Exhibit 2

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
2730 Loker Avenue West
Carlsbad, California 92008

In Reply Refer To:
FWS-WRIV-2102.3

JUL 0 1 2002

Colonel Richard G. Thompson
District Engineer
U.S. Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Attn: Alex Watt, Environmental Coordinator

Re: Biological Opinion for the Prado Dam Water Conservation and Supply Study, Orange, Riverside, and San Bernardino Counties, California

Dear Colonel Thompson:

This document transmits our biological opinion based on our review of the proposed Prado Dam Water Conservation and Supply Study and its effects on federally threatened and endangered species and their critical habitats, in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The biological opinion considers the possible effects of the proposed action on the federally endangered least Bell's vireo (*Vireo bellii pusillus*, "vireo") and its designated critical habitat, endangered southwestern willow flycatcher (*Empidonax traillii extimus*, "flycatcher"), and threatened Santa Ana sucker (*Catostomus santaanae*, "sucker"). Your July 3, 2001, letter requesting the initiation of formal consultation on the revised project was received by us on July 10, 2001.

This biological opinion is based on information provided in the May 2001, *Draft Biological Assessment for the Prado Dam Water Conservation and Supply Study* (Draft BA), site visits, and correspondence, notes and information compiled during the course of our consultation with your agency (Corps) and the project proponent, Orange County Water District (District). This information and other references cited in this biological opinion constitute the best available scientific information on the status and biology of the species considered. The complete administrative record for this consultation is on file at the Carlsbad Fish and Wildlife Service Office (CFWO).

Consultation History

We have consulted informally with the Corps since November 1998 and provided draft and revised draft Fish and Wildlife Coordination Act Reports (dated November 18, 1999, and March

22, 2001, respectively) for use in planning for this project. Meetings attended by the Corps, District and CFWO to discuss the project and measures to offset project-related effects to federally listed species and their habitats were held in 1999 on July 1 and December 12; in 2000 on April 25, August 2, August 9, August 19, October 11, November 21; and in 2001 on January 9 and October 24. Since many of our biological concerns with this water conservation project were related to our concerns with the Santa Ana River Mainstem Project (Mainstem), we encouraged the Corps to postpone consultation on this project until the issuance of the biological opinion on Mainstem. However, the Corps requested initiation of formal consultation, which was begun on July 10, 2001, prior to issuance of the Mainstem biological opinion on December 5, 2001. We requested an extension of formal consultation to allow time for completion of the Mainstem biological opinion and review of requested biological and hydrological information. We provided a draft project description of the proposed action to the Corps and District on January 10, 2002, and held a telephone conference call on Janaury 29, 2002, to discuss the proposed conservation measures outlined in the draft project description. We held a telephone conference call with the District on February 5, 2002, to further discuss proposed conservation measures, and a second draft project description was provided to the Corps and District on February 11, 2002. The District responded to the second draft project description by telephone on February 19, 2002. Formal consultation was extended to Friday, April 19, 2002, by agreement of the Corps via electronic mail on March 27, 2002. We provided our draft biological opinion on Monday, April 22, 2002. We received your response to the draft and request for a final biological opinion on June 26, 2002.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The general area of the Prado Basin is divided by the Riverside and San Bernardino county lines, while the Orange County line is downstream of the Basin. Prado Dam was built just downstream of the confluences of Chino, Mill, and Temescal creeks with the Santa Ana River. The water flow in much of the Santa Ana River is perennial due to inputs of stormwater, urban runoff, and treated wastewater discharge into the river and several tributaries. The area immediately surrounding Prado Basin is a matrix of agriculture, residential and commercial development, and open space.

Prado Dam is a 106-foot-high rolled-earthfill structure with a current crest elevation of 566 feet above mean sea level. Its detached concrete spillway crests at 543 feet. When constructed, the dam provided flood protection for a 100-year flood event. However, with increased urban runoff from the surrounding area and accumulated sediment behind the dam, the flood control capacity of the dam has been reduced. In 1988, the Corps issued a Main Report and Supplemental Environmental Impact Statement of the Phase II General Design Memorandum for the Santa Ana River Mainstem Project (Corps 1988) that outlined construction plans, including increasing the dam height by about 28 feet and spillway height by 20 feet and other improvements to the dam outlet structures and spillway that would improve the dam's capacity to control flooding in a 190-year flood event. The dam and spillway-raising portion of the project has not yet been built, but in Reach 8 downstream of the dam, concrete drop structures and bank protection have been completed.

Water conservation, in addition to flood control, has taken place at Prado Dam since at least the late 1960s. Water conservation retains excess water behind the dam for regulated release that allows the District to percolate the discharge in their downstream spreading basins. Water retention levels and impact minimization measures associated with current water conservation practices were outlined in biological opinions issued by the U.S. Fish and Wildlife Service (Service) in 1993, 1995, and 2000 (Biological Opinion 1-6-93-F-7 dated February 25, 1993, Biological Opinion 1-6-95-F-28 dated April 20, 1995, and Biological Opinion 1-6-99-F-75 dated February 10, 2000). Current agreements permit water to be pooled to an elevation of 494 feet during the flood season (October 1 through the end of February) and to 505 feet during the non-flood season (March 1 to September 30). During the non-flood season, the District must release a flow equal to the maximum recharge capacity of the downstream basins or a running average of 500 cubic feet per second (cfs), whichever is greater. Water must be released at a greater flow rate if the water level exceeds 505 feet, to get the water's elevation back at or below 505 feet as quickly as possible.

Impact minimization measures by the District and Corps for currently implemented water conservation included monetary contributions to establish a conservation fund used to remove the non-native invasive plant *Arundo donax* ("arundo") from the Santa Ana River watershed, the creation of riparian habitat, establishment of a vireo and flycatcher monitoring program, and implementation of brown-headed cowbird (*Molothrus ater*, "cowbird") trapping in Prado Basin. These measures were to offset the anticipated loss of half the function and value to habitat between 494 and 505 feet. In addition, the consultation required that, if vireo or flycatcher nests were imperiled by impounded water up to 505 feet, District personnel would relocate nests to higher elevations to prevent loss of eggs or nestlings. Incidental take for the vireo from the current water conservation project included harm to 90 pairs from alteration to habitat from impounded water. Impacts to the sucker, which was federally listed on April 12, 2000 (65 FR 19686), were not addressed in previous biological opinions.

This opinion addresses the incremental effects from additional water conservation during the flood season for vireo and flycatcher and the full project effects on the sucker. All conservation measures and terms and conditions of previous biological opinions on water conservation (i.e., Biological Opinion 1-6-93-F-7 dated February 25, 1993, Biological Opinion 1-6-95-F-28 dated April 20, 1995, and Biological Opinion 1-6-99-F-75 dated February 10, 2000) remain in effect and are not superceded by this opinion.

The proposed Prado Dam Water Conservation and Supply Study would implement changes to the current water conservation practices. The Corps examined eight project alternatives that proposed holding water at differing levels depending on time of year and whether Mainstem construction to raise Prado Dam had been completed. The Corps asked CFWO to examine two proposed alternatives; one for operation prior to dam-raising construction and the Corps' National Economic Development (NED) post-construction alternative.

The pre-construction alternative would permit water elevation levels to 498 feet (a 4-foot increase from the current 494 foot level) during the flood season and to 505 feet (the current level) during the non-flood season. This inundation at 498 feet is an annual average increase of 13.8 percent over the current water conservation practice. Water release rates from the dam for 5-year to 50-year floods would be 5,000 cfs, which is the current capacity of the outflow structures. The life of this alternative is anticipated to be 2 to 3 years; that is, until Mainstem construction is completed.

The Corps' NED post-construction alternative would allow a maximum pool level during the flood season of 498 feet and 505 feet during the non-flood season, the same levels as in the pre-construction alternative above. However, water release rates with the upgraded outflow structures in the dam would be 5,000 cfs during a 5-year to 10-year flood; 8,760 cfs during a 25-year flood; and 18,500 cfs during a 50-year flood. Maximum release through the gates will be 30,000 cfs. The life of this alternative is anticipated to be 50 years, once Mainstem construction is completed.

Both of these alternatives would increase inundation at the 498 foot level by an annual average of 13.8 percent (a 4-day increase over the current 29 days of inundation). The acreage between 494 and 498 feet is 219.6 acres, of which one-half of the value and function has been offset under prior water conservation agreements; thus, 109.8 acres may be additionally affected by increased inundation from this project. A 13.8 percent increase in effects to 109.8 acres equates to 15.2 acres of additional inundation effects within the Basin that were not offset through prior water conservation agreements. In addition, 22 acres of riparian habitat will be affected downstream of the Basin through water releases necessitated by the increased elevation. Therefore, a total of 37.2 acres of riparian habitat will be affected by either alternative.

The following conservation measures have been proposed to offset project-related effects to vireo and its critical habitat, flycatcher, and sucker:

1. With concurrence from CFWO, the Corps and/or District will acquire and protect in perpetuity via a conservation easement 37.2 acres within Prado Basin for restoration of riparian habitat prior to implementation of either alternative. This acreage is calculated from 37.2 acres of impact at a 1:1 ratio. The restoration will be done outside of areas that are already mitigation areas. A detailed map that delimits the restoration area will be provided to CFWO. To accomplish restoration of the acquired acreage:

a. Compensation to the Santa Ana River Conservation Trust Fund (SARCTF) for restoration, maintenance, and management in perpetuity of the 37.2 acres will be made in the amount of $25,000 per acre for a total of $930,000. This compensation will be made on or before the time of implementation of the habitat restoration plan. SARCTF will provide a detailed report to CFWO annually on the use of these funds for this restoration area.

b. A detailed habitat restoration plan for the 37.2-acre restoration site will be submitted to CFWO and California Department of Fish and Game (CDFG) for review and concurrence within three months of implementation of either the pre- or post-construction project alternative. The Corps will notify CFWO in writing of the date of implementation of either the pre- or post-construction project alternative and identify the date that the restoration plan will be submitted to CFWO and CDFG. The habitat restoration plan implementation will begin as soon as possible after CFWO and CDFG concurrence on the plan, with restoration activities conducted between September 15 and March 15 of each calendar year unless specifically authorized to do otherwise by CFWO and CDFG.

If it is necessary to conduct weeding or other restoration and/or creation activities outside of this period, then authorizations from CFWO and CDFG will be obtained in advance to preclude the unauthorized take of federally listed species which is increasingly likely as the restored/created habitat matures. The restoration plan must, at a minimum, include the following components: 1) plant material and seed mix; 2) planting and seeding methods; 3) salvage methods for vegetation and topsoil; 4) preparation of sites and implementation of planting; 5) a proposed monitoring and reporting schedule; and 6) remediation measures to be implemented if initial restoration efforts are unsuccessful.

c. The Corps and/or the District will notify CFWO and CDFG via written report when restoration and/or creation efforts in a given area are deemed successful by your agency based on the success criteria in the restoration plan. Each report must include quantitative evidence that the structure and composition of the revegetated area is statistically similar (i.e., not significantly different) to habitat occupied by vireos in the vicinity or other willow woodland habitats with understory as characterized by Zembal *et al.* (1985) and Zembal (1986). If the success criteria have been completely satisfied, then CFWO will concur in writing that restoration and/or creation requirements for that given area have been successfully attained.

d. The Corps and/or the District will ensure that all lands in the designated restoration area are not used for any purpose that would change or otherwise interfere with their value as wildlife habitat or a wildlife corridor (e.g., erect permanent or temporary structures, night lighting, or facilitate the ingress of domestic animals, exotic animals, or non-native plants).

e. The taking and use of cuttings from willow riparian, riparian scrub, marsh, or aquatic habitats will be prohibited except with the prior approval of CFWO and CDFG. Also, all water conveyance infrastructure in restoration areas and adjacent areas will be constructed and operated to avoid the flooding of vireo habitat in the action area. Imported water, including water used for irrigation, will not be allowed to flood or otherwise degrade existing or replacement habitats.

f. The use of rodenticides, herbicides, insecticides, or other chemicals that could potentially harm federally listed species will be prohibited.

2. The Corps and/or District will monitor vireo territories in Prado Basin within the 498 to 505 foot elevation for a 5-year period beginning with implementation of either project alternative. The baseline number of vireo territories within this area will be submitted to CFWO for review and concurrence at the beginning of project implementation. Should the number of vireo nesting territories show a statistically significant ($\alpha \leq 0.05$) decline over the 5-year period within these elevations, then the Corps and/or District will restore and protect in perpetuity an additional 37.2 acres of riparian habitat within Prado Basin and provide funding at a level to adequately implement, monitor, manage and assure success of that restored habitat area.

3. The Corps and District will commit to ongoing vireo and flycatcher population monitoring within the Prado Basin for the life of the project. Termination of monitoring will be subject to mutual agreement by the Corps, District, and CFWO. The District will make available one

existing vireo monitor to aid in population research on the flycatcher. As part of the commitment to population monitoring, historical and current vireo and flycatcher locations in Prado Basin will be digitally mapped. Digital mapping will be done annually for the life of the project. The District will submit an annual work plan for both vireo and flycatcher research to CFWO for review and concurrence.

4. A detailed eradication plan for Prado Basin for the removal of exotic, invasive animals that are competitors or predators on the sucker will be submitted to CFWO for review and concurrence within three months of implementation of either alternative. The plan will include goals and objectives, methods, efficacy assessment, reporting requirements and funding assurances. Funding for this plan's development and implementation will be assured by the Corps and/or District at the level required to achieve the plan's goals and objectives.

STATUS OF THE SPECIES

Least Bell's vireo

The least Bell's vireo is a neotropical, migratory, insectivorous songbird that nests and forages almost exclusively in riparian woodland habitats in California and northern Baja California, Mexico (Garrett and Dunn 1981, Gray and Greaves 1981, Miner 1989, AOU 1998). Vireos generally begin to arrive from their wintering range in southern Baja California and, possibly, mainland Mexico to establish breeding territories by mid- to late-March, though a singing vireo was detected on territory on March 2, 1994 (Garrett and Dunn 1981; Salata 1983a, b; Hays 1989; Pike and Hays 1992; Service, unpublished data). The large majority of the breeding vireos typically depart their breeding grounds by the third week of September, and only a few vireos are found wintering in California or the United States as a whole (Barlow 1962; Nolan 1960; Garrett and Dunn 1981; Ehrlich *et al.* 1988; Salata 1983a, b; Pike and Hays 1992).

Vireo nesting habitat typically consists of riparian woodlands with well-developed overstories, understories, and low densities of aquatic and herbaceous cover (Zembal 1984; Zembal *et al.* 1985; Hays 1986, 1989; Salata 1983a; RECON 1988). The understory frequently contains dense subshrub or shrub thickets. These thickets are often dominated by sandbar willow (*Salix hindsiana*), mule fat (*Baccharis salicifolia*), young individuals of other willow species, such as arroyo willow (*S. lasiolepis*) or black willow (*S. gooddingii*), and one or more herbaceous species (Salata 1983a, b; Zembal 1984; Zembal *et al.* 1985). Significant overstory species include mature arroyo willows and black willows. Occasional cottonwoods (*Populus* spp.) and western sycamore (*Platanus racemosa*) occur in some vireo habitats, and there additionally may be locally important contributions to the overstory by coast live oak (*Quercus agrifolia*).

Though the vireo occupies home ranges that typically range in size from 0.5 to 4.5 acres (RECON 1988), a few may be as large as 7.5 acres (Service 1998). In general, areas that contain relatively high proportions of degraded habitat have lower productivity (hatching success) than areas that contain high quality riparian woodland (Jones 1985, RECON 1988, Pike and Hays 1992).

The vireo was historically described by multiple observers as common to abundant in the appropriate riparian habitats from as far north as Tehama County, California, to northern Baja California, Mexico (Grinnell and Storer 1924, Willett 1933, Grinnell and Miller 1944, Wilbur 1980). The past, unparalleled decline of this California landbird species (Salata 1986, Service 1986) has been attributed, in part, to the combined, perhaps synergistic effects of the widespread destruction of riparian habitats, habitat fragmentation, and brood-parasitism by cowbirds (Garrett and Dunn 1981).

Reductions in vireo numbers in southern California and the San Joaquin and Sacramento valleys were evident by the 1930s and were "apparently coincident with increase of cowbirds which heavily parasitize this vireo" (Grinnell and Miller 1944). Widespread habitat losses fragmented most remaining populations into small, disjunct, and widely dispersed subpopulations. The historic loss of wetlands (including riparian woodlands) in California has been estimated at 91 percent (Dahl 1990). Much of the potential habitat remaining is infested with alien plants (e.g., arundo) and exotic animals (e.g., cowbirds).

During the past decade, the vireo has begun to recover at several locations (e.g., Prado Basin) within its range due to relatively intensive recovery efforts. Approximately 2,000 vireo territories were detected within California during 2000 (Service, unpublished data). The largest population of vireos continues to be located on Marine Corps Base, Camp Pendleton in San Diego County. In recent years, the populations of vireos at Camp Pendleton and the Prado Basin collectively represented approximately 60 percent of all known territories within California and the United States as a whole.

Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing incidence of nest predation and parasitism (Whitcomb *et al.* 1981, Small and Hunter 1988). Also, vireos are sensitive to many forms of human disturbance including noise, night lighting, and consistent human presence in an area. Excessive noise can cause vireos to abandon an area. Greaves (1989) hypothesized that the lack of breeding vireos in apparently suitable habitat was due to human disturbances (e.g., bulldozers, off-highway vehicles, and hiker travel) and further suggested that buffer zones between natural areas and surrounding degraded and disturbed areas could be used to increase the suitability of some habitat for vireos.

Habitat destruction and brood-parasitism by the cowbird continue to be the primary threats to the survival and recovery of this species. Riparian woodland vegetation containing both canopy and shrub layers, combined with adjacent upland habitats, are essential to the conservation of the vireo. The following activities continue to destroy or degrade habitat for vireos: 1) removal of riparian vegetation; 2) invasion of exotic species (e.g., arundo, cowbird); 3) thinning of riparian growth, especially near ground level; 4) removal or destruction of adjacent upland habitats used for foraging; 5) increases in human-associated or human-induced disturbances; and 6) flood control activities, including dams, channelization, water impoundment or extraction, and water diversion. The draft recovery plan for the vireo identified two major causes of vireo population decline as cowbird-nest parasitism and habitat loss and degradation. Recovery efforts are focused on addressing these two issues.

Because of the documented, drastic decline in abundance and distribution, the vireo was listed as an endangered species by the State of California in 1980. The vireo was listed as a federally endangered species by the Service on May 2, 1986 (51 *Federal Register* 16474). Critical habitat for this species, which includes all riverine and flood plain habitats with appurtenant riparian vegetation in the Prado Basin below the elevation of 543 feet upstream on the Santa Ana River to the Norco Bluffs area and beyond to the vicinity of the Van Buren Boulevard crossing, was designated on February 3, 1994 (59 *Federal Register* 4845).

Southwestern willow flycatcher

The southwestern willow flycatcher is a relatively small, insectivorous songbird that is one of five subspecies of the willow flycatcher (Hubbard 1987, Unitt 1987, Browning 1993). Although previously considered conspecific with the alder flycatcher (*Empidonax alnorum*), the willow flycatcher is distinguishable from that species by morphology (Aldrich 1951), song type, habitat use, structure and placement of nests (Aldrich 1953), eggs (Walkinshaw 1966), ecological separation (Barlow and MacGillivray 1983), and genetic distinctness (Seutin and Simon 1988).

The breeding range of the flycatcher includes southern California, southern Nevada, Arizona, New Mexico, and western Texas (Hubbard 1987, Unitt 1987, Browning 1993). The species may also breed in southwestern Colorado, but nesting records are lacking. Past records of breeding in Mexico are few and confined to extreme northern Baja California and Sonora (Unitt 1987, Howell and Webb 1995). Flycatchers winter in Mexico, Central America, and northern South America (Phillips 1948, Ridgely 1981, AOU 1983, Stiles and Skutch 1989, Ridgely and Tudor 1994, Howell and Webb 1995).

Breeding flycatchers are often present and singing on territories in mid-May (rarely in late April in southern California). Flycatchers are generally gone from breeding grounds in southern California by late August (The Nature Conservancy 1994) and are scarce in the United States after mid-October (Garrett and Dunn 1981).

The flycatcher breeds in riparian habitats along rivers, streams, and other wetland habitats where dense growths of willows (*Salix* spp.), coyote-bush (*Baccharis* spp.), arrowweed (*Pluchea sericea*), buttonbush (*Cephalanthus occidentalis*) [not found in southern California], or other plants of similar structure and configuration are present. The flycatcher nests in thickets of trees and shrubs approximately 13 to 23 feet or more in height with dense foliage from approximately 0 to 13 feet above ground. Overstories are often present in occupied habitats and composed of willows or cottonwoods or, in some portions of the species' range, tamarisks (*Tamarix* spp.) (Phillips 1948; Grinnell and Miller 1944; Whitmore 1977; Hubbard 1987; Unitt 1987; Whitfield 1990; Service 1993, 1995). Nesting flycatchers generally prefer areas with surface water nearby (Bent 1960, Stafford and Valentine 1985, Harris *et al.* 1986).

All three resident subspecies of the willow flycatcher (*E. t. extimus*, *E. t. brewsteri*, and *E. t. adastus*) were once considered widely distributed and common within California wherever suitable habitat existed (Grinnell and Miller 1944). The historic range of *E. t. extimus* in California apparently included all lowland riparian areas of the southern third of the State. Nest and egg collections indicate the bird was a common breeder along the lower Colorado River near

Yuma in 1902 (T. Huels, University of Arizona, *in litt.*). Willett (1933) considered the bird to be a common breeder in coastal southern California. Most recently, Unitt (1987) concluded that *E. t. extimus* was once fairly common in the Los Angeles basin, the San Bernardino/Riverside area, and San Diego County.

Throughout the known range of the flycatcher, occupied riparian habitats have been, and remain, widely separated by vast expanses of relatively arid lands. However, the species has suffered the extensive loss and modification of these cottonwood-willow riparian habitats due to grazing, flood control projects, and other water or land development projects (Klebenow and Oakleaf 1984, Taylor and Littlefield 1986, Unitt 1987, Dahl 1990, Service 1995). Changes in riparian plant communities have resulted in the reduction, degradation, and elimination of nesting habitat for the flycatcher, curtailing the ranges, distributions, and numbers of western subspecies, including *E. t. extimus* (e.g., Klebenow and Oakleaf 1984, Taylor and Littlefield 1986, Unitt 1987, Ehrlich *et al.* 1992).

The species is also impacted by a variety of other factors, including brood parasitism by cowbirds (Unitt 1987; Ehrlich *et al.* 1992; Service 1995). Parasitism rates of flycatcher nests have ranged from 50 to 80 percent in California (Whitfield 1990; M. Whitfield and S. Laymon, unpublished data) to 100 percent in the Grand Canyon in 1993 (Service 1993). Mayfield (1977) concluded that a species or population might be able to survive a 24 percent parasitism rate but that much higher losses "would be alarming." In any case, a composite of all current information indicates continuing declines, poor reproductive performance, and continued threats to most of the extant populations of flycatchers (e.g., Whitfield and Laymon (Kern River Research Center, *in litt.*, 1993); Service 1993, 1995, unpublished data).

Available information suggests that the abundance and distribution of breeding flycatchers in California have declined substantially, such that only small, disjunct nesting groups remain (e.g., Unitt 1987, Service 1995). Status reviews or analyses conducted before the listing of the flycatcher considered extirpation from California to be possible in the foreseeable future (Garrett and Dunn 1981, Harris *et al.* 1986). Unitt (1987) reviewed historical and contemporary records of the flycatcher throughout its range and determined that the species had declined precipitously during the last 50 years. He argued that the flycatcher was faring poorly throughout much of its breeding range and postulated that the "total population of the subspecies is well under 1,000 pairs; I suspect that 500 is more likely" (see also Monson and Phillips 1981, Garrett and Dunn 1981, Service 1995). Despite recent, relatively intensive surveys in much of the historic range of the species, the United States population is now estimated at 900 to 1,100 pairs (Service, unpublished data, 2001). The species is apparently extirpated or exceedingly rare in Mexico (Howell and Webb 1995).

Only six permanent breeding sites for the flycatcher remain in California. Only the populations along the Kern and San Luis Rey rivers contain 20 or more nesting pairs. Despite the virtual elimination of impacts from livestock grazing to the large and important flycatcher population on the south fork of the Kern River (Harris *et al.* 1986, Whitfield 1990), numerical declines in the population levels were observed in 1991 and 1992. Fortunately, increases in nesting success were realized in 1992 and 1993. These increases were attributed to removing cowbird eggs or nestlings found in southwestern willow flycatcher nests and cowbird trapping (Whitfield and

Laymon, Kern River Research Center, *in litt.*, 1993). The Kern River population consisted of 23 pairs in 1999 (U.S. Geological Survey, Biological Resources Division [USGS/BRD], unpublished data). Forty-seven pairs were detected along the upper San Luis Rey River in 1999 where cowbird numbers have also been reduced by trapping (USGS/BRD, unpublished data).

Although four other nesting groups were known in southern California in 1996, all but one of these consisted of four or fewer nesting pairs in recent years (Service, unpublished data). A total of 104 pairs of flycatchers were recorded in California in 1996, and the available data indicate that approximately 100 pairs were present in the state in 1998 (Service, unpublished data). More intensive survey efforts in 1999 resulted in the detection of 160 territories that contained 117 confirmed pairs (Service and USGS/BRD, unpublished data).

The southwestern willow flycatcher was listed as a federally endangered species throughout its range on February 27, 1995 (59 *Federal Register* 10693). Breeding flycatchers are listed as state endangered by California and Arizona. As identified in the draft recovery plan for the southwestern willow flycatcher (Service 2001), the conservation needs of the species include preventing the loss of flycatcher habitat, habitat restoration, cowbird trapping, and research designed to evaluate the efficacy of measures intended to minimize or reduce impacts.

Santa Ana sucker

The Santa Ana sucker is a small, short-lived member of the Catostomidae family that is endemic to the Los Angeles, San Gabriel, and Santa Ana rivers. Historically, the sucker occupied the Los Angeles, San Gabriel, and Santa Ana rivers from near the Pacific Ocean to their uplands (Swift *et al.* 1993). Although the sucker was described as common in the 1970s (Moyle 1976), recent surveys indicate that the species has experienced declines throughout most of its range (Moyle *et al.* 1995, Swift *et al.* 1993) and persists in isolated, remnant populations. Approximately 70 to 80 percent of the sucker's historic range in the Los Angeles, San Gabriel, and Santa Ana rivers has been destroyed or altered to such an extent to make it unsuitable for occupation.

The sucker only occupies portions of Big Tujunga Creek between the Big Tujunga and Hansen dams along the Los Angeles River. Recent surveys indicate that the sucker is relatively rare downstream of the Big Tujunga Dam, including the vicinities of Delta Flat and Wildwood but relatively abundant near Stoneyvale (Wickman 1996).

The sucker is found only in the west, east, and north forks of the San Gabriel River above the Morris Dam. In the west fork, Haglund and Baskin (1992, 1995, 1996) found the sucker from the Cogswell Reservoir to the confluence of the north and west forks. In the east fork, the sucker was observed during surveys by Saiki (2000) and Knowles (1999). The California Department of Fish and Game detected suckers in the north fork just above its confluence with the west fork, sections of the west fork, and one section of the east fork (Deinstadt and Ally 1997). The east fork appeared to have the highest relative abundance, followed by sections of the west and north forks. The population of suckers in the north fork is small, and the population in the west fork appears to be declining.

The sucker occupies reaches of the Santa Ana River between the City of San Bernardino and the vicinity of Anaheim. During 1999 and 2000, the sucker was collected between the Rapid Infiltration and Extraction (RIX) facility in Colton and Prado Dam and was relatively abundant in the upstream portions of this reach (Swift 2001). Baskin and Haglund (2001) detected eight adult and two juvenile suckers downstream of Prado Dam between Weir Canyon Road and the Imperial Highway. Chadwick and Associates (1996) hypothesized that tributaries are the primary source of suckers for the Santa Ana River population because abundances were highest in these areas during their surveys. However, Swift (1999) detected a relatively low abundance of suckers in only four tributaries (i.e., Rialto Drain, Sunnyslope Creek, Evans Lake Drain, and Anza Park Drain).

There is a population of suckers in the Santa Clara River that is thought to be introduced, although this presumption is based on the absence of the species from early collections rather than any documented records of introduction (Bell 1978). Portions of this population have apparently hybridized with the Owens sucker (*Catostomus fumeiventris*; Hubbs *et al.* 1943) and, as a result, this population is not included within the range of the native sucker.
The sucker is fairly general in its habitat requirements, occupying both low-gradient, lowland reaches and high-gradient, mountain streams where water temperatures are less than 22° Celsius. However, the sucker appears to fare best in small to medium streams with higher gradients, clear water, and coarse substrates, such as the East Fork of the San Gabriel River. Flowing water is essential, but flows can range from slight to swift. The sucker can tolerate seasonal turbidity, but Saiki (2000) found that their relative abundance is negatively correlated with turbidity.

The sucker is typically associated with gravel, cobble, and boulder substrates, although it is also found over sand and mud substrates. *Catostomus* spp. produce demersal, adhesive eggs that are thought to be adapted to spawning habitat with boulders, cobble, and gravel rather than shifting sands or mud (Moyle 1976). Saiki (2000) found the sucker to be most common near cobble, boulders, and man-made structures in the San Gabriel River. During sampling in the Santa Ana River, Swift (1999) found that suckers comprised 38 percent of the catch in a habitat dominated by gravel and cobble, but only 2 percent of the catch in a habitat dominated by shifting sands. Conversely, no suckers were present in the Chino Creek, a tributary of the Santa Ana River, where gravel and cobble comprised a majority of the substrates. Water quality may have been reduced at that site, thus accounting for the lack of the sucker (Swift 1998).

The sucker feeds mostly on algae, diatoms, and detritus scraped from rocks and other hard surfaces. Aquatic insects comprise only a small component of their diet (Greenfield *et al.* 1970). They have a relatively short life span of three to four years but reach sexual maturity in one year and have high fecundity. For example, the fecundity of 6 females, ranging in size from 3.1 inches (78 millimeters) to 6.2 inches (158 millimeters), was 4,423 to 16,151 eggs (Greenfield *et al.* 1970). Spawning generally occurs from late March to early July, with the peak occurring in late May and June (Greenfield *et al.* 1970, Swift 2001).

Although little is known about sucker movements, other species in the Catostomidae family are known to be highly vagile and undertake spawning migrations (Tyus and Karp 1990). For example, juveniles of the mountain sucker, *Catostomus platyrhynchus,* swim downstream and then move back upstream to spawn (Moyle 1976). It is not known if the Santa Ana sucker follows this pattern; however, Swift (2000) reported that juveniles detected downstream of River Road in the Santa Ana River were likely the progeny of adults reproducing upstream. These suckers may need to return upstream to spawn.

Information on population dynamics of the sucker is lacking. However, frequent fluctuations between periods of low and high abundance may be characteristic of their populations due to the unpredictable fluvial systems they inhabit. Arid regions of California are subject to considerable environmental variation, particularly in year-to-year precipitation that occurs primarily as winter rains. Unpredictable flood events may contribute to catastrophic decreases in abundance by transporting suckers downstream past barriers to movement that essentially preclude any future contribution to the breeding population. Conversely, unpredictable droughts may contribute to decreases in abundance by stranding suckers in isolated pools where ambient conditions become unsuitable or they can be extirpated by predation. Although the sucker's high intrinsic reproductive rate should enable it to quickly repopulate once environmental conditions become more favorable (Moyle 1976), rapid decreases in abundance render small populations even more susceptible to chance extinctions, especially if unfavorable environmental conditions persist or reoccur before the populations can recover.

Few estimates of age-specific survival rates, age structures, sex ratios, or dispersal rates are available for populations of the sucker. Age classes of suckers in the San Gabriel River were normally distributed between zero and four years old during 1984 and 1994. In 1987 and 1995, however, young-of-the-year were preponderant and older age classes were lacking (Haglund and Baskin 1995, 1996). Density estimates in the Santa Ana River during winter of 1999 and 2000 were 0.02 to 1 fish per meter (Swift 2001). Density estimates in the San Gabriel River during 1997 were 0.03 to 0.13 fish per meter (Hernandez 1997).

Threats that may have contributed to the decrease in the status of the sucker include the following: 1) direct loss of suckers due to water diversions; 2) competition and predation from introduced non-native competitors and predators; 3) loss of connectivity; and 4) destruction and degradation of habitat through urbanization, channelization and other flood control structures, water diversion and withdrawal, suction dredging, reductions in water quality, and other activities (65 *Federal Register* 19686).

The construction of flood control and water diversion structures associated with urbanization has resulted in conversion of sucker habitat to unsuitable concrete-lined storm drains in the lower-most reaches of the Los Angeles, San Gabriel, and Santa Ana rivers (Moyle *et al.* 1995) and a substantial loss of habitat in the upper portions of these rivers and their tributaries. These structures have also contributed to the dewatering of extensive reaches of these rivers and their tributaries, thereby eliminating additional habitat for the sucker. For example, the Big Tujunga Creek Dam has eliminated flows along most of the Big Tujunga Creek during late summer and autumn of dry years. During these periods, the sucker is restricted to an approximate one mile stretch of the creek.

Historically, the Los Angeles, San Gabriel, and Santa Ana rivers flowed perennially throughout their length (McGlashan 1930). However, the withdrawal of ground and surface water has de-watered extensive portions of these rivers that now remain dry during non-flood periods, unless the discharge of treated wastewater effluent sustain flows (e.g., Santa Ana River downstream of the RIX facility). For example, surface flows along the Santa Ana River upstream of the City of Riverside have long been diverted to provide water for communities in western San Bernardino and Riverside counties. Although records from the 1940s (Anonymous 2000) indicate that the sucker was once a common resident in this reach, no suckers have been detected within the upper Santa Ana River in recent years (Jones & Stokes Associates 1997).

Remaining habitat for sucker is often degraded by a variety of factors, including sedimentation, ephemeral water flow, reduced water quality, and the presence of invasive species. Degraded habitat conditions may contribute to reduced growth, fecundity, and survival of suckers due to loss of prey items, reduction in foraging efficiency, and lack of nursery areas (Gibson 1994). High turbidity is strongly correlated with lower relative abundance of suckers, possibly due to a reduction in the availability of prey (e.g., loss of light for algal photosynthesis) and/or the inability of suckers to detect prey items in turbid waters (Saiki 2000).

Most of the existing flow in the lower Santa Ana River during the summer months is derived from treated wastewater discharged into the stream channel, primarily from the RIX treatment facility in Colton. Flows from this facility are reduced or terminated periodically when malfunctions cause reductions in discharge quality that exceed standards required by the State Regional Water Quality Control Board. The temporary reduction or termination of flows significantly reduce the amount of habitat available to suckers and could potentially strand them in dewatered sections of the stream. Also, because much of the Santa Ana River is maintained through treated water, contaminants within the treated water may adversely affect the sucker. Saiki (2000) reported that suckers inhabiting the Santa Ana River had significantly higher concentrations of dichlorodiphenyltrichloroethylene (DDT) and trans-Nonachlor than those in the San Gabriel River. Conversely, concentrations of arsenic and mercury were significantly higher in suckers inhabiting the San Gabriel River. However, all of these concentrations were lower than those found in a variety of freshwater species throughout the United States (Saiki 2000).

Recreational activities have contributed to the degradation of habitat for the sucker via erosion of stream banks, destruction of vegetation, and release of untreated human waste and other refuse. Off-highway vehicle activity may physically increase erosion and sedimentation and alter channel morphology. In addition, recreational suction dredging occurs in all counties occupied by the sucker. Suction dredging removes all substrates smaller than the diameter of the intake nozzle and deposits them as large, unstable piles just downstream from the dredge. As a result, suction dredging can locally increase turbidity, change channel topography, and decrease the abundance of aquatic insects (Harvey and Lisle 1998). Also, suction dredging appears to have significant negative effects to the early life stages (i.e., eggs, larvae, fry) that could pass through a suction dredge and be killed or injured (Harvey and Lisle 1998). For example, Griffith and Andrews (1981) found mortality rates of up to 100 percent for eggs and fry of cutthroat trout (*Oncorhynchus clarki*) and rainbow trout (*O. mykiss*) that passed through a suction dredge.

The introduction of exotic species may eliminate or reduce the abundance and distribution of native species via predation, competition, and ecosystem alteration (Moyle and Light 1996). Infestations of the invasive arundo have degraded extensive areas of habitat for the sucker by forming monotypic stands of marsh and slow-moving aquatic habitats. Although arundo may provide cover and a possible source of food for the sucker, its overall effects are likely more detrimental than beneficial (Baskin and Haglund 1999).

Moyle and Yoshiyama (1992) concluded that introduced brown trout (*Salmo trutta*) contributed to the extirpation of the sucker from the upper Santa Ana River in the San Bernardino Mountains. In addition, flood control and water diversion structures have contributed to conditions that are favorable to many predators and competitors of the sucker, including the common carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanella*) and tilapia (*Oreochromis mossambicus*). Saiki (2000) reported that the relative abundance of the sucker was negatively correlated with the relative abundances of common carp and largemouth bass. Hence, the ponding of water (e.g., settling ponds, inundation pools for dams) essentially creates areas that are unsuitable for the sucker and serve as population sinks.

Flood control and water diversion structures on the Los Angeles, San Gabriel, and Santa Ana rivers have also reduced the status of the sucker by imposing barriers that preclude or impede movements within populations. Within the Santa Ana River, the sucker population is bisected by Prado Dam, which effectively blocks the movement of fish upstream. Hence, adults, larvae or juveniles that move downstream of Prado Dam are lost from the upstream portion of the breeding population. Hansen Dam on Big Tujunga Creek and the San Gabriel River Dam may contribute to similar effects. Smaller barriers such as gauging stations, culverts and drop structures also impede movements of suckers along each of these rivers. For example, suckers washed downstream of the Weir Canyon drop structure along the Santa Ana River during high flows are effectively removed from the breeding population. The importance of upstream migration for the sucker is not known at this time. However, it is apparent that spawning is rare below Prado Dam and appears to be concentrated between Mission Boulevard and Rialto Drain, well upstream of Prado Dam. Therefore, providing upstream passage to the sucker may be important to improving reproduction for this species.

All remaining populations of the sucker are at risk due to their small size. Most of the lowland river habitats have been destroyed, and the remaining populations of the sucker are low in numbers, with the exception of the population in the San Gabriel River. Although the sucker is, in places, locally common in what remains of their native range, the total population size of any one of these remaining populations is still relatively small. Small populations have a higher probability of extinction than larger populations because their low abundance renders them susceptible to stochastic (random, naturally occurring) events such as inbreeding, the loss of genetic variation, demographic problems like skewed variability in age and sex ratios, and catastrophes such as floods, droughts, or disease epidemics (Lande 1988, Saccheri *et al.* 1998).

Another factor that renders populations of the sucker vulnerable to stochastic events is isolation, which often acts in concert with small population size to increase the probability of extinction for populations. Altered fluvial processes and impediments to movement have fragmented the historic range of the sucker such that remaining reaches of occupied habitat now function independently of each other. Isolated populations are more susceptible to extirpation by accidental or natural catastrophes because their recolonization has been precluded. Hence, the extirpation of remnant populations during local catastrophes will continue to become more probable as development and barriers further constrict remaining populations.

The sucker was listed as a federally threatened species on April 12, 2000 (65 *Federal Register* 19686). Critical habitat was not designated at that time because the biological needs of the sucker were not sufficiently known to identify areas essential for conservation. The sucker is designated a "species of special concern" by the State of California.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present effects of all Federal, State, or private actions and other human activities in the action area. Included in the environmental baseline are the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation and the effects of State and private actions which are contemporaneous with the consultation in progress.

The action area encompasses areas that would either be directly or indirectly affected by the proposed action, and not merely the immediate area involved in the action. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area as determined by our agency. We have described the action area in this consultation to include the Prado Flood Control Basin upstream of the dam and Reach 9 of the Santa Ana River downstream of the dam. Because our action area is a biological determination that must incorporate direct, indirect, and interrelated/interdependent effects to listed species and their habitats, our action area may differ from the scope of analysis used by your agency under the National Environmental Policy Act.

Least Bell's vireo

The vireo population in the Prado Basin and contiguous reaches of the Santa Ana River and Mill and Chino creeks has been actively studied and managed since 1986. Annual monitoring is conducted to estimate abundance and distribution, breeding chronology, reproductive success, and nest site preferences. Also, cowbirds present in vireo home ranges were routinely monitored, and modified Australian crow traps were deployed throughout the basin and the adjacent Santa Ana River in an attempt to control this brood-parasitic species.

Vireos nesting in the Prado Basin area demonstrate a strong preference for nesting and foraging in willows and mule fat (The Nature Conservancy 1997, Pike and Hays 2000). Fifty-four percent of all nests in 1997 for which data were available ($n = 239$) were placed in various willow species, while 40 percent were found in mule fat (The Nature Conservancy 1997).

Surveys indicate that the vireo population in the Prado Basin area has increased significantly from approximately 164 pairs in 1995 to a minimum of 336 pairs during the 2001 breeding season. This population continues to be the second largest overall and the largest north of San Diego County. Preliminary data from the 2001 breeding season suggest that there were a minimum of 444 vireo territories that contained approximately 336 mated pairs within the Prado Basin study area (Pike *et al.* 2001). Hoffman (2001) reported a total of 61 additional territories containing 44 pairs at select areas within the remainder of the Santa Ana River Watershed. Data for the 2000 breeding season in Prado Basin indicated the presence at least 357 territorial male vireos, 281 of which were paired (Pike and Hays 2000). Of the 336 territorial male vireos detected in the area in 1999, 224 were paired (Pike and Hays 1999). By contrast, 270 pairs were recorded in 1998, 195 pairs were detected in 1996, and 164 pairs were located in 1995 (Pike and Hays 1998). The reason for the decrease in the number of breeding pairs from 1998 to 1999 remains unknown.

A minimum of 714 known fledged young was detected within the Prado Basin study area during the 2001 breeding season, which was a 10 percent increase over the 1999 total of 649 (Pike *et al.* 2001). Nesting success in recent years has been relatively high; the data for 1999 (57 percent) and 2000 (71 percent) both exceeded the figures for 1997 (50 percent) and 1998 (41 percent) Pike and Hays 1999, 2000). By contrast, the average number of fledglings per breeding pair from 1999 to 2001 (2.2) remained well below the average (3.1) for the breeding seasons from 1988 to 1991. In recent years significantly fewer pairs have renested after successfully fledging young on their first attempt (Pike and Hays 1999, 2000; Pike *et al.* 2001).

The primary threats to the vireo in the Prado Basin area are habitat loss and degradation and nest parasitism by cowbirds. Recovery objectives and current range-wide management efforts are focused on addressing these two issues (Service 1998). For example, 2,785 cowbirds were trapped and removed from habitats for the vireo and flycatcher within the Prado Basin area during 2001, 2,587 cowbirds were removed in 2000, and 2,300 cowbirds were removed in 1999. Nest parasitism was at 13 percent in 2001, while in 2000 the rate had decreased to an all-time low of 8 percent (Pike and Hays 2000), likely due to the cowbird trapping efforts in riparian habitat and at adjacent cattle farms; parasitism rates had been as high at 39 percent in 1986 and 57 percent in 1993.

Vireo researchers at Prado Basin area have detected several apparently well-incubated clutches of vireos that failed to produce a single viable nestling (Hays 1989). Entire clutches failed to hatch in three cases, and all vireo nestling young failed to survive in two other instances during the early part of the 1988 breeding season. In 1994, four full clutches failed to hatch; one apparently infertile female is thought to be responsible for two of these clutches.

In 1997, a vireo nestling with a deformed upper mandible was observed (Pike and Hays 2000). Such abnormalities are often the expressed result of exposure to environmental contaminants. Abnormalities that often are attributable to toxic levels of various pollutants were detected in invertebrate specimens collected within the Prado Basin. Specifically, crayfish (*Procambius clarkii*) with abnormal appendages have been found, and several Chinese river clam (*Corbicula fluminea*) specimens exhibited shell ring patterns that indicated irregular growth (Service, unpublished data). Also, several age classes of Chinese river clams appeared to be missing from the aquatic habitats that were surveyed. This phenomenon may be the result of episodic, lethal exposures to toxic substances. Most importantly, preliminary data derived from the toxicological testing of abandoned vireo eggs from the Prado Basin have revealed the presence of dichlorodiphenylethylene (DDE), a metabolite of DDT, in concentrations that could cause eggshell thinning (Service, unpublished data).

The draft recovery plan for the vireo (Service 1998) calls for the protection and management of riparian and adjacent upland habitat in each identified population/metapopulation site (including the Santa Ana River) and a reduction of threats to the extent that: 1) the species no longer needs significant human intervention to survive; or 2) if human intervention is necessary, "... perpetual endowments are secured for cowbird trapping and exotic plant (*Arundo*) control in riparian habitat occupied by least Bell's vireos."

Critical habitat for the vireo includes all riverine and flood plain habitats with appropriate riparian vegetation in the Prado Basin below the elevation of 543 feet and upstream along the Santa Ana River through the Norco Bluffs area to the vicinity of the Van Buren Boulevard crossing. The action area contains a minimum of 3,500 acres of riparian habitats supporting the primary constituent elements of critical habitat. This critical habitat functions as a core area for vireos that is essential for the conservation of this species. Activities that could adversely affect these primary constituent elements include removal of riparian vegetation, thinning of riparian growth, especially near ground level, the invasion of exotic species (e.g., arundo), removal or destruction of adjacent upland habitats used by vireos for foraging, and flood control activities, including dams, channelization, water impoundment or extraction, and water diversion.

Southwestern willow flycatcher

The Prado Basin population is one of only six permanent southwestern willow flycatcher breeding sites that now exist in California. In 2001, the first flycatcher of the breeding season at the Prado Basin was detected on May 3 and the last (two juveniles) were noted on August 28 (Pike *et al.* 2001). Seven flycatcher home ranges were detected during the 2001 breeding season. Pike *et al.* (2001) indicate that three of the territorial birds paired and nested. A total of three young were fledged from two nests, the third nest was unsuccessful. Only one pair of flycatchers was detected during the 2000 breeding season; apparently only two young were fledged in the Prado Basin at that time (Pike and Hays 2000). By contrast, five flycatcher home ranges were detected within the Prado Basin during the 1999 breeding season. Pairs were eventually found in three of these home ranges; two of the three pairs produced a total of five fledglings (Pike and Hays 1999).

Flycatchers in the Prado Basin virtually always nest near surface water or saturated soil (The Nature Conservancy 1994). All known territories have been situated in relatively close proximity to water-filled creeks or channels. Nests have been placed as low as two feet above ground level. Of the five flycatcher nests found in 1996, two were placed in arroyo willow, one was found in a red willow (*Salix laevigata*), one was placed in a sandbar willow, and one was placed in a tamarisk. Both nests discovered during the 1997 season were in arroyo willows. In 2001, two nests were in arroyo willow and one in tamarisk.

Although flycatcher home ranges have been detected throughout much of the surveyed portions of the Prado Basin, successful breeding prior to 1996 had been detected only in North Basin and West Basin (Chino Creek). From 1996 to 1998 and again in 2000 and 2001, however, the only successful breeding occurred in the South Basin. No flycatcher home ranges have been detected in Reach 9 of the Santa Ana River (Service, unpublished data). Although trapping and removal of cowbirds have reduced nest parasitism and increased reproductive success of vireos in the

Prado Basin, similar results have not been seen for the flycatcher. The lack of a demonstrated relationship may reflect the low abundance of flycatchers in the area or that some other factor(s) are limiting the population.

While the unauthorized destruction of habitat within the action area has largely been curtailed, it has not completely ceased. During 1998, 1999, and 2000, property lessees of the Corps apparently mowed or cleared more than three acres of riparian habitat suitable for the vireo and flycatcher within the basin adjacent to Chino Creek. In addition, operations and maintenance work completed for the Corps in late 1998 resulted in the clearing of less than one acre of riparian habitat suitable for the vireo and flycatcher. Also, during autumn of 1999 approximately two acres of vireo habitat was destroyed or degraded in conjunction with the construction of roads, apparently on District property, in the western portion of the Basin. Most recently, seven ponds in the lower basin were created without apparent authorization. Staff in the Corps' Operations and Regulatory branches are currently working with CFWO to address these issues.

The primary threats to flycatcher within the action area essentially are the same as those identified affecting the vireo. The draft recovery plan for the flycatcher (Service 2001) calls for a minimum of 50 territories within the designated Santa Ana management unit and protection from identified threats to assure maintenance of the population over time.

Santa Ana sucker

The sucker has lost approximately 70 percent of its native range in the Santa Ana River; the portions of the Santa Ana River occupied by the sucker constitute approximately 60 percent of the entire remaining native range of the species. In the mid-1980s, Fisher (1999) reported observing numerous suckers at Imperial Highway. In Reach 9, researchers caught five suckers in 1991, one sucker in 1996, and five suckers in 1998 (Chadwick and Associates 1996, Swift 1998). The area downstream of the first drop structure downstream of Prado Dam contained appropriate habitat for sucker, including rocky to gravelly substrate, slow to moderate flowing water, and a mean depth of about 20 inches (Swift 1998). Thus, the relatively low density of suckers is apparently not due to a lack of habitat. In recent surveys, ten adult suckers were caught between Weir Canyon Road and Imperial Highway (Baskin and Haglund 2001).

Between the Hamner Avenue crossing of the Santa Ana River and Prado Dam, researchers caught 3 suckers in 1991, 76 in 1997, 22 in 1998, 5 in 1999, and 3 in 2000 (Chadwick and Associates 1996; Swift 1997, 1998, 1999, 2001). All 76 suckers caught in the Norco Bluffs area in 1997 were between 0.8 to 2.8 inches in length. Therefore, Swift (1997) hypothesized that this area was a nursery for the sucker. However, the substrate was mostly shifting sand and provided low food resources. Additionally, the presence of invasive competitors such as fathead minnow may limit the availability of diatoms and epiphytic green algae to the sucker. The fish caught in this area during other years were adults or the length information was not provided. It appears that this area may provide appropriate habitat to the sucker in some years.

The causes of sucker decline in the proposed project area are attributed to habitat degradation and destruction, increase in invasive species and loss of connectivity in recent years. Habitat quality and quantity have been reduced by increased turbidity and sedimentation upstream of the Prado

Dam and the construction and maintenance of flood control structures. Increased turbidity reduces the available light needed for photosynthetic processes for algae and visibility for prey searching. Sedimentation reduces available spawning habitat and food sources by covering favorable cobble and gravel substrate. The installation of hard bank stabilization structures along various areas of the Santa Ana River has also contributed to losses of habitat. These hard bank stabilization structures reduce habitat quality and quantity by reducing bank vegetation and increasing flow, thus encouraging the removal of larger-sized substrate. Habitat quality is further reduced by bank stabilization structures that remove pool-riffle complexes.

The status of the sucker in the action area has likely been adversely affected by increased predation and competition from invasive species. Banks stabilization structures, the Prado Dam reservoir, and the construction of wetlands have provided excellent habitat for invasive predatory and competitive species such as largemouth bass, channel catfish, carp, bluegill, green sunfish and mosquitofish (*Gambusia affinis*). Swift (2001) reported that carp and channel catfish were most common downstream of the Prado Dam, and green sunfish and largemouth bass rarely strayed from deep pools and slow-moving aquatic habitats. However, Baskin (2001) hypothesized that large numbers of mosquitofish observed in the mouth of the Sunnyslope Creek may be preying on recently spawned larval suckers.

As suckers are washed downriver, they are unable to return upstream due to the presence of several barriers. Four existing drop structures are present downstream of Prado Dam that probably prevent suckers from passing upstream due to their height and design. Additionally, Prado Dam almost certainly impedes passage, especially during low flows in the dry season, and during high flows and subsequent ponding upstream of the dam during flood seasons. Upstream of Prado Dam, the diversion at River Road provides another barrier. This diversion is a 12 to 36-inch earthen dam that diverts 70 percent of the water to wetlands managed by the Orange County Water District. The remaining water is diverted through culverts beneath the dam to the main river channel. Upstream of the culverts, water is ponded and provides habitat for exotic predators and competitors. Suckers are likely not able to swim upstream through the fast flowing water exiting the culverts and, should they succeed, then they must pass through ponds. The importance of upstream migration has been demonstrated for several species of lake suckers, including the cui-ui sucker (*Chasmistes cujus*), Sacramento sucker (*Catostomus occidentalis*), and Modoc sucker (*Catostomus microps*) (Moyle 1976; S. Reid, Service, Klamath Falls, OR, personal communication to L. Caskey, CFWO, April 2001). Where fish passage has been constructed for the lake suckers, fish locks have been successful in passing 150,000 to 700,000 suckers per day (B. Mefford, Bureau of Reclamation, Denver, CO, personal communication to L. Caskey, CFWO, March 2001).

The relatively low density of suckers downstream of Prado Dam may be due to several factors, including a lack of recruitment due to the small amount of suitable spawning habitat, relatively high density of exotic predators, and loss of habitat from the installation of flood control features (e.g., drop structures, bank stabilization, and low flow channels).

Because the status of the sucker is precarious and declining, long-term conservation depends on the implementation of the following conservation measures: 1) protection of remaining populations to ensure that they are independently viable with stable or increasing abundance and recruitment; 2) maintenance or restoration of adequate perennial flows necessary to support and create viable habitat in each river and tributary occupied by the sucker, including reaches that are currently dewatered; 3) maintenance or restoration of connectivity of habitat in each river and tributary occupied by the sucker, including the removal or modification of existing barriers to movement; 4) maintenance of water quality suitable for the sucker; and 5) removal of exotic species that degrade habitat and/or reduce the status of the sucker through predation or competition.

Habitats that are currently degraded could be improved in a number of ways. Naturally sinuous river channels should be encouraged throughout the historic range of the sucker, and ponded water should be reduced to a minimum and/or managed in such a way as to discourage entry by the sucker. In addition, water management plans and/or legal agreements should be developed to maintain adequate perennial flows in all rivers, particularly in the Santa Ana River where RIX facility shutdowns could strand the sucker in shallow pools. Furthermore, restoring flow to dry reaches with appropriate substrate could provide adequate habitat to support the reintroduction of suckers. In addition to flow, turbidity should be reduced through appropriate dam modifications, and the scope and intensity of recreational activities that adversely affect the sucker and its habitat should be limited. Habitat for sucker may also be improved by adding coarse material and boulders to the substrate. In areas where other listed species are not present, nursery habitats should be created and maintained by clearing emergent non-native vegetation and, if necessary, modifying stream banks to create shallow stream bank areas. Once habitat is created, it should be protected from human-induced high flows (e.g., dam releases) that could scour gravel and cobble substrate. One possible measure that could dissipate these high velocity flows is the installation of relief channels. Relief channels are constructed to divert high flows away from the main channel. An example of a relief channel is at the confluence of Sespe Creek and Santa Clara River. This relief channel appears to support a population of suckers, arroyo chubs and sticklebacks (Baskin and Haglund 1999).

An exotic species program should be implemented to remove vegetation such as arundo and competitors and predators of the sucker such as green sunfish, largemouth bass, carp, and channel catfish. Such a program would improve habitat for the sucker by reducing the amount of slow moving or standing water created by large stands of arundo and by decreasing the presence of exotic fish. Removal of invasive fish species is usually completed by chemical or mechanical means such as the use of seines, nets, and traps. Mechanical means would be the most effective and least harmful to the native fish species in the Santa Ana River.

Barriers that preclude or impede the movements of suckers should be removed or modified (e.g., installation of fish passage structures) so that individuals are no longer lost to the breeding population and can colonize currently unoccupied areas. Several types of fish passage are available including fish locks, vertical slot structures, and fish rock passageways. Vertical slot structures have been successful for the cui-ui sucker in the Truckee River, and natural fish passageways are being constructed for the Modoc sucker in a Pit River tributary (S. Reid, Service, personal communication to L. Caskey, CFWO, April 2001). The darting speed of small suckers is estimated to be 4 body lengths per second (e.g., a 6-inch-long sucker would have darting speed of 2 feet per second) (S. Reid, Service, personal communication to L. Caskey, CFWO, April 2001). However, the swimming speed and affinities of the sucker and other similar species should be examined more closely so that appropriate passageways can be constructed.

Because few specifics are known about the life history strategies, population dynamics, and habitat affinities of the sucker, research and monitoring should be initiated immediately. The Santa Ana Sucker Discussion Team has funded initial studies of the distribution, habitat affinities, and potential effects of contaminants, turbidity, and exotic species on the sucker population in the Santa Ana River. Additional studies should be funded to investigate additional areas and variables. Also, goals should be clearly defined for all measures implementing conservation needs, and the success of conservation efforts must be assessed through quantitative and qualitative monitoring.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by or result from the proposed action, and are later in time, but are still reasonably certain to occur.

Activities associated with, or resulting from, the proposed action could adversely affect the vireo and its critical habitat, flycatcher, and/or sucker in the following manner: 1) increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat; 2) increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges; 3) increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species; and 4) effects to sucker from water conservation structures and diversions. Each of these categories of adverse effects are discussed in detail in the following sections.

Effects to sucker

<u>Increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat:</u> Impounding water and creating a larger reservoir behind Prado Dam would have adverse affects on the sucker. Approximately 2.2 to 4.8 acres of river habitat would be lost, at least temporarily, to impounded water (Table 8, draft BA). As flowing water reaches the conservation pool, its velocity drops and suspended sediment settles out; fines that settle create unsuitable bottom habitat for sucker. Freshwater aquatic habitat consisting of pooled, non-flowing water decreases the extent of natural stream habitat for sucker. Pooled, standing water has increased stagnation, accumulation of nutrients, eutrophication, elevated temperature, and decreased dissolved oxygen, which are conditions unsuitable for native fish.

While specific river enhancements to benefit sucker are not proposed as part of the conservation measures of this project, some habitat restoration for the sucker is being addressed through implementation of conservation measures under the Mainstem consultation. In addition, the District is a member of the Santa Ana Sucker Discussion Team (Sucker Team), which is developing a conservation program that will identify scientific study needs and species management options and work to implement a suite of activities, including habitat enhancement, to benefit the sucker.

Increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges from the dam: Scour of the downstream channel will contribute to the degradation of habitat for sucker. Suckers depend on gravel substrate because they scrape algae off of rocks for food and use these types of substrate for spawning. Although it is not known if suckers spawn in Reach 9, they have been detected in that area. It is reasonably certain that discharges in the range of 5,000 to 10,000 cfs will mobilize gravels, alter the river substrate, and decrease the availability of spawning habitat and food resources for the sucker downstream of Prado Dam. This substrate is unlikely to be replaced at a rate commensurate with its loss due to the barrier to gravel transport imposed by the dam. The loss of any spawning habitat downstream of the Prado Dam could limit reproduction by the sucker because there is little possibility for these fish to return to upstream spawning sites due to the barrier imposed by the dam. Even an infrequent, high-rate discharge event that reduces available spawning or larval habitat and, thereby, contributes to a decrease in recruitment could decrease the status of the species for years due to persistent effects (i.e., time lags) on local population dynamics.

Impacts to sucker from the increased flow and frequency include sweeping suckers from areas where there is great constriction and no refugia past Weir Canyon Bridge into Reach 8 and beyond of the Santa Ana River, loss of spawning habitat, and loss of food resources. Since there are no known spawning locations between Prado Dam and Weir Canyon Bridge, it is difficult to assess impacts to reproduction. Survival could be significantly reduced for any existing sucker population as food resources would be anticipated to decrease. Additionally, any suckers swept past the drop structure downstream of Weir Canyon Bridge would be moved to habitats that are less conducive to their survival. For example, between Weir Canyon Bridge and Imperial Highway Bridge, there is less canopy and refugia, and the river is highly fragmented by three drop structures. After Imperial Highway Bridge, water flow is extremely reduced, and little or no canopy and habitat, including appropriate substrate, exists. Therefore, it is likely any suckers swept below Weir Canyon would be lost to the known sucker populations.

Increased discharge rates may wash suckers past Weir Canyon, where they would not be able to return upstream past the several existing drop structures. These suckers would be lost to any breeding population downstream of Prado Dam because there is no known spawning habitat downstream of Weir Canyon. No specific measures under this proposed water conservation project are being proposed to address effects to sucker from being passed downstream in high flows; however under the Mainstem consultation, the Corps will design and implement an efficient, cost effective trap and haul program in coordination with the Service, CDFG and other experts. This program should reduce the number of suckers that would be permanently lost from the breeding population. In addition, the Sucker Team is working to initiate an intensive study of the species' status and distribution downstream of Prado Dam.

Increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species: Increasing the water conservation pool will increase habitat for exotic animal species such as bass, carp, green sunfish, bullfrog, and crayfish, all of which are competitors with or predators on native fish, such as the sucker. The conservation measure proposed by this project to develop and implement an effective exotic animal species control program within the Basin will reduce the negative effects that these species have on sucker and other native fish.

Effects to sucker from water conservation structures and diversions: Under current water conservation practices, approximately 50 percent of the river is diverted into a channel just downstream of the River Road bridge for delivery to water quality ponds (polishing ponds). That diversion channel has good quality habitat and sucker have been found in it. However, in its current configuration, the diversion channel does not allow sucker to pass back into the main river, and the outflow of the diversion ends at the polishing ponds. The polishing ponds are areas of still water that contain species which are predators and/or competitors of the sucker. It is unlikely that sucker survive if they pass into the polishing ponds. In addition, the main river channel has culverts near the diversion channel that have a significant drop, preventing sucker that pass through the culvert from being able to move back upstream. Sucker that pass through the culverts there are effectively removed from any upstream breeding population. Conservation measures to be implemented under the Mainstem project include providing for year-round, bidirectional passage of suckers in both the main river channel and the diversion channel.

Effects to vireo and flycatcher

Increased degradation of riparian and stream habitat in the reservoir pool due to more frequent, higher elevation pooling of water and, in turn, inundation effects to habitat: Our agency voiced concerns about increased inundation effects not only due to higher levels of water conservation but also due to the ability of the dam to hold water more frequently and at a higher level once the new dam outlet gates are installed during Mainstem. With and without the Mainstem project inundation levels and durations were compared to determine if that project would result in prolonged inundation of vireo critical habitat or an increased potential for flooding of vireo nests following rare late spring storms. Your agency has maintained that the Mainstem project would not cause significant increases in inundation elevations or dwell times within habitat for vireos behind the dam due to the increased discharge capacity of the outlet works (Corps 2001a). Also, your staff has indicated that the dam will continue to be operated primarily for flood control purposes and that during late winter water will not be held longer or at higher elevations behind the dam in anticipation of water control activities up to 505 feet elevation following March 1. In addition, your agency maintains that any increases in inundation under future conditions will be the result of parameters (e.g., sedimentation and watershed development) not related to Mainstem or increased water conservation.

While we agree that the increased discharge capacity of the reconstructed dam could, under certain circumstances, reduce both the elevation and dwell time of water pooled behind the dam, it is evident that the inundation of wetland, riparian and upland habitats up to an elevation of 566 feet will be enabled by Mainstem, and therefore, the dwell time of impounded waters at all elevations, including those for water conservation, could be increased. As an example, the current water control manual (Corps 1994) provides for a range of release rates at all elevations from the debris pool to the elevation of the spillway (and above). Given that a stated objective of the manual is to accommodate water conservation whenever possible, the much larger post-Mainstem potential reservoir pool, and resulting decreased flood risk associated with storing water at higher elevations, it is reasonable to conclude that Mainstem will induce incremental damage to habitats occupied by the vireo and, possibly, the flycatcher, at the current winter water conservation 494 foot elevation and that same type of incremental damage will take place at the higher proposed water conservation level of 498 feet. The increased storage of water during the later winter could result in the degradation of riparian habitat and the understory that vireos require for nesting.

Although the effects of inundation on riparian habitat are relatively difficult to quantify, water conservation efforts may result in the following effects: 1) vegetation mortality that reduces the areal extent of willow riparian habitat; 2) reduction in species diversity, as plants intolerant of inundation are reduced within the basin; and 3) structural changes within the habitat, especially a loss of shrubby understory. Persistent water will have an effect out some distance beyond its immediate edge due to soil saturation, capillary action, and microclimate alteration. In some areas, only the most inundation tolerant plants would persist, potentially expanding the existing monotypic black willow forest to a higher contour level, with concomitant shifts of other vegetation communities also to higher contours or resulting in their direct loss. These losses or changes to the plant community depend on a variety factors including the elevational gradient, soil type, and current plant community. The border of much of Prado Basin has a steep elevational gradient; therefore, plant community changes in these areas will be more abrupt, while within the Basin and riverbed, changes would occur over a wider area where the elevation change is more gradual.

The primary effects to the vireo and flycatcher include a reduction in the carrying capacity of the area due to decreased availability of habitat and a reduction in recruitment due to decreased foraging and nesting locations. Since monitoring for the vireo began, there has been a shift in the distribution of vireo nesting territories from lower elevations in the southern basin to more eastern and higher elevation areas due to habitat changes, particularly the loss of shrubby understory, from current water conservation practices (Biological Opinion 1-6-95-F-28 dated April 20, 1995). This shift has moved a large portion of the breeding population nearer to the Corona Airport, increasing the number of vireos subject to potentially adverse noise effects and closer to dairies, agricultural and ruderal habitats, which could subject breeding vireos to increased nest parasitism by cowbirds.

We anticipate that the increased pooling of water during winter months when Prado Dam is operated for flood control (October 1 to February 28) is not likely to directly threaten individual vireos or flycatchers because these species are typically not present in the project area during this time period. Vireos typically arrive in the Prado Basin and southern California from their wintering grounds in mid- to late March, with territory establishment and nesting taking place from March through late July (Pike and Hays 1999). Dispersal of fledglings and mature adults typically occurs in August and September. Flycatchers typically arrive in the Prado Basin later than vireos and leave earlier. As a result, vireos and flycatchers are only rarely detected in the Basin during October 1 to March 15 (Pike and Hays 1999). The biological opinion for the current water conservation activities anticipated the harm of 90 pairs of vireos or 180 individual vireos over the life of the project due to the periodic, temporary flooding, destruction or degradation of occupied habitat; no harm was anticipated for flycatchers. Since the proposed project's water conservation elevation of 505 feet during summer months is the same as the current water conservation activities, all measures outlined in previous formal consultations for avoidance and minimization to vireo and flycatcher nests and young, including any necessary relocation of nests subject to flooding to a higher elevation, will continue to be implemented by the Corps and/or District for the life of the project. In addition, one conservation measure to be implemented with this proposed project would create at least 37.2 acres of riparian habitat that, over time, would become suitable for occupation by the vireo and, potentially, the flycatcher. This created area would provide nesting area for vireos that may be displaced by the increased water conservation activities between 494 and 498 feet and for the general vireo population, that has grown substantially.

Increased degradation of habitat downstream of the dam due to potentially more frequent, higher rate discharges from the dam: The upsizing of the dam outlet works from Mainstem will increase the capacity for discharges from 5,000 cfs to 8,760 cfs for a 25-year flood, from 5,000 cfs to 18,500 cfs for a 50-year flood, and from 22,200 cfs to 30,000 cfs for a 100-year flood (Corps 2001a, b). Your agency maintains that significant damage to riparian habitat downstream from the dam would occur only rarely because sustained discharges exceeding 10,000 cfs would be rare. However, the draft BA (page 33) states that a release of 7,400 cfs with velocities from 4 to 14 feet per second can cause considerable scouring of the channel. Your agency estimates that 22 acres of downstream habitat will be affected by discharges due to water conservation activities.

Scour of the downstream channel will contribute to the degradation of habitat for vireo. Release at high rates erodes soil, removes vegetation, moves cobble, rock and boulders, and can cause armoring of the channel. High rates of discharge can be a significant factor in causing streambank erosion resulting in loss of riparian vegetation. Water released from Prado Dam, while containing a load of suspended fines, in nearly free of coarser sediments. Thus, the natural dynamics of deposition replacing sediment scoured by large flow rates are highly altered. Vegetation would be unable or take longer to reestablish in areas scoured of soil. The loss of vegetation due to higher velocity flows facilitated by the upsized outlet structures will reduce the extent of suitable overstory and understory riparian downstream of the dam that vireos depend upon for nesting and foraging.

The Habitat Management Plan prepared for these public lands has not been completed or adopted. However, the Corps and District have agreed to finalize the proposed plan or equivalent within one year of the initiation of Mainstem construction in coordination with our agency and, subsequently, obtain approval from our agency and implement the plan immediately thereafter to appropriately conserve listed species within Reach 9 of the River. The local sponsors have indicated that, under any circumstances, the approved Habitat Management Plan will be implemented in full upon the conclusion of construction in the Santa Ana River Canyon (County of Orange 2001). In the interim local sponsors have committed to maintain open space that is under their direct control in a manner that is consistent with the intent of the Habitat Management Plan (County of Orange 2001). We anticipate that the purchase and management of the Santa Ana River flood plain and other habitat restoration measures within the action area will be implemented over time to moderate any damage incurred by higher release flows.

Increased invasion of exotic species due to disturbance of habitats within the expanded reservoir pool area that are favorable to these species: Any project-related creation and maintenance of conditions that favor exotic plants and animals could decrease the status of the vireo and flycatcher. The increase and spread of alien plants such as arundo is continuing in the Santa Ana River watershed, including the Prado Basin. Undisturbed areas vegetated with native species are much more resistant to invasion by this and other alien plants. The alteration of the landscape within the project area and associated establishment and dispersal of select non-native plants likely will impact, and could overwhelm, native habitats in the project area. Invasive exotic plants could be established in riparian habitat impacted by activities associated with the project. Stands of arundo, castor bean (*Ricinus communis*), and other invasive, noxious non-native plants provide little habitat for the vireo and flycatcher. The vast majority of vireo nests within the Prado Basin and elsewhere have been placed in native trees and shrubs (Pike and Hays 2000).

The disturbance or removal of existing riparian can result in the creation of cowbird foraging habitat or increase cowbird parasitism events due to the fragmentation of nesting habitat (Askins 2000). Cowbirds prefer feeding in open areas such as those created by human alterations of the landscape (Garrett and Dunn 1981). There is a relatively high density of cowbirds in the Prado Basin and contiguous reaches of the Santa Ana River, possibly due to the rather close juxtaposition of host-rich riparian habitats and expansive feeding areas in and around nearby dairies, livestock operations, urban, and agricultural fields (Zembal *et al.* 1985, Hays 1987, Lowther 1993, Pike and Hays 1999).

Because the rate of parasitism of vireo nests in the Prado Basin was as high as 100 percent prior to the inception of current management efforts (Zembal *et al.* 1985), any project-related feature that creates conditions favorable to cowbirds in the project area would likely decrease the reproductive success of vireos in the absence of management. However, the cowbird trapping and removal efforts that are part of ongoing efforts by the District should effectively reduce the incidence of parasitism to the vireo or flycatcher in the Prado Basin, based on the results of several recent publications that demonstrated the efficacy of cowbird trapping programs at increasing the reproductive success for the vireo (Kus 1999, Whitfield and Sogge 1999, Whitfield *et al.* 1999, Pike and Hays 2000, Powell and Steidl 2000).

Effects to designated critical habitat for vireo

Within Prado Basin,15.2 acres of designated vireo critical habitat will be affected by increased inundation. Inundation effects include vegetation mortality that reduces the areal extent of willow riparian habitat and structural changes within the habitat, especially a loss of shrubby understory. These effects to vireo critical habitat will be offset by the creation of 37.2 acres of riparian habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

We are unaware of any future, non-Federal actions that are reasonably certain to occur within the action area that could adversely affect the vireo and its critical habitat, flycatcher, or sucker.

CONCLUSION

Measures to offset effects to vireo and flycatcher from prior water conservation projects include species monitoring and reporting, cowbird trapping, and habitat restoration. Measures to offset effects to sucker from the Mainstem project include habitat restoration and continued development and implementation of a sucker management plan. After reviewing the current status of the vireo and its critical habitat, flycatcher, and sucker, the environmental baseline for the action area, effects of the proposed action including conservation measures, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the vireo, flycatcher, or sucker or adversely modify critical habitat for the vireo. Our conclusion is based on the following findings:

1. Adequate conservation measures have been implemented from prior consultations to minimize project-related effects during non-flood season at elevations between 498 and 505 feet, and adequate conservation measures will be implemented for project-related effects during flood season between 494 and 498 feet, thus maintaining the baseline of habitat, abundance, and distribution for the vireo and flycatcher within the project action area;

2. Implementation of the proposed habitat creation efforts, plus remedial measures if necessary, will ensure that habitat function for the vireo and flycatcher is maintained within the action area;

3. Adequate conservation measures will be implemented for project-related effects to the sucker, thus maintaining the baseline of habitat, abundance and distribution of sucker within the project action area; and,

4. Implementation of the proposed exotic predator/competitor eradication plan will ensure that project-related effects to sucker are minimized.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), such incidental taking is not considered to be a prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary and must be implemented by the Corps or the District in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Corps (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

We anticipate no additional incidental take of vireo from this proposed project over that assessed in Biological Opinion 1-6-99-75 for prior water conservation activities that are still in effect during the life of this project, that is, the harm of 90 pairs of vireos or 180 individual vireos over the life of the project due to the periodic, temporary flooding, destruction or degradation of occupied habitat.

We anticipate no incidental take of flycatchers.

We anticipate incidental take of an unquantifiable number of suckers in the form of harm due to loss of breeding habitat downstream of Prado Dam and inundation effects to 2.2 to 4.8 acres of stream habitat behind the dam in the reservoir pool.

EFFECT OF TAKE

In the accompanying biological opinion, we determined that the level of anticipated take is not likely to result in jeopardy to the vireo, flycatcher and/or sucker, or adverse modification of vireo critical habitat.

REASONABLE AND PRUDENT MEASURES

The Corps shall implement the following reasonable and prudent measure.

1. Your agency or the District will ensure that adverse effects to the vireo, flycatcher and sucker resulting from the implementation of the proposed action are minimized to the maximum extent practicable.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, your agency and/or the project proponents and their agents must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1.1 The Corps and the District shall implement the project minimization measures for vireo, flycatcher and sucker as described in the section entitled "Description of the Proposed Action."

1.2 The Corps, District, or their agents shall obtain all necessary local, State, and Federal permits to implement the project. In particular, the Corps and District must obtain any necessary permits from California Department of Fish and Game. The incidental take authorization in this biological opinion is not in effect in the absence of any or all such permits.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. Your agency must immediately provide an explanation of the causes of the taking and review with this office the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend your agency consider implementing the following recommendations to further the conservation of the vireo, flycatcher, and sucker:

1. A long-term plan for restoring sucker habitat within the Santa Ana River, including Reach 8, should be developed and implemented to address the creation of stream meanders, pool-riffle complexes, upstream and downstream fish passage throughout the reach, reestablishment of riparian vegetation, and other conservation needs. Your agency should regularly participate in the monthly meetings of the Santa Ana Sucker Discussion Team.

2. The installation of low-flow rock passageways, vertical slot structures, fish locks, or other similar methods that provide fish passage through or around drop structures in the Santa Ana River should be developed and implemented. The velocity of flow in which the sucker can maintain direction and movement should be investigated so that appropriate

fish passage systems could be established at each of the drop structures between Prado Dam and Imperial Highway.

3. Conduct an annual assessment of the effects of inundation (e.g., dwell time and elevation) to the vireo, sucker, and their habitats for the life of the dam. This assessment should include baseline information such as the distribution and elevation of all vireo nests during each monitoring season for which data has been collected (i.e., approximately the past 16 years).

4. To the extent practicable, remove all invasive/exotic biota from riparian habitats in the Prado Basin. The existing cowbird management program should be continued and expanded to maximize the reproductive success of the vireo, flycatcher, and other sensitive avian species. Also, the control of invasive, exotic plants such as arundo and castor bean must continue if riparian habitats are to provide the elements necessary to accommodate the vireo, flycatcher, and a large variety of other sensitive animal taxa over time.

5. A sediment transport study should be developed and implemented in cooperation with other local, State, and Federal agencies. The sediment transport study should incorporate historical and current data and evaluate the effectiveness of the Santa Ana River as a sediment transport system. The study should address the excess sedimentation that occurs upstream of Prado Dam and the sediment deficit downstream of Prado Dam. The results of this study would be used to develop measures that would attempt to return the Santa Ana River to a fully functioning sediment transport system.

REINITIATION NOTICE

This concludes formal consultation on the proposed action as specified in your request for formal consultation. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. Any questions or comments should be directed to Jill Terp of my staff at (760) 431-9440.

Sincerely,

Karen A. Evans

Karen A. Evans
Assistant Field Supervisor

cc: Orange County Water District, C. Miller and D. Zembal

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