in the Project Description, how mitigation water would be conveyed to the Salton Sea has not yet been specified. Potentially, the mitigation water could be transported via drains and rivers in the Imperial Valley. In this case, flows in the rivers and drains used to convey the water could approach levels under the Baseline. Alternatively, mitigation water generated through conservation in the IID water service area could be conveyed to the Salton Sea through channels other than the drains and rivers in the Imperial Valley. In this case, flows in the drains and rivers in the Imperial Valley would be reduced relative to Alternative 3 without implementation of the Salton Sea Habitat Conservation Strategy. Flow reductions relative to Baseline conditions would be greater with the Salton Sea Habitat Conservation Strategy. However, the response of biological resources to reduced flow levels in the rivers and drains would be the same as described for Alternative 3 without the Salton Sea Habitat Conservation Strategy (see Impacts A3-BR-10, A3-BR-13, A3-BR-16, A3-BR-21, and A3-BR-23). For the same reasons as described for the Proposed Project without implementation of the HCP, the impacts to vegetation and wildlife along the drains and rivers (see Impacts A3-BR-10 and A3-BR-13), and to fish and aquatic habitat in the drains and rivers (see Impacts A3-BR-21 and A3-BR-23), would be less than significant. However, like the Proposed Project without implementation of the Salton Sea Habitat Conservation Strategy, potentially significant impacts to desert pupfish could result from decreases in flow levels in drains that discharge directly to the Sea. Implementation of the Desert Pupfish Conservation Strategy under the HCP would reduce this potential impact to less than significant. (Less than signficant impact.)

Fallowing to generate mitigation water would not be expected to change the tail and tile water percentages in the drains. Therefore, water quality conditions in the drains (i.e., salinity and selenium concentrations) would not change substantially with implementation of the Salton Sea Habitat Conservation Strategy relative to Alternative 3 without the Salton Sea Habitat Conservation Strategy.

SALTON SEA

Water Conservation and Transfer

Impact A3-BR – 32. Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. With conservation of 230 KAFY through on-farm irrigation system and water delivery system improvements, the water surface elevation of the Sea would decline rapidly for the first 30 years. After this period, the water surface elevation would stabilize at about -246 ft msl, about 18 feet below the existing level (Figure 3.2-15). This reduction is similar to that projected under the Proposed Project, under which the water surface elevation would decline by about 22 feet. Thus, as explained for the Proposed Project, potential changes in tamarisk adjacent to the Salton Sea from reduced surface elevations under Alternative 3 would not be a significant impact. (Less than significant impact.)

Impact A3-BR–33. Increased Salinity Would Change Invertebrate Resources in the Salton Sea. The rate of salinization under Alternative 3 would be similar to the Proposed Project, and the effects on invertebrate resources in the Salton Sea from increased salinity would be the same as described under the Proposed Project. The exceedance of salinity thresholds for invertebrates in the Salton Sea under Alternative 3 is shown on Figure 3.2-16. As explained for the Proposed Project, the acceleration in the changes in the invertebrate community of the Salton Sea is not considered a significant impact. (Less than significant impact.)

Impact A3-BR – 34. Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. Alternative 3 would have the same effects on shorebirds and other waterbirds as the Proposed Project. As described for the Proposed Project, shorebirds using the Salton Sea also use Mono Lake where brine flies and shrimp provide the primary invertebrate food source. Because shorebirds would exploit brine flies and shrimp, the acceleration of the transition to an invertebrate community dominated by these species under Alternative 3 would have a less than significant impact on shorebirds. (Less than significant impact.)

Impact A3-BR – 35. Increased Salinity Would Reduce Fish Resources in the Salton Sea. The effects on fish resources in the Salton Sea from increased salinity are described under the Proposed Project. Under Alternative 3, salinity would increase and result in the same effects as described for the Proposed Project and the No Project Alternative. Conservation and transfer of 230 KAFY would reduce inflow to the Salton Sea and accelerate the rate of salinization relative to the No Project Alternative. The salinity thresholds for sargo, gulf croaker, and tilapia would be exceeded under this Alternative at about the same times as under the Proposed Project (Figure 3.2-17). Therefore, the effects to fish resources would be the same as described for the Proposed Project. (Less than significant impact.)

Impact A3-BR – 36. Reduced Fish Abundance Would Affect Piscivorous Birds. Under Alternative 3, the salinity tolerances of fish would be exceeded in about the same years as the Proposed Project. Therefore, Alternative 3 would have the same effects on piscivorous

birds as described for the Proposed Project. (Less than significant impact with implementation of the HCP-SS component.)

Impact A3-BR – 37. Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds. Alternative 3 would qualitatively have the same effects on selenium loading to the Salton Sea as the Proposed Project. For the same reasons as described for the Proposed Project (Impact BR-47), Alternative 3 would have no effect on exposure of fish and birds to selenium in the Salton Sea. (No impact.)

Impact A3-BR – 38. Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. Under Alternative 3, the rate and magnitude of reductions in the water surface elevation of the Salton Sea would be similar to the Proposed Project. Therefore, Alternative 3 would have the same impacts to colonial nest and roost sites as described for the Proposed Project. (Less than significant impact.)

Impact A3-BR – 39. Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. Under Alternative 3, the rate and magnitude of reductions in the water surface elevation of the Salton Sea would be similar to the Proposed Project. Under Alternative 3, the surface water elevation of the Salton Sea is projected to decline to –246 ft msl. This decline would reduce the perimeter of the Salton Sea from about 100 miles to about 83 miles, but the amount of shallow water habitat would increase from about 1,100 acres to 3,300 acres. Alternative 3 would have the same impacts on mudflat and shallow water habitat for shorebirds as described for the Proposed Project. (Less than significant impact.)

Impact A3-BR – 40. Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Under Alternative 3, the mean projections show the salinity of the Salton Sea exceeding 90 g/L in 2029. At this salinity, the Sea could become intolerable to pupfish and prevent them from moving among drains. If the Sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Small, isolated populations are at risk of extinction because of environmental and genetic stochasticity. Ultimately, this condition also would occur under the No Project Alternative, but at a later time. However, because of the large difference in when pupfish populations could be isolated between the No Project Alternative (not predicted to occur in the 75-year modeling period) and Alternative 3, this is a potentially significant impact. However, implementation of the HCP-SS component of Alternative 3 would reduce this impact to a less than significant level. (Less than significant impact.)

Salton Sea Habitat Conservation Strategy (HCP-SS)

The Salton Sea Habitat Conservation Strategy of the HCP implemented under Alternative 3 would be the same as under the Proposed Action, except that the volume of water supplied to the Sea under Salton Sea-1 would be lower because of the lower level of water conservation and transfer. Measures to address isolation of desert pupfish because of increased salinity (i.e., Salton Sea–2) and potential effects to tamarisk scrub habitat adjacent to the Sea because of a declining in Sea elevation (i.e., Salton Sea–3) would be the same as under the Proposed Project. Thus, the following evaluation addresses effects of providing mitigation water to the Salton Sea (i.e., Salton Sea–1) under Alternative 3.

Impact A3-HCP-SS-BR-41. Implementation of the HCP Would Avoid Conservation-induced Changes in Fish Resources and Impacts to Piscivorous Birds. As with implementation of the HCP under the Proposed Project, implementation of the HCP under Alternative 3 would avoid or minimize the potential for take of covered piscivorous birds resulting from implementation of the water conservation and transfer project by providing mitigation water to the Salton Sea sufficient to maintain salinity in the Sea at or below 60 ppt until the year 2030. The effects on fish resources and piscivorous birds with implementation of the HCP under Alternative 3 would be the same as those described for implementation of the HCP under the Proposed Project (see Impact HCP-SS-BR-52), but with slight differences in the years in which the salinity tolerances of the fish in the Salton Sea would be exceeded (see Figure 3.2-17a). With the Salton Sea Habitat Conservation Strategy, the impacts to piscivorous birds from reduced fish abundance attributable to the Alternative 3 (see Impact A3-BR-36) would be offset. (Less than significant impact.)

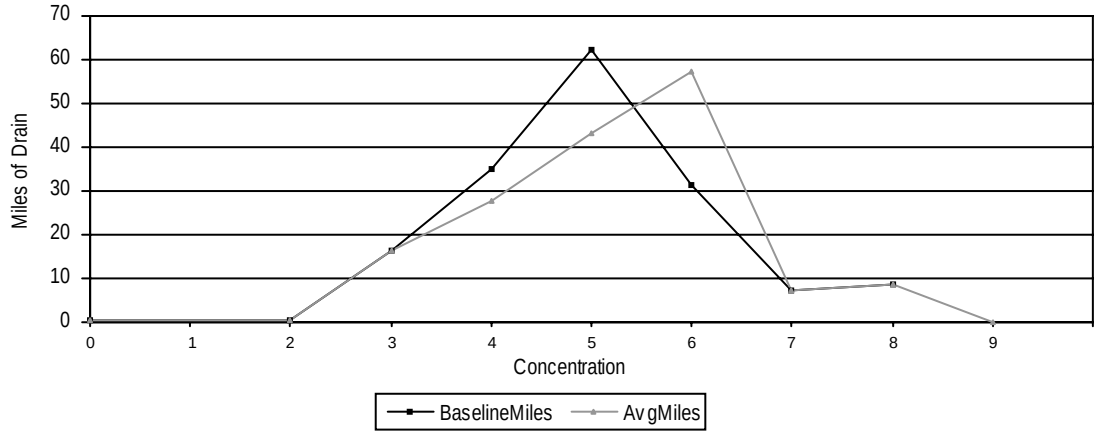
Impact A3-HCP-SS-BR–42. Implementation of the HCP Would Benefit Colonial Nesting and Roosting Birds. As described for the Proposed Project, implementation of the Salton Sea Conservation Strategy of the HCP under Alternative 3 would benefit colonial nesting and roosting birds by maintaining the water surface elevation of the Sea higher than under the Baseline until about 2035 (see Impact HCP-SS-BR-53). With implementation of the Salton Sea Conservation Strategy under Alternative 3, the surface elevation of the Sea is projected to fall 2 feet below the present elevation of -228 feet msl by 2016 and 3 feet by 2032. Under the Baseline, the Sea is projected to fall 2 feet by 2010 and 3 feet by 2015. Thus, islands and trees used by colonial birds for nesting and roosting would remain surrounded by water for a longer period of time (up to 17 years) than under the Baseline. (Beneficial impact.)

Impact A3-HCP-SS-BR-43. Implementation of the HCP Would Delay Changes in the Invertebrate Community of the Salton Sea and Responses of the Shorebird and Other Waterbird Communities From Water Conservation and Transfer. Implementation of the Salton Sea Conservation Strategy would delay the changes in the invertebrate community and the responses of the shorebirds and other waterbirds using the Salton Sea described for the water conservation and transfer project (see Impacts A3-BR-33 and A3-BR-34). Figure 3.2-17c shows the years in which the salinity tolerance of invertebrates in the Salton Sea would be exceeded under the Baseline and Alternative 3 with the HCP. For the same reasons as described for the Proposed Project (see Impacts BR-43 and BR-44), changes in the invertebrate and bird communities using this resource would be less than significant. (Less than significant impact).

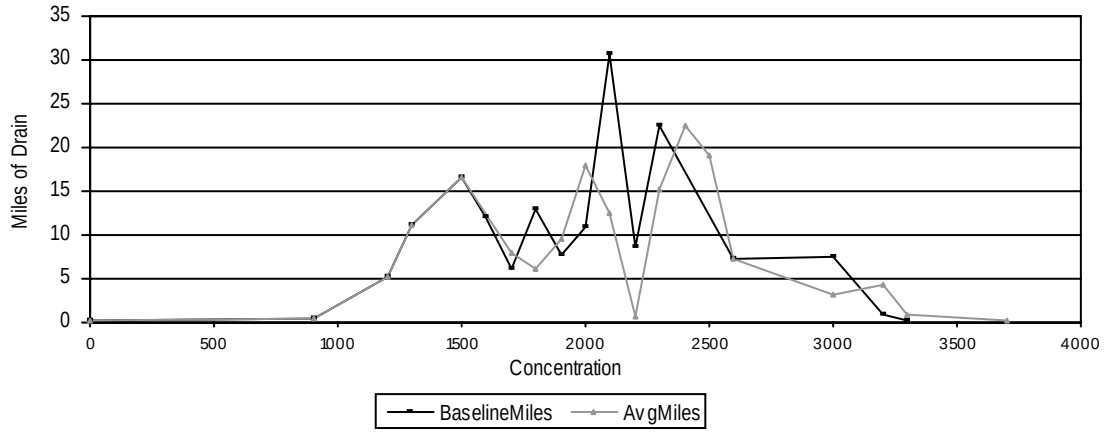
Impact A3-HCP-SS-BR-44. The Acreage of Mudflat and Shallow Water Habitat Could Change with Implementation of the HCP. As described under Impact A3-BR-39, the acreage of mudflat and shallow water habitat likely will change as the elevation of the Salton Sea declines. Under the HCP, the surface water elevation would decline at a slower rate than projected under the Baseline until 2030, after which the rate of decline would increase (Figure 3.2-17b). The lowest water surface elevation the Salton Sea is projected to reach under Alternative 3 (using on-farm and / or water delivery system conservation measures) is about -246 ft msl with implementation of the HCP, about 11 feet lower than under the Baseline. Based on the bathymetric data from the University of Redlands, under the Baseline, the perimeter of the Salton Sea is projected to fall from the existing length of 100 miles to 95 miles, and the acreage of shallow water habitat (< 1 foot deep) is projected to increase from the existing

Alternative 2 - 130K On-Farm COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the Salton Sea



TDS (mg/L) IID Surface Drain Discharge to the Salton Sea



TSS (mg/L) IID Surface Drain Discharge to the Salton Sea

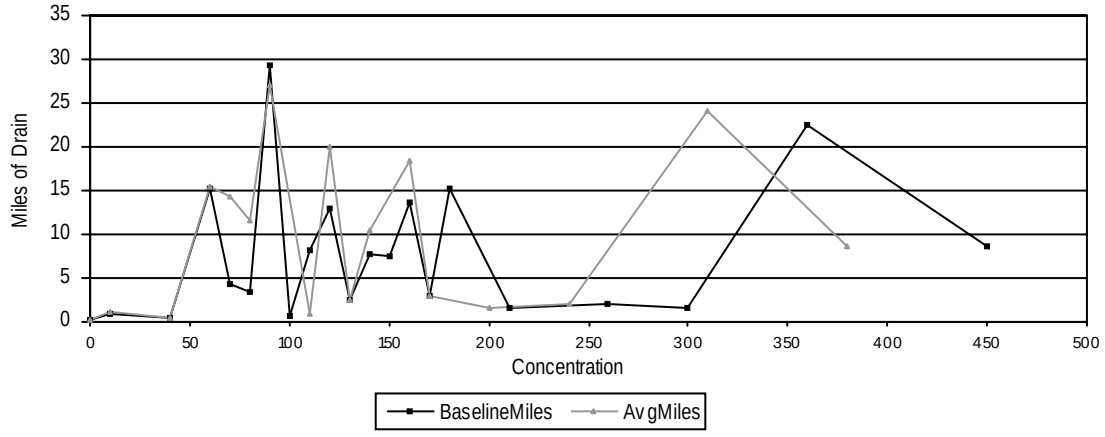


Figure 3.2-18c
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 2 for Drains Discharging into the Salton Sea

amount of 1,100 acres to about 3,600 acres. At the elevation of –246 ft msl projected at the end of the project with implementation of the HCP, the perimeter of the Salton Sea would be about 82 miles and the acreage of shallow water habitat would be about 3,200 acres. Changes in the availability of mudflat and shallow water habitat would be the same as described for Proposed Project (see Impact BR-49) and would not result in significant impacts. (Less than significant impact.)

3.2.4.7 Alternative 4 (A4): Water Conservation and Transfer of Up to 300 KAFY to SDCWA, CVWD, and/or MWD (Fallowing as Exclusive Conservation Measure)

LOWER COLORADO RIVER

Water Conservation and Transfer

Under Alternative 4, IID would conserve 300 KAF of water per year for transfer to the SDCWA service area, CVWD service area, or MWD service area. Water would be conserved only through fallowing. The water conserved by the IID water service area would be diverted at Parker Dam rather than at Imperial Dam.

This change in the point of diversion from Imperial Dam to Parker Dam would reduce the water surface elevation and adjacent groundwater elevation in the LCR between Parker and Imperial Dams. Because the method of water conservation would not influence the flow levels resulting in the LCR, the effects of this Alternative on biological resources are the same as for the Proposed Project. As under the Proposed Project, Reclamation would implement conservation measures so impacts to biological resources along the LCR would be less than significant.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

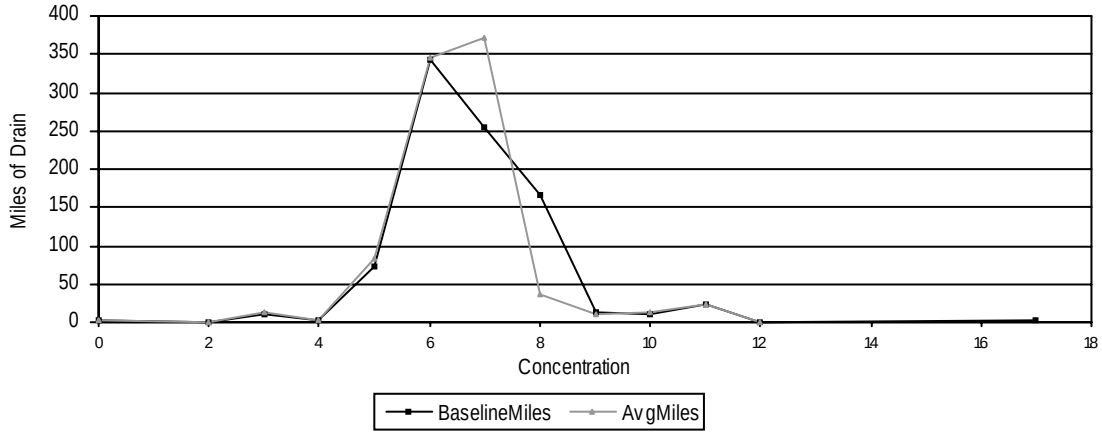
Impact A4-BR – 1. Reduced Flows in the Drains Could Alter Drain Vegetation and Affect Wildlife. Under Alternative 4, 300 KAFY would be conserved through fallowing. Flows in the drains would be reduced by about 9 percent relative to the No Project Alternative. For the same reasons as described for the Proposed Project, which would result in greater flow reductions in the drains, changes in drain flows under Alternative 4 would not substantially change the amount or composition of drain habitat. Because drain vegetation would not change substantially, wildlife using the drains would not be substantially affected. Therefore, changes in drain habitat and wildlife using drain habitat would be less than significant. (Less than significant impact.)

Impact A4-BR – 2. No Change in Salinity in the Drains Would Occur. Under Alternative 4, conservation of 300 KAFY of water through Fallowing would not change salinity levels in the drains. Therefore, this Alternative would not change the acreage or vigor of cattails in the drains. (No impact.)

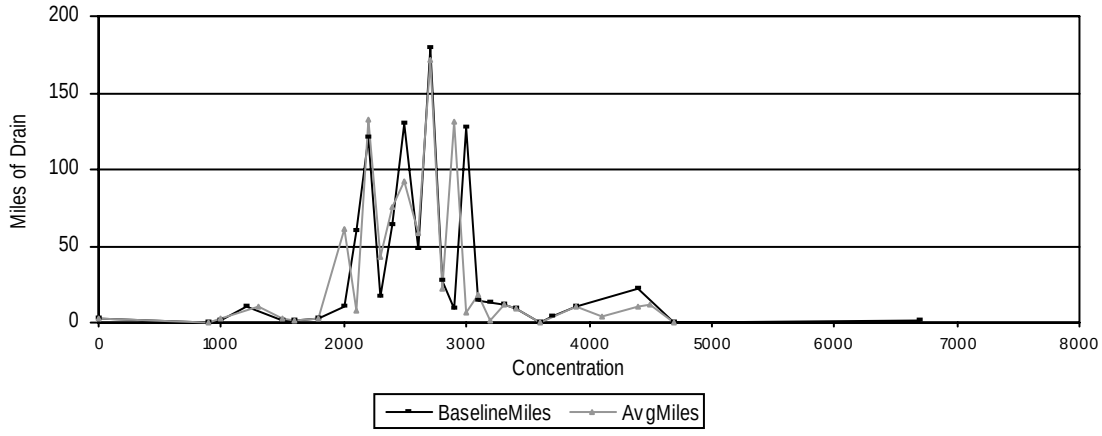
Impact A4-BR – 3. No Adverse Effects to Fish or Wildlife in the Drains and Rivers Would Occur from Water Quality Changes. Under Alternative 4, only fallowing would be used to conserve water for transfer. Fallowing would reduce the overall amount of water in the drains but would not change the relative proportions of tailwater and tilewater. As such, fallowing would not change or would slightly improve the concentrations of water quality constituents in the drains and rivers relative to the Baseline (see Figures 3.2-20a, 3.2-20b, and

Alternative 4 - 300K Fallowing Only COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the Alamo River



TDS (mg/L) IID Surface Drain Discharge to the Alamo River



TSS (mg/L) IID Surface Drain Discharge to the Alamo River

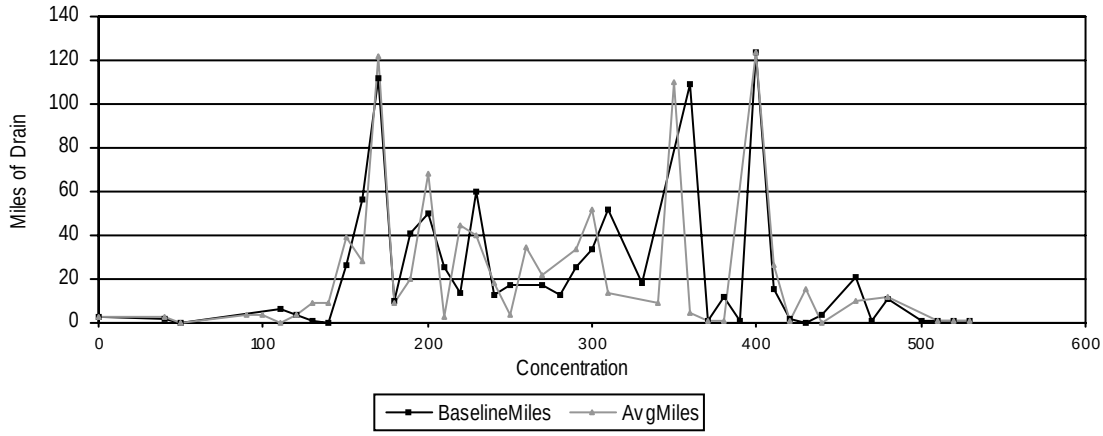
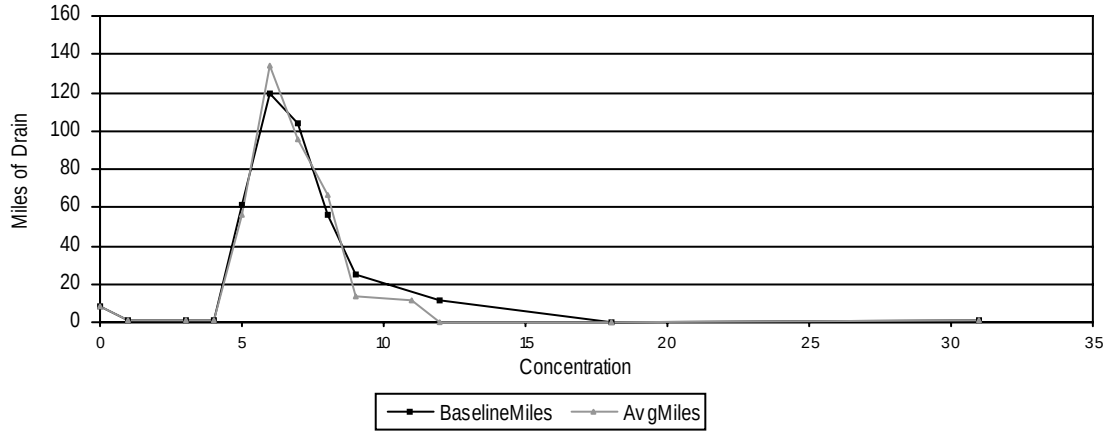


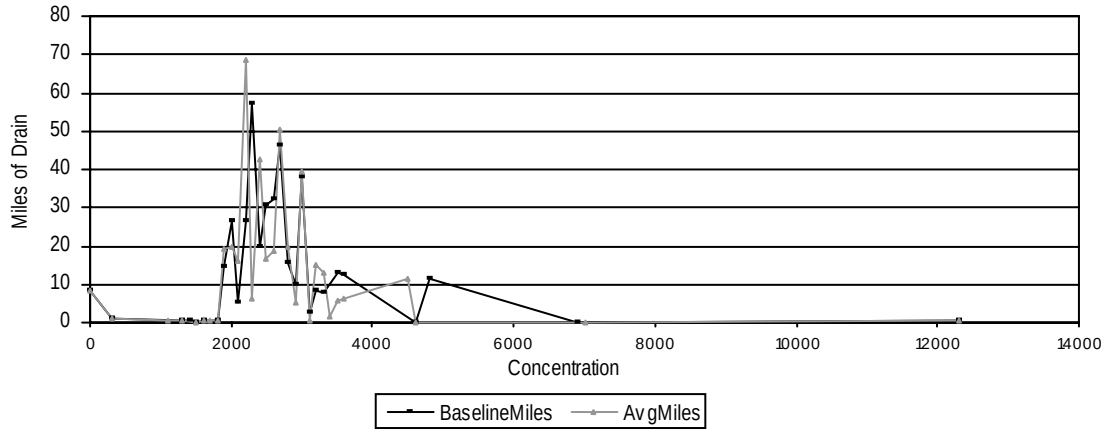
Figure 3.2-20a
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 4 for Drains Discharging into the Alamo River

Alternative 4 - 300K Fallowing Only COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the New River



TDS (mg/L) IID Surface Drain Discharge to the New River



TSS (mg/L) IID Surface Drain Discharge to the New River

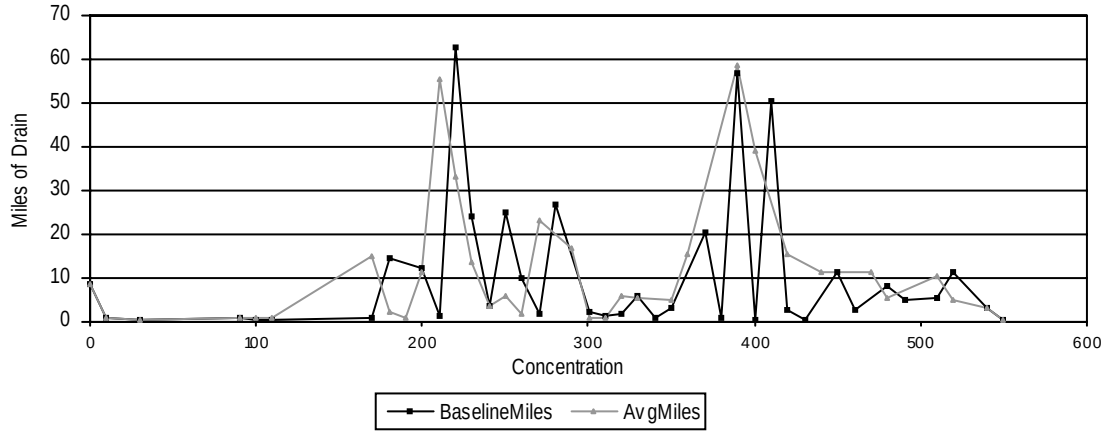
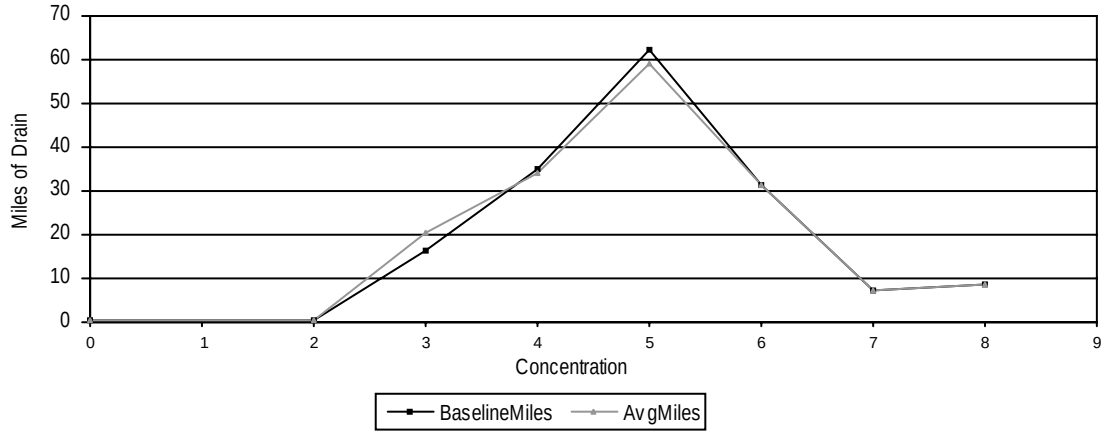


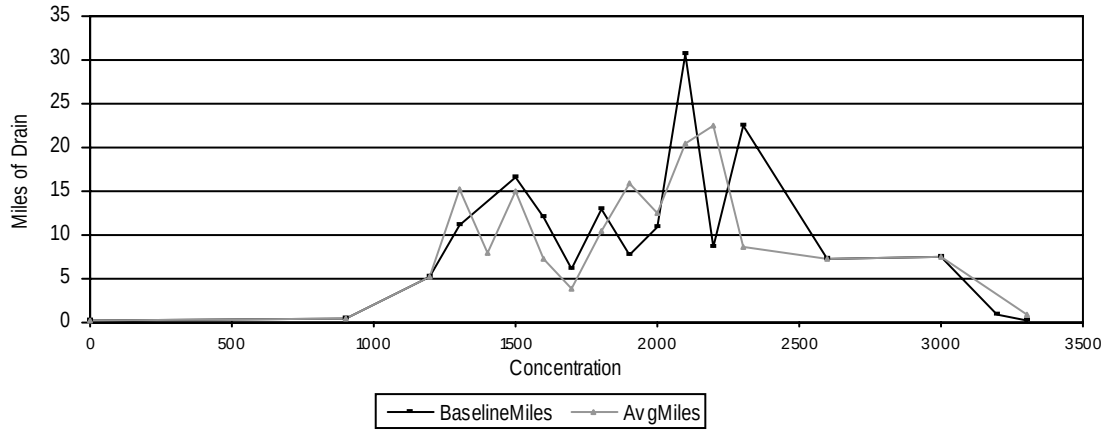
Figure 3.2-20b
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 4 for Drains Discharging into the New River

Alternative 4 - 300K Fallowing Only COC Concentration per Miles of Drain in IID 12-Year Model Run

Selenium (µg/L) IID Surface Drain Discharge to the Salton Sea



TDS (mg/L) IID Surface Drain Discharge to the Salton Sea



TSS (mg/L) IID Surface Drain Discharge to the Salton Sea

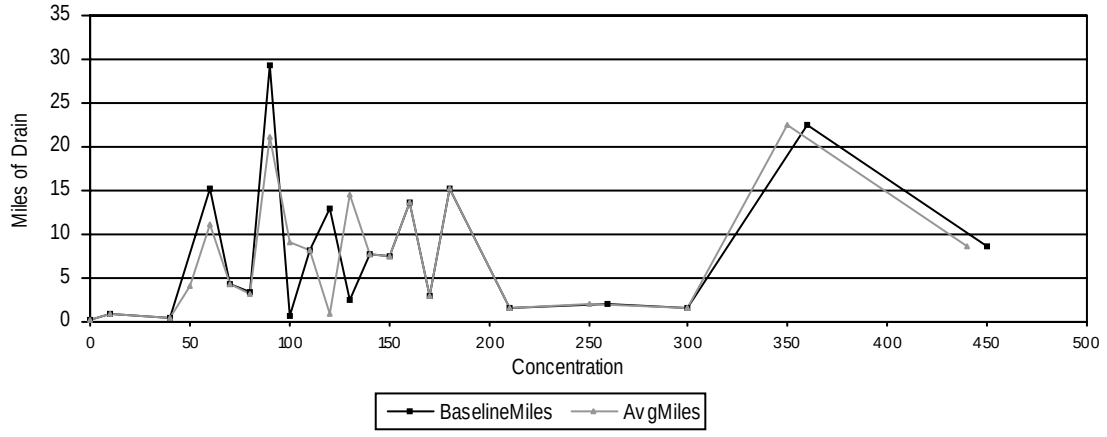


Figure 3.2-20c
Miles of Drains at Average Concentrations of Selenium, TDS, and TSS under Alternative 4 for Drains Discharging into the Salton Sea

3.2-20c). Alternative 4 would decrease slightly the miles of drain in which birds could experience selenium-related hatchability effects relative to the Baseline. Conservation of 300 KAFY through fallowing would result in hatchability effects along the equivalent of approximately 46 miles of drain, about 2 fewer miles than under the Baseline (Table 3.2-40).

Therefore, relative to the Baseline, Alternative 4 would not adversely affect biological resources from changes in water quality and could have modest beneficial effects. (No impact.)

Impact A4-BR – 4. Reduced Flows in the Rivers Could Alter Vegetation and Affect Wildlife. Under Alternative 4, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 300 KAFY through fallowing would reduce Alamo River discharge to the Sea by about 10 percent and New River discharge by about 7 percent (Table 3.2-41). For the same reasons as described for the Proposed Project (see Impact BR-13, which would result in greater flow reductions in the rivers), changes in river flows under Alternative 4 would not substantially change the amount of tamarisk along the New or Alamo Rivers. Because the extent of tamarisk along the rivers would not change substantially, wildlife that use this habitat would not be substantially affected. Therefore, impacts to tamarisk along the rivers and wildlife potentially using this habitat would be less than significant. (Less than significant impact.)

Impact A4-BR – 5. Fallowing Would Not Change the Acreage of Agricultural Fields. Under Alternative 4, 300 KAFY of water would be conserved through fallowing. Fallowing could reduce the acreage of irrigated agriculture available in the IID water service area at any one time. About 50,000 acres of land would be needed to conserve 300 KAFY of water. This acreage represents about 10 percent of the irrigated area in the IID water service area. Even with this reduction, agricultural field habitat would remain abundant in the IID water service area, consisting of about 450,000 acres remaining in agricultural production. Because agricultural field habitat is abundant in the Imperial Valley, the potential loss of some agricultural land is considered a less than significant impact to wildlife and wildlife habitat. (Less than significant impact.)

Impact A4-BR – 6. Fallowing Would Not Change the Amount of Desert Habitat. Under Alternative 4, fallowing could include land retirement for the entire 75-year project duration or for shorter periods, ranging from a single season to several years. Land taken out of agricultural production for a long time could be colonized by desert plants. The likelihood of desert plants becoming reestablished would be influenced by the proximity of the retired land to desert habitat, soil conditions, and rainfall, among others. Land retired for short periods of time probably would not be colonized by desert plants. Some fields in the Imperial Valley that have been out of agricultural production for many years do not support vegetation. The limited amount of vegetation that has developed consists of ruderal species rather than native desert plant species. Thus, fallowing would not change the amount of desert habitat or otherwise affect wildlife associated with desert habitats. (No impact.)

Impact A4-BR – 7. Reduced Flows in Drains Could Affect Fish and Aquatic Habitat. Under Alternative 4, water conservation would reduce the amount of water in the drainage system (Table 3.2-42). Relative to the Baseline, conservation of 300 KAFY through fallowing would reduce flow in the drains by about 9 percent. For the same reasons as described for the Proposed Project (see Impact BR-21, which would result in greater flow reductions in the

drains than this Alternative), reductions in drain flows under Alternative 4 would have a less than significant impact on fish and other aquatic resources in the drains. (Less than significant impact.)

Impact A4-BR – 8. Reduced Flows in the Rivers Drain Could Affect Fish and Aquatic Habitat. Under Alternative 4, water conservation would reduce flows in the New and Alamo Rivers. Relative to the Baseline, conservation of 300 KAFY would reduce Alamo River discharge to the Sea by about 10 percent and New River discharge to the Salton Sea by about 7 percent. For the same reasons as explained for the Proposed Project, under which flow reductions in the New and Alamo Rivers would be greater than under this Alternative, no significant impacts to fish or aquatic resources would result from flow reductions in these rivers under Alternative 4. (Less than significant impact.)

Impact A4-BR – 9. Reduced Flows in the Drains Could Affect Desert Pupfish. Desert pupfish inhabit drains that discharge directly to the Salton Sea. Conservation of 300 KAFY of water through fallowing is predicted to reduce flow levels in these drains in the IID water service area by 7 percent relative to the Baseline (Table 3.2-42). If water is transferred to CVWD, flows in drains inhabited by pupfish would increase in drains in the CVWD service area. The changes in flows in drains inhabited by pupfish would have the same effects qualitatively as those described for the Proposed Project, but the magnitude of potential effects in drains in the IID water service area would be less because of the smaller reduction in drain flows. Changes in flow in the drains in the IID water service area that discharge directly to the Sea and that support pupfish constitute a potentially significant impact of the water conservation and transfer component of Alternative 4. However, implementation of the HCP-IID component of Alternative 4 would reduce this potential impact to a less than significant level. (Less than significant impact.)

Impact A4-BR – 10. Changes in Drain Habitat Could Affect Special-Status Species. As described under Impacts A4-BR – 1 and BR-2, Alternative 4 would not significantly change the amount or species composition of vegetation in the drains. Therefore, no significant impacts to special-status species associated with drain habitat would occur under this Alternative. (Less than significant impact.)

Impact A4-BR – 11. Changes in the Tamarisk Scrub Habitat Could Affect Special-Status Species. Alternative 4 would not change the amount of tamarisk in the Imperial Valley, and no construction in tamarisk would disturb special-status species. Because there would be no change in the amount of potential habitat, Alternative 4 would not affect special-status species associated with tamarisk scrub habitat. (No impact.)

Impact A4-BR – 12. Water Conservation Practices Could Affect Special-Status Species Associated with Agricultural Fields. Many special-status species exploit agricultural fields for foraging, particularly during winter when many birds overwinter in the Imperial Valley. Special-status species frequenting agricultural fields for foraging include mountain plover, sandhill cranes, black terns, and white-faced ibis. Fallowing would reduce the amount of agricultural land in active production. As explained under Impact A4-BR-5, fallowing would not substantially reduce the availability of agricultural lands in the IID water service area. Thus, Alternative 4 would not significantly affect special-status species associated with agricultural fields. (Less than significant impact.)

Impact A4-BR – 13. Water Conservation Practices Could Affect Burrowing Owls. Burrowing owls forage in and adjacent to agricultural fields. Insects are their primary prey, but small mammals are also taken. Fallowing would remove agricultural land from production and could reduce the availability of insects and small mammals in the localized area of the fallowed field. The overall potential effects of fallowing on burrowing owls are uncertain.

Currently, farmers fallow fields for one or more seasons for a number of reasons such as poor market conditions or to improve the land by removing it temporarily from production. As such, fallowing is part of the existing condition, and burrowing owls have persisted in the Imperial Valley with fallowing. However, under Alternative 4, a greater amount of land could be fallowed than is currently fallowed. Burrowing owls are not limited by food availability in the Imperial Valley (Rosenberg and Haley 2001). If fallowed lands are equally distributed throughout the valley so all territories had only a small reduction in potential foraging habitat, fallowing would not likely reduce prey availability to an extent that would reduce reproductive success or adult survival. If fallowed fields are concentrated in a few areas, some burrowing owls would potentially abandon territories near the fallowed fields, if alternative foraging areas are not available.

If burrows are limited, and fallowing reduces prey availability to a degree that causes owls to abandon territories, some owls might not reestablish a territory elsewhere. Whether or not burrows are a limited resource for owls in the Imperial Valley is uncertain. Although the potential effects of fallowing on owls are unclear, for this evaluation, the potential loss of territories is considered a potentially significant impact of the water conservation and transfer component of the Alternative 4. Under the HCP-IID, IID would conduct a demographic study and long-term relative abundance monitoring, which would allow a determination of the trajectory of burrowing owl population. If the population was found to be declining, measures would be implemented to address this decline. Thus, with implementation of the HCP-IID component of Alternative 4, this potential impact would be less than significant. (Less than significant impact.)

Salton Sea Habitat Conservation Strategy (HCP-SS)

The Salton Sea Habitat Conservation Strategy includes supplying water to the Sea so as to maintain the salinity of the Salton Sea below 60 ppt until 2030. If fallowing was used as the sole method of providing mitigation water, about 30,500 acres of land would need to be fallowed to satisfy the requirements of the Salton Sea Habitat Conservation Strategy under this Alternative. This acreage would be in addition to the approximately 50,000 acres required to generate water for transfer. Thus, this Alternative would reduce the amount of agricultural land by about 80,500 acres which constitutes about 16 percent. Even with this reduction, agricultural fields would remain abundant at about 419,500 acres, and no significant adverse effects to biological resources would be expected. Section 3.8.6 of the HCP (Appendix C) provides information on the potential effects of the Salton Sea mitigation approach on special-status species.

As described in the Project Description, how mitigation water would be conveyed to the Salton Sea has not yet been specified. Potentially, the mitigation water could be transported via drains and rivers in the Imperial Valley. In this case, flows in the rivers and drains used to convey the water could approach levels under the Baseline. Alternatively, mitigation water generated in the Imperial Valley could be conveyed to the Salton Sea through channels other than the drains and rivers in the Imperial Valley. In this case, flows in the

drains and rivers in the Imperial Valley would be reduced relative to Alternative 4 without implementation of the Salton Sea Habitat Conservation Strategy. Flow reductions relative to Baseline conditions would be greater than Alternative 4 without the Salton Sea Habitat Conservation Strategy. However, the response of biological resources to reduced flow levels in the rivers and drains would be the same as those described for Alternative 4 without the Salton Sea Conservation Strategy (see Impacts A4-BR-1, A4-BR-4, A4-BR-7, A4-BR-8, and A4-BR-9). For the same reasons as described for the Proposed Project without implementation of the HCP, the impacts to vegetation and wildlife along the drains and rivers (see Impacts A4-BR-1 and A4-BR-4), and to fish and aquatic habitat in the drains and rivers (see Impacts A4-BR-7 and A4-BR-8), would be less than significant. However, like the Proposed Project without implementation of the Salton Sea Habitat Conservation Strategy, potentially significant impacts to desert pupfish could result from decreases in flow levels in drains that discharge directly to the Sea. Implementation of the Desert Pupfish Conservation Strategy under the HCP would reduce this potential impact to less than significant.

If mitigation water is generated by fallowing within the IID water service area, fallowing to generate mitigation water would not be expected to change the tail and tile water percentages in the drains. Therefore, water quality conditions in the drains (i.e., salinity and selenium concentrations) would not change substantially with implementation of the Salton Sea Habitat Conservation Strategy relative to Alternative 4 without the Salton Sea Habitat Conservation Strategy.

SALTON SEA

Water Conservation and Transfer

Impact A4-BR – 14. Reduced Sea Elevation Could Affect the Acreage of Adjacent Wetlands Dominated by Tamarisk and Shoreline Strand. With conservation of 300 KAFY under Alternative 4, the water surface elevation of the Salton Sea would decline and stabilize after about 30 years at about –240 ft msl, about 5 feet lower than under the No Project Alternative. As described for the No Project Alternative, there is uncertainty regarding changes in the amount of tamarisk adjacent to the Salton Sea as the water surface elevation declines, and it is not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas. Although it is not possible to predict the magnitude of change in the amount of tamarisk adjacent to the Salton Sea under Alternative 4, a reduction in the amount of tamarisk would not be a significant impact because (1) tamarisk is an invasive, non-native species of poor habitat quality for wildlife, (2) no special-status species are dependent on tamarisk, and (3) the magnitude of changes would be the same under Alternative 4 and the No Project Alternative because the reduction in surface elevation would be similar under the two Alternatives. (Less than significant impact.)

Impact A4-BR – 15. Increased Salinity Would Change Invertebrate Resources in the Salton Sea. The effects on invertebrate resources in the Salton Sea from increased salinity were described under the Proposed Project. Under Alternative 4, salinity would increase and result in the same effects as described for the Proposed Project and the No Project Alternative. The exceedance of salinity thresholds for invertebrates in the Salton Sea under Alternative 4 is shown on Figure 3.2-16. Under Alternative 4, the salinity thresholds for rotifers and pileworms would be exceeded in the same years as under the No Project Alternative. For the copepods and barnacles, the thresholds would be exceeded 6 to 28 years earlier (Figure 3.2-16). For the same reasons described for the Proposed Project, the

acceleration in the changes in the invertebrate community of the Salton Sea is not considered a significant impact. (Less than significant impact.)

Impact A4-BR – 16. Changes in the Invertebrate Community Could Affect Shorebirds and Other Waterbirds. As described for the Proposed Project and No Project Alternative, shorebirds using the Salton Sea also use Mono Lake, where brine flies and shrimp provide the primary invertebrate food source. Because shorebirds would exploit brine flies and shrimp, the acceleration of the transition to an invertebrate community dominated by these species under Alternative 4 would have a less than significant impact on shorebirds. (Less than significant impact.)

Impact A4-BR – 17. Increased Salinity Would Reduce Fish Resources in the Salton Sea. The effects on fish resources in the Salton Sea from increased salinity are described under the Proposed Project. Under Alternative 4, salinity would increase and result in the same effects as described for the Proposed Project and the No Project Alternative. With conservation of 300 KAFY through fallowing, sargo would be exceeded in 2008, the same year it is predicted to be exceeded under the Baseline (Figure 3.2-17). For gulf croaker and tilapia, their reproductive salinity thresholds would be exceeded in 2012 and 2017, respectively. Relative to the No Project Alternative, the threshold for croaker would be exceeded 3 years earlier, and for tilapia 6 years earlier. As explained for the Proposed Project, it is uncertain how much longer corvina will reproduce, and gulf croaker could be lost earlier than suggested by the exceedance of their life cycle salinity tolerance, if pileworm abundance declines.

Under both the No Project Alternative and Alternative 4, the salinity of the Salton Sea would rise and exceed levels at which fish species inhabiting the Sea could reproduce. For gulf croaker and tilapia, the thresholds could be exceeded 3 to 6 years earlier under Alternative 4 resulting in earlier declines in these two species. For the same reasons as described for the Proposed Project, this acceleration is a less than significant impact to fish resources of the Salton Sea. (Less than significant impact.)

Impact A4-BR – 18. Reduced Fish Abundance Would Affect Piscivorous Birds. Alternative 4 would increase the rate of salinization relative to the No Project Alternative and the occurrence of the resultant effects to fish resources and piscivorous birds. The exceedances of salinity thresholds for fish in the Salton Sea under Alternative 4 are shown on Figure 3.2-17. With 300 KAFY of conservation through fallowing, the mean salinity would exceed 60 g/L in 2017, 6 years earlier than under the No Project Alternative. Adverse impacts to piscivorous birds would therefore occur earlier under Alternative 4 relative to the No Project Alternative. The earlier occurrence of adverse effects to piscivorous birds is considered a potentially significant impact of the water conservation and transfer component of the Proposed Project. With implementation of the HCP-SS component of the Proposed Project, however, this impact would be less than significant. (Less than significant impact.)

Impact A2-BR – 19. Changes in Selenium in the Salton Sea Would Not Affect Fish and Birds. Alternative 4 would have similar qualitative effects on selenium loading to the Salton Sea as the Proposed Project. For the same reasons as described for the Proposed Project (Impact BR-47), Alternative 4 would have no effect on exposure of fish and birds to selenium in the Salton Sea. (No impact.)

Impact A4-BR – 20. Reduced Sea Elevation Could Affect Colonial Nest/Roost Sites. Under the No Project Alternative, the water surface elevation is projected to fall 2 feet from its current elevation of -228 feet msl by 2010 and 3 feet by 2015. This reduction in surface elevation would connect islands —including Mullet Island, used by ground-nesting birds for nesting and roosting —to the mainland (Figure 3.2-15). Alternative 4 would accelerate this effect by a few years. With conservation of 300 KAFY through fallowing, the surface water elevation would drop by 2 feet and 3 feet, 2 and 4 years earlier than under the No Project Alternative, respectively. Snags used by herons and egrets would be similarly affected. For the same reasons as described for the Proposed Project, effects to nesting sites of colonial-nesting birds would be less than significant. (Less than significant impact.)

Impact A4-BR – 21. Reduced Sea Elevation Could Affect the Availability of Mudflat and Shallow Water Habitat. Alternative 4 would have the same effects on mudflat and shallow water habitat for shorebirds as described for the No Project Alternative. Under Alternative 4, the water surface elevation would decline rapidly for the first 30 years after which the rate of decline would slow. The water surface elevation would reach about –240 feet msl at the end of the modeling period, about 5 feet lower than the Baseline. This decline would reduce the perimeter of the Salton Sea from about 100 miles to about 87.5 miles as compared to 95 miles projected to occur under the No Project Alternative. The amount of shallow water habitat would increase under Alternative 4 from about 1,100 acres to 4,900 acres. Alternative 4 would have similar effects on shallow water/mudflat habitat as described for the Proposed Project. (Less than significant impact.)

Impact A4-BR – 22. Increased Salinity Could Isolate Drains Supporting Desert Pupfish. Under Alternative 4, the salinity of the Salton Sea is projected to exceed 90 g/L in 2051. At this salinity, pupfish might not be able to move among drains via the Salton Sea. The salinity of the Sea is not projected to exceed this salinity level in 75 years under the No Project Alternative. As explained for the Proposed Project, if the Sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Although, this condition also would eventually occur under the No Project Alternative, but at a later time, the acceleration of the occurrence of the condition by at least 25 years is a potentially significant impact of the water conservation and transfer component of Alternative 4. With implementation of the HCP-SS component of Alternative 2, this impact would be less than significant. (Less than significant impact.)

Salton Sea Habitat Conservation Strategy (HCP-SS)

The Salton Sea Habitat Conservation Strategy of the HCP implemented under Alternative 4 would be the same as under the Proposed Action. Measures to address isolation of desert pupfish because of increased salinity (i.e., Salton Sea–2) and potential effects to tamarisk scrub habitat adjacent to the Sea because of a decline in Sea elevation (i.e., Salton Sea–3) would be the same as under the Proposed Project. Thus, the following evaluation addresses effects of providing mitigation water to the Salton Sea (i.e., Salton Sea–1) under Alternative 4.

Impact A4-HCP-SS-BR-23. Implementation of the HCP Would Avoid Conservation-induced Changes in Fish Resources and Impacts to Piscivorous Birds. As with implementation of the HCP under the Proposed Project, implementation of the HCP under Alternative 4 would avoid or minimize the potential for take of covered piscivorous birds resulting from implementation of the water conservation and transfer project by conserving additional

water and allowing that water to flow to the Salton Sea. The amount of water allowed to flow to the Sea would be sufficient to maintain salinity in the Sea at or below 60 ppt until the year 2030. The effects on fish resources and piscivorous birds with implementation of the HCP under Alternative 4 would be the same as those described for implementation of the HCP under the Proposed Project (see Impact HCP-SS-BR-52). With the HCP, the impacts to piscivorous birds from reduced fish abundance attributable to Alternative 4 (see Impact A4-BR-18) would be offset. (Less than significant impact.)

Impact A4-HCP-SS-BR–24. Implementation of the HCP Would Benefit Colonial Nesting and Roosting Birds. As described for the Proposed Project, implementation of the Salton Sea Habitat Conservation Strategy of the HCP under Alternative 4 would benefit colonial nesting and roosting birds by maintaining the water surface elevation of the Sea higher than under the Baseline until about 2035 (see Impact HCP-SS-BR-53). With implementation of the Salton Sea Habitat Conservation Strategy under Alternative 4, the surface elevation of the Sea is projected to fall 2 feet from its present elevation of -228 feet msl by 2012, and 3 feet by 2024. Under the Baseline, the Sea is projected to fall 2 feet by 2010 and 3 feet by 2015. Thus, islands and trees used by colonial birds for nesting and roosting would remain surrounded by water for a longer period of time (up to 11 years) than under the Baseline. (Beneficial impact.)

Impact A4-HCP-SS-BR-25. Implementation of the HCP Would Delay Changes in the Invertebrate Community of the Salton Sea and Responses of the Shorebird and Other Waterbird Communities From Water Conservation and Transfer. Implementation of the Salton Sea Conservation Strategy would delay the changes in the invertebrate community and the responses of the shorebirds and other waterbirds using the Salton Sea described for the water conservation and transfer project (see Impacts A4-BR-15 and A4-BR-16). Figure 3.2-17c shows the years in which the salinity tolerance of invertebrates in the Salton Sea would be exceeded under the Baseline and Alternative 4 with the HCP. For the same reasons as described for the Proposed Project (see Impacts BR-43 and BR-44), changes in the invertebrate and bird communities using this resource would be less than significant. (Less than significant impact.)

Impact A4-HCP-SS-BR-26. The Acreage of Mudflat and Shallow Water Habitat Could Change with Implementation of the HCP. As described under Impact A4-BR-21, the acreage of mudflat and shallow water habitat likely will change as the elevation of the Salton Sea declines. Under the HCP, the surface water elevation would decline at a slower rate than projected under the Baseline until 2030, after which the rate of decline would increase (Figure 3.2-17b). The water surface elevation of the Salton Sea is projected to reach about -240 ft msl with implementation of the HCP, about 5 feet lower than under the Baseline. Based on the bathymetric data from the University of Redlands, under the Baseline, the perimeter of the Salton Sea is projected to fall from the existing length of 100 miles to 95 miles, and the acreage of shallow water habitat (< 1 foot deep) is projected to increase from the existing amount of 1,100 acres to about 3,600 acres. At the elevation of –240 ft msl projected at the end of the project with implementation of the HCP, the perimeter of the Salton Sea would be about 87 miles and the acreage of shallow water habitat would be about 4,900 acres. Changes in the availability of mudflat and shallow water habitat would be the same as described for Proposed Project (Impact BR-49) and would not result in significant impacts. (Less than significant impact.)