San Marino Environmental Associates

Habitat Conservation Plan for the Federally Endangered Unarmored Threespine Stickleback and Other Species of Special Concern at The Newhall Land and Farming Company's Crossings of the Santa Clara River, Los Angeles and Ventura Counties, California

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Revised February 2004

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EXECUTIVE SUMMARY

The Newhall Land and Farming Company has applied for a permit pursuant to section 10(a) (1) (B) of the Endangered Species Act of 1973 (16 U.S.C. 1531–1544, 87 Stat. 884) (Act), as amended from the U.S. Fish and Wildlife Service (Service) for the incidental take of the unarmored threespine stickleback, Santa Ana sucker, arroyo chub, California red–legged frog, southwestern pond turtle, and two–striped garter snake. The proposed incidental taking would occur within the area of the six historical river crossings and two water diversions on the Santa Clara River on property owned by The Newhall Land and Farming Company, the Addressee, in Los Angeles and Ventura counties, California. While no federal permitting is required, The Newhall Land and Farming Company proposes to implement the habitat conservation plan (HCP) described herein which provides measures for minimizing and mitigating possible adverse effects on the unarmored threespine stickleback, Santa Ana sucker, arroyo chub, California red–legged frog, southwestern pond turtle, and two-striped garter snake in order to formalize previously approved avoidance practices. The Newhall Land and Farming Company is requesting the section 10(a)(1)(B) permit be issued for a period of 50 years.

This HCP delineates the responsibilities of the Newhall Land and Farming Company for all past, present and future activities described herein. This document describes measures that will be implemented by The Newhall Land and Farming Company to minimize and mitigate the impacts of the project to unarmored threespine stickleback, Santa Ana sucker, arroyo chub, California red–legged frog, southwestern pond turtle, and two–striped garter snake and their habitats and to further the conservation of these species. These measures include the implementation of a Take Avoidance Plan and recognition that the structures are self mitigating. The HCP also defines measures to ensure that the elements of the HCP are implemented in a timely manner. Funding sources for implementation of the HCP, actions to be taken for unforeseen events, alternatives to the proposed action, and other measures required by the Service are also discussed. Reports documenting the presence of the target species at The Newhall Land and Farming Company river crossings and water diversions, and other pertinent supporting documents, are included in the Appendices.

1.0 PROJECT DESCRIPTION

1.1 Site Description

The project area contains six specific crossing sites and two water diversion sites all of which are on the property of The Newhall and Land Farming Company. The project sites are distributed over approximately 8 miles of the Santa Clara River in Los Angeles and Ventura Counties.

The Santa Clara River is the largest river system in southern California that remains in a relatively natural state. The Santa Clara River flows westward approximately 84 miles from its source to the Pacific Ocean. The river transverses Los Angeles and Ventura Counties, is fed by several streams flowing south out of the San Rafael Mountains in the Transverse Range, and then flows into the Pacific Ocean at Ventura. The Santa Clara river along its entire length is a braided stream with such characteristic structures as point bar deposits, gravelly stream bottoms, and broad, wide washes. Such structures manifest themselves in cut and fill structures and interbedded silt, sand, and gravel lenses. In addition, a relatively wide floodplain area forms the surrounding flat–lying areas of the river. In these areas, finer grained material is the dominant sediment size.

Much of the middle and upper terrace zones have been converted to agriculture. This conversion took place early, by 1927. The distribution and gross extent of riparian woodlands, the vegetation characteristic of the higher terraces, have not diminishes markedly in the last 50 years (Faber et al 1989). However, in recent years, activities such as off–road vehicle traffic, mining, natural flooding, and urban development have resulted in thinning and fragmentation of these woodlands (Faber *et al* 1989).

Table 1 lists the names of the crossing/diversions from upstream to downstream and provides the acreage at each site.

Table 1. Crossing/Diversion Site Names and Acreages. The acreage indicated is the maximum area that can be disturbed under permits from the California Department of Fish and Game and the U.S. Army Corps of Engineers. The total permitted acreage is 14.18 acres, however this maximum allowable disturbance area is rarely if ever utilized; under most conditions the installation and removal results in the disturbance of significantly less area.

Site Name	Type	Ft^2/Acreage
Humble	crossing	63,000/1.45
Long Canyon	crossing	74,000/1.70

Alfalfa	crossing	94,000/2.16
Mayo	crossing	81,000/1.86
Salt Creek	crossing	114,000/2.62
Summer	crossing	60,000/1.38
Camulos	diversion	67,000/1.54
Isola	diversion	64,000/1.47

Each of the sites within the project area is shown on Figure 1 (page 9) and is individually described below. The position of the crossings/diversions is also indicated on the USGS topographic sheets in the rear pocket. Each of the crossing sites has been in use for over 40 years.

The descriptions of individual project sites which follow refer to four vegetational communities: (1) Mulefat Scrub, (2) Southern Cottonwood/Willow Riparian Forest, (3) Southern Willow Riparian Woodland, and (4) Southern Willow Scrub. Each of these communities is briefly described below. It should be noted that the installation/removal of the crossings and diversions will not have any impacts on the vegetation communities described at each crossing because the roads have been in place many years and stream channel materials will be used for construction of the crossings/diversions.

Mulefat Scrub

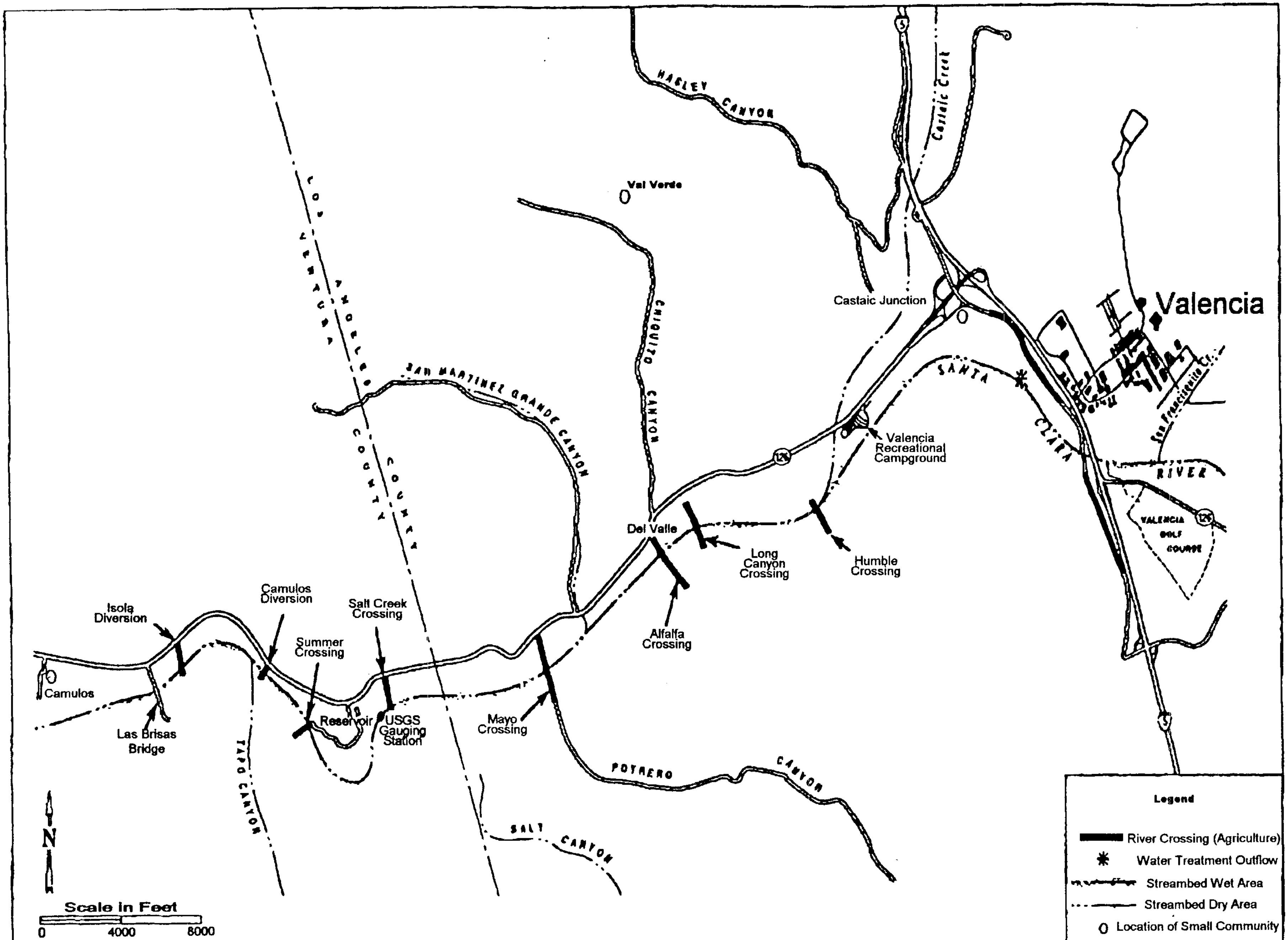
Mulefat scrub is an early seral community maintained by frequent flooding and thus is most frequently found adjacent to the active channel. The dominant plant species is mulefat. Other associated species include narrow—leaved willow, and the invasive non—native giant cane and tamarisk. When flooding is infrequent the succession of willow and cottonwood dominated communities is favored and mulefat scrub becomes uncommon.

Southern Cottonwood/Willow Riparian Forest

Southern cottonwood/willow riparian forest is a moderately dense, multilayered community dominated by Fremont cottonwood and red willow. Mulefat, arrow weed, and a variety of willows are also found in the shrubby understory. Other associated plants include black cottonwood, blackberry, California bay, hoary nettle, mugwort, and wild grape.

Southern Willow Riparian Woodland

Southern willow riparian woodland is characterized by dense to open stands of mature willow trees that develop after 15 to 20 years. Dominant willow species include red willow and arroyo willow. Scattered Fremont cottonwood, black cottonwood, and western sycamore are also typically part of this community.



Map by ACS, revised 4/97 by SMEA

Location of Temporary River Crossings and Water Diversions Along the Santa Clara River

FIGURE 1

The understory is composed of shrubby willows, such as narrow-leaved willow and arroyo willow, and mulefat.

Southern Willow Scrub

Southern willow scrub is dominated by dense thickets of one or more willow species, including arroyo willow, red willow, and narrow-leaved willow. Mulefat is often found as a codominant species in this community. Little understory exists because of the dense shrub cover. Young trees of willow, Fremont cottonwood and occasionally sycamore grow in this community. Establishment typically occurs along recently deposited or scoured banks and gravel bars where bare areas have been created and a moist substrate provides water for seedlings during the growing season.

Crossing Descriptions

Humble Crossing.
Humble crossing has a very narrow band of riparian vegetation along the north side of the Santa Clara River that is backed by agricultural fields. The riparian community is southern willow scrub at the crossing site on both the north and south banks (see Figure 2 on page 11). The willow scrub on the south bank is thicker than that found on the north bank and is less disturbed. The, north bank contains giant cane thickets adjacent to the crossing. There is a southern willow riparian woodland on the south bank, however this community is upstream of the crossing and will be unaffected by the crossing installation/removal. Please note that the aquatic habitat in Figure 2 is wider than it will be during construction due to a 300 cfs release from Castaic Reservoir at the time the photographs were taken.

Long Canyon Crossing.
The Long Canyon crossing is closely constricted by agricultural fields on the north side. The north side of the crossing essentially lacks any native plant community, although there are a few isolated willows. Downstream of the crossing on the south side of the river there is a narrow band of southern willow scrub behind which is a small patch of southern cottonwood/willow riparian forest, these communities can be seen in Figure 3 (page 12).

Figure 2. Humble crossing. The photograph was taken from the north bank looking down the axis of the crossing. This figure shows the southern willow scrub backed by more upland plant communities on the south bank, as well as the narrow willow scrub on the north bank. Note the absence of development of annual emergent vegetation along the stream at this time of year. (Photo: March 1997)

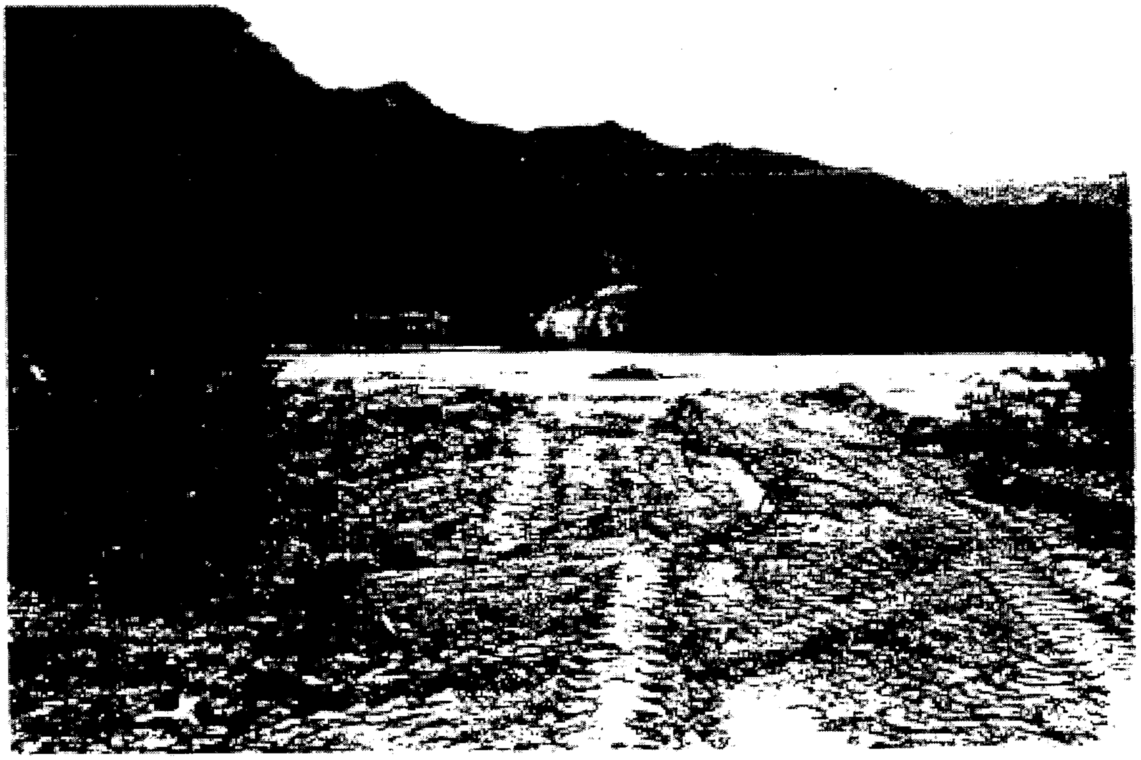


Figure 3. Long Canyon crossing. The photograph was taken from the north bank looking south along the axis of the road. Downstream of the crossing on the south side of the river there is a narrow band of southern willow scrub behind which is a small patch of southern cottonwood/willow riparian forest. (Photo: March 1997)

Alfalfa Crossing.
The Alfalfa crossing has agricultural fields on both the north and south sides of the river. Neither bank has a significant riparian community development but instead they are characterized by isolated patches of vegetation of small aerial extent. There is a patch of southern cottonwood/willow riparian forest on the south bank on the east side of the road (see Figure 4 on page 14). To the west of the road on the north bank is a sparse willow scrub with mulefat.

Mayo Crossing.
The Mayo crossing has agricultural fields to the east of the road on the north side of the river as well as some areas of southern willow scrub. On the north and the south side of the river to the west of the road is southern cottonwood/willow riparian forest with patches of southern willow scrub, these areas have been degraded by cattle grazing. To the east of the road on the south side of the river are areas of southern willow riparian woodland and southern willow scrub and behind them is southern cottonwood/willow riparian forest. There are patches of mulefat both east and west of the river (see Figure 5 on page 15).

Salt Creek Crossing.
The north side of the river has a broad area of southern willow scrub along the river channel which is backed by agricultural land. The south side of the river contains some mulefat at scrub in the active channel and further up out of the active channel there is a thin band of southern willow scrub and southern willow riparian woodland behind which is an agricultural field. The active channel is very wide at this location. The Newhall Land and Farming Company has an above ground water pipeline installed seasonally, within the footprint of the road, at this location (see Figure 6 on page 16).

Figure 4. Alfalfa crossing. This photograph was taken from the north looking south along the axis of the crossing. The absence of vegetation in the work/impact area can be seen. The low flow channel during installation/removal will be considerably narrower as the channel is carrying a 300 cfs release from Castaic Reservoir in the photograph. (Photo: March 1997)

Figure 5. Mayo Crossing. The photograph was taken from the north side of the river looking south along the axis of the road. It can be seen that there is no vegetation in the area that is impacted by crossing installation and removal.
(Photo: March 1997)

Figure 6. Salt Creek crossing. This photograph was taken from the north side of the river looking south along the road crossing. This photograph was taken approximately 2 months after the crossing installation. (Photo: May 1997)

Summer Crossing.
There is a narrow band of southern cottonwood/willow riparian forest on the south side of the river to the east of the crossing and along the north side of the river to the east of the crossing there is a broad expanse of this community with some southern willow riparian woodland. To the west of the crossing on both sides of the river there is some southern willow scrub and on the upper slopes are orange orchards (see Figure 7. on page 18).

Camulos Diversion.
The south side of the active channel is edged by southern willow scrub (see Figure 8 on page 19). Beyond the willow scrub is an orange orchard. The north side of the active channel has mature willows and what would be a southern willow riparian woodland but there is ungrouted riprap about 8 meters (24 feet) from the active channel making this a very narrow plant community.

Isola Diversion.
The south side of the river at the Isola diversion has southern willow scrub with a narrow band of southern willow riparian forest behind it (see Figure 11 on page 20). There is an orange orchard behind the willow communities. On the north side of the river in the area of the actual diversion there is no native plant community the area is highly disturbed (see Figure 11 on page 20) with patches of giant reed. Adjacent to the diversion there are some willows and a couple of cottonwoods.- This area is bounded by an orange orchard which is only about 40 meters from the water edge at the diversion point.

Figure 7. Summer crossing. This photograph was taken from the north side of the river from the edge of the orange grove looking south along the axis of the road crossing. The orchards on the south side of the river can be seen in this figure. (Photo: March 1997)

Figure 8. Camulos diversion. This photograph was taken from the north side of the river and looks south across the axis of the diversion. As can be seen there is southern willow scrub on the south side of the river. The north side of the river has mature willows and what would be southern willow riparian woodland but there is ungrouted riprap about 24 feet from the active channel. (Photo: March 1997)

Figure 9. Camulos diversion. This photograph was taken from the north side of the river looking south across the river. The diversion area can be seen in the foreground. (Photo: March 1997)

Figure 10. Isola diversion. This photograph taken from the north side of the river shows the actual diversion pool, (Photo: May 1997)

Figure 11. Isola diversion. This photograph was taken from the north side of the river just below the orange orchard. The diversion pool is in the foreground, giant reed on the north side of the river is visible as are the willow habitats on the south side of the river. (Photo March 1997)

Six aquatic species are covered by this habitat Conservation Plan (HCP): (1) unarmored threespine stickleback, *Gasterosteus aculeatus williamsoni*; (2) Santa Ana sucker, *Catostomus santaanae*; (3) arroyo chub, *Gila orcutti*; (4) California red-legged frog, *Rana aurora draytonii*; (5) Southwestern pond turtle, *Clemmys marmorata pallida*; and (6) two-striped garter snake, *Thamnophis hammondii*. The six species covered by this HCP and their documented presence at the project sites over the last six years is summarized in Table 2.

Table 2. Known occurrence of the sensitive aquatic species at the crossings/diversions. The shaded boxes indicate that the species has been recorded at least once from that project site within the last six years.

Project Site	1	2	3	4	5	6
Humble crossing						
Long Canyon crossing						
Alfalfa crossing						
Mayo crossing						
Salt Creek crossing						
Summer crossing						
Camulos diversion						
Isola diversion						

1 unarmored threespine stickleback, *Gasterosteus aculeatus williamsoni*
2 Santa Ana sucker, *Catostomus santaanae*
3 arroyo chub, *Gila orcutti*
4 California red-legged frog, *Rana aurora draytonii*
5 southwestern pond turtle, *Clemmys marmorata pallida*
6 two-striped garter snake, *Thamnophis hammondii*

Appendix 1 contains a sample report documenting the presence of sensitive aquatic species identified during river crossing installation.

1.2 History of the Habitat Conservation Planning Process

The Habitat Conservation Plan includes only The Newhall Land and Farming Company's lands; there are no other stakeholders. Historically, The Newhall Land and farming Company has avoided any take of endangered species by voluntarily implementing the Take Avoidance Plan substantially as outlined in this document. Because no federal permits are required for the activities, the Take Avoidance Plan was carried out by qualified biologists under their California collecting permits, M.O.U.s with California Department of Fish and Game along with their federal endangered species permits. Recently, the U.S. Fish and Wildlife Service placed restrictions on the federal endangered species permits which prohibited the biologists from implementing the Take Avoidance procedures. That led to discussions with personnel from the U.S. Fish and Wildlife Service Ventura field office on 14 February, 1997, when the Service suggested the HCP as an alternative to the previously used federal permits. The Service suggested that with some expansion of the Take Avoidance Plan, they could expeditiously process an HCP and if The Newhall Land and Farming Company was unhappy with the process, the application could be withdrawn at any time. San Marino Environmental Associates have been in contact with Kirk Waln of the U.S. Fish and Wildlife Service Ventura field office throughout the process.

1.3 Proposed Action

The Newhall Land and Farming Company (NLF) owns lands bisected by the Santa Clara River. The Newhall Land and Farming Company's agricultural operations and related activities along the Santa Clara River require that vehicles and equipment be able to cross the river to access existing fields and to conduct other operational activities. Crossings have been constructed at key locations permitting farm equipment to access fields on either side of the river without having to enter the flowing water. Once installed, vehicle crossings allow fish to freely move up and downstream through culverts placed within the channel.

NLF has historically installed six river crossings and two water diversions during the early spring to permit access to farming and other operations on either side of the Santa Clara River and to supply water to downstream operations (Figure 1). As part of an existing maintenance agreement with the California Department of Fish and Game and an activity exempted from Section 404 by the U.S. Army Corps (see Appendix 2), these crossings and water diversions should be removed prior to being washed out by high winter flows.

Each of the six river crossings are constructed in a similar manner. Steel pipes are installed within the River Channel (the area in which the river normally meanders), local materials are used as fill material between the pipes, and a roadway is constructed over the top of the pipes. Once installed, the river water flow becomes protected from farm equipment accessing either side of the river. Installation of the crossings usually requires only a few hours. to complete, and impacts to the aquatic habitat are minimal. The two water diversions, also constructed from local materials, using similar techniques to direct surface water flows into existing intake pipes.

Installation activities have routinely required that the work area within the low flow channel(the area in which water flows during the summer months) first be cleared of any existing fish. NLF has exercised caution when installing or removing the crossings, because the endangered unarmored threespine stickleback (Gasterosteus aculeatus williamsoni) occasionally has been encountered at some of the crossings. Typically, a qualified fishery biologist installs blocking nets both up and downstream of the work area, seines all fish from within the work areas, and releases/relocates captured fish at downstream locations to prevent their return to the work site. Once the fish are removed, the pipes are installed and the crossings constructed.

Removal of the river crossings is a slightly different process. First, blocking nets are installed upstream of the work area. All fish are netted between the blocking net and the existing crossing. Any fish existing within the work area, immediately downstream of the crossings are also netted and released at downstream locations. The old roadway is removed along the centerline of the crossing until the pipes are exposed. The pipes are then removed to upland areas adjacent to the work area and the river channel is returned to its preexisting grade. This work is usually completed prior to the rainy season to prevent pipes from being washed downstream. Any culvert pipe installed within the two diversion structures is also removed at the end of the season.

The Take Avoidance Plan described in Section 3.0 describes the proposed installation procedures in greater detail.

In addition to the Take Avoidance Plan being utilized for the installation and removal of water diversions, we have also done an assessment of the operation of the diversions. In regard to the operation of the Isola diversion, water is conveyed to the pump reservoir via an 18″ PVC pipe which extends below ground from the pump reservoir to the pool area created by the diversion berm. The pipe then turns upward with a 900 elbow and extends toward the surface of the pool, typically extending to within approximately two inches from the surface of the pool. Water flows into the pipe under the influence of gravity with the volume of flow being regulated by the surface elevation of the pool. Under this design, the pipe operates as a weir collecting surface flows where fish typically are not present.

The Camulos diversion is a permanent structure located on Newhall's property and is operated by the Camulos Ranch. However, under certain conditions, Newhall utilizes the diversion as well. An earthen dike is installed to elevate the water level flowing through the diversion. Water in the top several inches of the flow in the diversion pass over a weir and flow by gravity into a diversion box. This design effectively operates in a fashion similar to the Isola diversion and is unlikely to take species covered in the plan.

Because of the design of the diversions, rapid flows in the area, and the biology of the covered species, it is highly unlikely that individuals of these species would be captured in the diversions. Therefore, based on consultation with the Service, no additional measures to minimize incidental take are considered to be necessary and the affects of the diversions will not be further discussed in the HCP. If at some point it is necessary to redesign the current method of diverting flows, Newhall will discuss the potential affect of the new design with the Service, as identified in the modifications and amendments section.

2.0 BIOLOGICAL DATA AND SPECIES OF SPECIAL CONCERN

2.1 Unarmored threespine stickleback, *Gasterosteus aculeatus williamsoni* Girard

2.1.1. Species Description and Overall Status

2.1.1.1. Species Description/Legal Status

Threespine sticklebacks are small, laterally compressed fish.

They have three sharp spines on the back in front of the soft dorsal fin. The pelvic fin is reduced to a single stout spine and a small ray. Their eyes are large and the mouth terminal, but slanting slightly upward. The caudal peduncle is narrow. They lack spines but may possess a variable number of bony plates on their sides. This subspecies of the threespine stickleback, is listed as Federally Endangered.

2.1.1.2 Status of the Species throughout its Range

In California, the presence of *Gasterosteus aculeatus* in most coastal drainages has been well documented beginning in the mid-1800s (e.g., Girard 1854). Recent texts and field guides still list *Gasterosteus aculeatus* as present in virtually all coastal streams of California (e.g., Moyle 1976; McGinnis 1984). Miller and Hubbs (1969) recognized three subspecies in California: (1) *Gasterosteus aculeatus aculeatus,* a typically anadromous form with a complete row of lateral plates extending from the anterior portion of the body to the caudal peduncle; (2) *Gasterosteus aculeatus microcephalus,* a freshwater resident with the lateral plates restricted to the anterior portion of the body; and (3) *Gasterosteus aculeatus williamsoni,* a subspecies that lacks lateral plates and has a limited distribution within southern California.

Gasterosteus aculeatus williamsoni, the unarmored threespine stickleback, was described by Girard in 1854, however the type locality in the headwaters of the Santa Clara River near Acton was not unequivocally identified until 1960 (Miller 1960). At one time unplated sticklebacks were abundant throughout the Los Angeles basin (Culver and Hubbs 1917) but have been extirpated presumably as a result of increased urbanization in the region (e.g., Miller 1961; Irwin and Soltz 1982). *Gasterosteus aculeatus williamsoni* had been extirpated in the Los Angeles and Santa Ana Rivers by the early 1930s, whereas it survived in the San Gabriel River into the 1940s but was gone before the end of the decade (Miller 1961). Surveys conducted during the 1980s corroborate the absence of sticklebacks from these three drainages (Haglund, unpubl. data; Swift, pers. comm.).

Exploratory work by Baskin and Bell (1976) also led to the discovery of a population of sticklebacks in San Antonio Creek (Santa Barbara County) of questionable taxonomic status that had a mean lateral plate number intermediate between *Gasterosteus aculeatus microcephalus* and *Gasterosteus aculeatus williamsoni*. Most recently a population of unplated sticklebacks was discovered in Shay Creek, tributary to Baldwin Lake in San Bernardino County.

Initially all unplated populations were considered to be *Gasterosteus aculeatus williamsoni* (e.g., Miller and Hubbs 1969).

Gasterosteus aculeatus williamsoni was listed by the U.S. Fish and Wildlife Service as an endangered species in 1970 (Federal Register 35: 16047). The Revised Recovery Plan for the Unarmored Threespine Stickleback (1985) recognized the upper Santa Clara River and San Antonio Creek populations as extant populations of the federally endangered *Gasterosteus aculeatus williamsoni* while postponing judgment on the Shay Creek population.

2.1.1.3 Primary Threats to Continued Existence

The unarmored threespine stickleback is threatened by habitat destruction through channelization, urbanization, and water quality degradation. In addition the introduction of many non-native predators and competitors into the Santa Clara River threaten the stickleback. Increasing use of ORVs is a more recent threat to the stickleback. Since 1990, the Santa Clara River has been subjected to two major oilspills and at least one more minor spill. These spills are an indication of the threat posed by the pipeline and transportation corridors along and across the Santa Clara River.

Because the unarmored threespine stickleback is a subspecies, the integrity of its gene pool is threatened by introgression with another subspecies found downstream in the Santa Clara River. Any activity that promotes more continuous water flow between the currently unconnected sections of the river poses a threat. These threats include but are not limited to increased treated water discharge, increased runoff due to urbanization, and increased agricultural return flows.

2.1.1.4 Biology and Ecology

Stickleback occur throughout the stream but tend to gather in areas of slow flow or standing water. In fast flowing stream sections they are found in eddies behind obstructions or along the edge of the stream where vegetation slows the flow.

During breeding season male sticklebacks develop a distinctive nuptial coloration (red throat, blue sides and a blue eye). Males defend territories adjacent to vegetation where they construct a nest. The nest is constructed by excavating a depression in the substrate, placing a mound of algal strands and other plant material in the depression, and gluing the material together with a sticky kidney secretion. Once formed, the male creates a tunnel in the nest by wriggling his way through the mound. Once the nest has been completed the male performs an elaborate courtship which entices females to lay their eggs in the nest. Males attract several females to the nest, each of which will lay from 50-300 eggs. After the courtship phase has passed males defend the eggs and care for them while they develop. One activity during this period is "fanning".

"Fanning" males use their pectoral fins to create water currents that flow over the eggs. This activity is apparently necessary for normal development of the eggs. The eggs take approximately 6-8 days to hatch at 18-20°C. The fry remain in the nest for the first couple days during which time the male continues to guard them (Wootton 1976; Haglund 1981).

Two features of the sticklebacks habitat appear to be essential for the survival of the young. First a slow flow of clear water is necessary for the proper development of the eggs. Any form of pollution or even small amounts of turbidity may interfere with normal development. Second, once the fry emerge, aquatic vegetation must be present along the shoreline to supply cover and abundant microscopic food organisms (Ono et *al.* 1983).

Based on size—frequency curves, gonadal examination and field observations, there is some reproduction in most months if stream flows remain low. There is however, a peak reproductive time in the spring, beginning in about March. This reproductive peak continues into the early summer then attenuates through late summer and fall. Minimum reproduction occurs in the winter months.

The species apparently lives for only one year. Thus stickleback populations tend to decline in the winter due to natural mortality and low recruitment.

Sticklebacks are opportunistic feeders relying upon a wide variety of foods. They appear to prefer insects but at times snails may be important while flatworms and nematodes comprise only a small percentage of the diet.

Sticklebacks are preyed upon by a wide variety of organisms. Wading birds such as herons have been observed feeding on sticklebacks. Other native predators include the two-striped garter snake, *Thamnophis hammondii,* (Bell and Haglund 1981) and belostomatid water bugs, *Belostoma* sp., (pers obs). The southwestern pond turtle may occasionally feed on stickleback eggs (Haglund, unpubl. data). Introduced organisms also prey upon the stickleback. These include fishes, such as bullheads *(Ictalurus)* and sunfishes *(Lepomis),* and the African clawed frog *(Xenopus laevus).*

2.1.2 Survey Dates and Occurrence of Unarmored Threespine Sticklebacks in the Project Areas

Table 3. The data in the following table indicates the frequency with which the unarmored threespine stickleback has been encountered at each of the crossing/diversion sites over a six year period. The dates in the boxes indicate survey dates, shaded boxes indicate that unarmored threespine sticklebacks were captured, unshaded boxes indicate the absence of sticklebacks on the survey dates.

YEAR	CROSSINGS						DIVERSIONS	
	Humble	Long Canyon	Alfalfa	Mayo	Salt Creek	Summer	Camulos	Isola
1992	18 May	23 May	14 May	21 May	18 May 23 May	No Data	No Data	No Data
1993	20 May 26 Oct	17 May 9 Nov[1]	26 Oct	6 May 9 Nov[1]	26 Oct	9 Nov[1]	13 May 12 June	No Data
1994	27 May	10 Apr	10 Apr 27 May	8 Apr	6 Apr 27 May	6 Apr	23 June	No Data
1995	7 June 15 Dec	15 Dec	No Data	15 Apr 21 Apr 15 Dec	10 Apr 15 Dec	10 Apr 26 Apr 27 Nov	12 July	23 June
1996	4 Apr 11 June	4 Apr	9 Jan 4 Apr	4 Apr	4 Apr	4 Apr	No Data	No Data
1997	1 Apr	1 Apr	1 Apr	31 Mar	31 Mar	31 Mar	11 Apr	No Data

[1] Courtois listed the sticklebacks he captured during these surveys as partially armored.

As can be seen from the data in Table 3, sticklebacks are frequently found at one or more of the project sites. The inconsistency of occurrence is a function of the dynamic physical environment. The Santa Clara River is a dynamic system and as a consequence, although stickleback habitat is always present along the river its quantity, quality, and distribution varies annually.

2.1.3 Effects of the Proposed Action on Unarmored Threespine Stickleback

The proposed action is expected to have no long term effects on the unarmored threespine stickleback. During installation/removal of the crossings/diversions there will be a short period of time when a plume of turbid water will be transported downstream. Such a pulse of turbidity will be no worse than that caused by a storm induced flood flow. The elevated turbidity caused by project activities lasts only a couple of hours, usually on only four days out of the year. Such a transitory increase in suspended sediment load is unlikely to significantly affect respiration, prey capture, predation or any other aspect of the stickleback's life history. Furthermore, the timing of the installations/removals will also reduce the potential for impact on the stickleback. The work will be done outside the primary reproductive season of the stickleback. The implementation of the Take Avoidance Plan described later in this document will also serve to minimize take due to injury or mortality. Previous experience with the proposed procedures has resulted in a known mortality of less than 0.1% of juvenile and adult sticklebacks captured and handled (less than 1 out of every 1,000 fish handled - Haglund, unpubl data). Therefore the project should have only a minimal effect on individual unarmored threespine sticklebacks in the affected stream reaches and little if any long term impacts on the species.

Finally the creation of slow water behind the road crossing will actually create stickleback habitat therefore causing a beneficial impact. Algae develops in the pool habitat along with areas of fine substrate. The sticklebacks utilize these still areas as nesting sites. Stickleback nests are typically built of algae on fine substrate and fine substrate may be placed on the nest to further camouflage it. The still areas with emergent vegetation that develop in the pools provide fry rearing habitat.

2.2 Santa Ana sucker, *Catostomus santaanae* (Snyder)

2.2.1 Species description and overall status

2.2.1.1 Species Description/Legal Status

Santa Ana suckers are small catostomids with adults commonly less than 175mm SL (standard length). Their gross morphology is generally similar to that of mountain suckers *(Catostomus platyrhynchus)* and they possess notches at the junctions of the lower and upper lips as do mountain suckers. Large papillae are found on the anterior of the lower lip but papillae are poorly developed on the upper lip. The jaws have cartilaginous scraping edges inside the lips. There are 21-28 gill rakers on the external row of the first arch and 27–36 on the internal row. This species has 67–86 lateral line scales; 9–11 dorsal fin rays, usually 10; and 8-10 pelvic fin rays. The axillary process at the base of the pelvic fins is represented only as a simple fold. They possess a short dorsal fin and a deep caudal peduncle. The fish are silver ventrally while the dorsal surface is darker with irregular blotching. The degree of dorsal darkening and blotching is variable. Breeding males develop breeding tubercles over most of the body, but the tubercles are most dense on the caudal and anal fins and the caudal peduncle. Reproductive females possess tubercles only on the caudal fin and peduncle (Moyle 1976). The review of a listing proposal for this species has just been completed by the U.S. Fish and Wildlife Service. It was determined that sufficient evidence was presented to justify listing however, because no immediate threat of extirpation existed, the sucker's listing would be delayed until the listing of species in more immediate threat of extirpation was completed.

2.2.1.2 Status of the Species Throughout its Range

Catostomus santaanae was originally described as *Pantosteus santa-anae* by Snyder in 1908 based on specimens collected from the Santa Ana River, Riverside, California. The hyphen was dropped from the specific name and the species was assigned to the genus *Catostomus* by Smith in 1966. Smith considers *Pantosteus* to be a subgenus of *Catostomus*. The older literature uses the name assigned by Snyder. A complete synonymy is provided in Smith (1966).

Santa Ana suckers are endemic to the Los Angeles basin. Their original range included only the Los Angeles, Santa Ana and San Gabriel river systems (Smith 1966). Today small populations are still found in the Santa Ana River; Tujunga Wash in the Los Angeles River system (possibly extirpated); and in the upper San Gabriel River system (Swift *et al.*, 1990; 1993). The Santa Ana sucker is presently listed as a Species of Special Concern in the state of California. Large populations are found only in the San Gabriel River. For this reason Swift *et al.* (1990; 1993) suggested that the East, West and North Forks of the San Gabriel River be considered for status as a Native Fish Management Area for this species. An introduced population exists in the Santa Clara River, however, this population is in decline and throughout the lower portion of the drainage has hybridized with another introduced sucker, the Owens River sucker, *Catostomus* *fumeiventris* (Haglund unpubl. data).

2.2.1.3 Primary Threats to Continued Existence

The Santa Ana sucker is threatened by elimination or alteration of its stream habitats, reduction or alteration of stream flows, pollution, and introduced species. The fact that this fish is in such trouble is indicative of the poor state of the streams in the Los Angeles basin, which suffer from multiple and cumulative effects of many agents.

In lowland areas, virtually all of the habitats once used by this species have been channelized, dewatered, or otherwise altered. In upland areas, most streams have been either dammed or diverted, or are continually threatened by mass erosion of destabilized hillsides, by gold dredging (suction dredging) and other mining activities, and by grazing or other heavy uses of the riparian area. For example, mining activity has increased in recent years on Cattle Canyon, a tributary of the East Fork of the San Gabriel River, resulting in the apparent elimination of sucker populations in Cattle Canyon.

A number of the remaining populations of the Santa Ana sucker live below dams or in river reaches dependent on wastewater from sewage treatment plants. The flows of Big Tujunga Creek below Big Tujunga Dam vary so greatly that an artificially enhance trout population cannot maintain itself and all the native fish are subject to extirpation. The population in the West Fork of the San Gabriel River is constantly threatened by high releases of sediment laden water from Cogswell Reservoir, which have devastated the stream in the past. In the Santa Ana River, the main population depends on adequate releases of water from Prado Dam. In earlier years, water diversions for power generation probably often dried up the lower reaches of the Santa Ana River during the summer.

Introduced species are a constant threat to the Santa Ana sucker populations. For example, the sucker formerly inhabited the upper Santa Ana River in the San Bernardino Mountains, but seems to have been eliminated by introduced predatory brown trout. The introduced suckers of the Santa Clara River are potentially threatened by introgression with Owens suckers introduced into the lower Santa Clara River. Other populations are threatened by the red shiner (potential competitor and egg predator), green sunfish (potential predator), and smallmouth bass (potential predator).

2.2.1.4 Biology and Ecology

Santa Ana suckers are found in small to medium sized streams, usually less than 7 meters in width, with depths ranging from a few centimeters to over a meter (Smith 1966; Deinstadt *et al.* 1990). Flow must be present but it can range from slight to swift. The native streams were all subject to severe periodic flooding, thus suckers prefer clear water but can tolerate seasonal turbidity. The preferred substrates are gravel and cobble but may also include sand. Santa Ana suckers are associated with algae but not macrophytes. Although the sucker seems to be quite generalized in its habitat requirements, they are intolerant of polluted or highly modified streams.

The only substantial life history study done on this species studied the introduced Santa Clara River population (Greenfield *et al.* 1970). Spawning in this species occurs from April until early July but peaks in late May/early June. The eggs are demersal and are spawned over gravel. Fecundity is high for such a small sucker species, ranging from 4,423 eggs in a 78mm SL (standard length) female to 16,151 in a 158mm SL female. The Santa Ana sucker is relatively short-lived, few individuals survive beyond their second year and none beyond the third year. They are reproductively mature in their first year and thus will typically spawn for two years. The species is more fecund than most other catostomids. Growth rates suggest first year individuals reach 61mm, second years 77–83mm and by the third year 141-153mm SL. Development of the eggs and larvae is described by Greenfield *et al.* (1970).

Greenfield et al. (1970) found that detritus, algae and diatoms comprised 97% of the stomach contents while aquatic insect larvae, fish scales and fish eggs accounted for the remaining 3%. Larger specimens usually had an increased amount of insect material in their stomachs. The herbivorous trophic status of the Santa Aria sucker is substantiated by it's long intestine with up to 8 coils.

2.2.2 Survey Dates and Occurrence of Santa Ana Suckers in the Project Areas

Table 3. The data in the following table indicates the frequency with which the Santa Ana sucker has been encountered at each of the crossing/diversion sites over a six year period. The dates in the boxes indicate survey dates, shaded boxes indicate that Santa Ana suckers were captured, unshaded boxes indicate the absence of suckers on the survey dates.

YEAR	CROSSINGS						DIVERSIONS	
	Humble	Long Canyon	Alfalfa	Mayo	Salt Creek	Summer	Camulos	Isola
1992	18 May	23 May	14 May	21 May	18 May 23 May	No Data	No Data	No Data
1993	20 May 26 Oct	17 May 9 Nov	26 Oct	6 May 9 Nov	13 July 26 Oct	9 Nov	13 May 12 June	No Data
1994	27 May	10 Apr 9 Nov	10 Apr 27 May	8 Apr	6 Apr 27 May	6 Apr	23 June	No Data
1995	7 June 15 Dec	31 Mar 21 Apr 15 Dec	21 Apr	15 Apr 21 Apr 15 Dec	10 Apr 15 Dec	10 Apr 26 Apr 27 Nov	12 July	23 June
1996	4 Apr 11 June	4 Apr	9 Jan 4 Apr	4 Apr	4 Apr	4 Apr	No Data	No Data
1997	1 Apr	1 Apr	1 Apr	31 Mar	31 Mar	31 Mar	11 Apr	No Data

As can be seen from the data in Table 4, suckers are frequently found at one or more of the project sites. The inconsistency of occurrence is a function of the dynamic physical environment. The Santa Clara River is a dynamic system and as a consequence, although sucker habitat is always present along the river its quantity, quality, and distribution varies annually.

2.2.3 Effects of the Proposed Action on Santa Ana Suckers

The proposed action is expected to have no long term effects on the Santa ana sucker. During installation/removal of the crossings/diversions there will be a short period of time when a plume of turbid water will be transported downstream. Such a pulse of turbidity will be no worse than that caused by a storm induced flood flow. The elevated turbidity caused by project activities lasts only a couple of hours, usually on only four days out of the year. Such a transitory increase in suspended sediment load is unlikely to significantly affect respiration, prey capture, predation or any other aspect of the sucker's life history. Furthermore, the timing of the installations/removals. will also reduce the potential for impact on the sucker. The work will be done outside the primary reproductive season of the sucker. The implementation of the Take Avoidance Plan described later in this document will also serve to minimize take due to injury or mortality. Previous experience with the proposed procedures has resulted in no known mortality of the juvenile and adult suckers captured and handled (no mortality among approximately 500 fish handled - Haglund, unpubl data). Therefore the project should have only a minimal effect on individual Santa Ana suckers in the affected stream reaches and little if any long term impacts on the species.

Additionally, the road crossings actually create sucker habitat therefore causing a beneficial impact. Downstream of the crossing (at the culvert outflow) the accelerated flow usually produces a scour pool with good current and an adjacent eddy. This is good sucker habitat and suckers are frequently found in these areas even when they were not present at the site prior to the road installation.

2.3 Arroyo chub, *Gila orcutti* (Eigenmann and Eigenmann)

2.3.1 Species Description and Overall Status

2.3.1.1 Species Description/Legal Status

The arroyo chub is a small fish that averages 120mm TL (total length) although occasionally large individuals may reach 300mm TL. They possess a "chubby" body, moderately large eyes and small mouths. The dorsal color is silvery or grayish to olive green, ventrally they are white and there is usually a dull gray lateral band (Moyle 1976). They have 7 anal fin rays, 8 dorsal rays, 5-9 gill rakers and 48—62 lateral line scales. The dorsal fin origin is placed behind the origin of the pelvic fins. .The pharyngeal teeth (2,5-4,2; variable) are closely spaced and strongly hooked. The arroyo chub is a California Species of Special Concern and a federal "watch" species.

2.3.1.2 Status of the Species Throughout its Range

Miller (1945) placed both *Gila orcutti* and closely related *Gila purpurea* in the subgenus *temeculina*. The arroyo chub hybridizes with the Mohave tui chub *(Gila bicolor mohavensis)* and the California roach *(Lavinia symmetricus)* (Hubbs and Miller 1942; Greenfield and Greenfield 1970; Greenfield and Deckert 1973).

Arroyo chubs are native to the Los Angeles basin (Los Angeles, Santa Ana and San Gabriel Rivers), Malibu and San Juan Creeks and the Santa Margarita River drainage (Swift *et al.* 1990; 1993). Although once common and widespread, its distribution has been significantly reduced (Swift *et al.* 1990; 1993). Moyle and Williams (1990) considered the reduction severe enough to suggest that this species deserves, close monitoring and that attempts should be made to improve the status of existing populations. The arroyo chub is presently listed by the state of California as a Species of Special Concern. Swift *et al.* (1990; 1993) suggested that the East, West and North Forks of the San Gabriel River be considered for status as a Native Fish Management Area for this species. Populations of arroyo chub presently exist to the north, outside the native range, in the Santa Clara, Santa Ynez, Santa Maria, Cuyama and Mojave river systems.

2.3.1.3 Primary Threats to Continued Existence

If arroyo chubs had not been successfully introduced into a number of drainages outside of their native range, they would qualify for federal listing as threatened. Their native range is largely coincident with the Los Angeles metropolitan area where most streams are degraded and fish populations reduced and fragmented. This is especially true of the low gradient stream reaches which formerly contained optimal habitat. Recently the red shiner, *Cyprinella lutrensis,* has been introduced into arroyo chub streams and may competitively exclude chubs from many areas. The potential effects if introduced species, combined with the continued degradation of the urbanized streams that constitute much of its native habitat, mean that this species is not secure despite its wide geographic range.

2.3.1.4 Biology and Ecology

Arroyo chubs are adapted to survive in the warm fluctuating streams of the Los Angeles basin. These streams, prior to channelization, were often turbid torrents in the winter and clear intermittent creeks in the summer. The chub preferentially inhabits low gradient but flowing water, however, it is also found in slow water areas within high gradient streams. The association with low flow areas means that this species is usually found over sand or mud substrates (Swift *et al.* 1975). Laboratory studies demonstrate that the arroyo chub is physiologically adapted to survive .hypoxic conditions and large temperature fluctuations (Castleberry and Cech 1986).

The only extensive studies on the biology of the arroyo chub were done on the introduced population inhabiting the Cuyama River in Santa Barbara County (Greenfield and Greenfield 1972; Greenfield and Deckert 1973) and more recently on the Santa Clara River population (Tres 1992). Arroyo chubs are known to breed primarily during March and April although some reproduction may occur into July (Tres 1992). Spawning typically occurs in pools in association with aquatic vegetation; The eggs are demersal and adhesive; hatching occurs in 4 days at 24.2 ^{0}C.

The oldest chubs found by Tres (1992) were 4+ years, but breeding apparently begins after the first year. After year 2, females are larger than males (Tres 1992).

This species is omnivorous, feeding on algae, insects and small crustaceans. When examined 60–80% of the stomach contents consists of algae (Greenfield and Deckert 1973). However, they are believed to derive most of their nutrition from the aquatic organisms associated with the plants. They have also been shown to feed on the nematode infested roots of the floating water fern, *Azolla* (Moyle 1976). Invertebrates increase in number and variety in the diet during the spring and are least abundant during the winter.

Because they evolved in a community of fish (Santa Ana suckers, Santa Ana speckled dace and threespine sticklebacks) lacking major predators, they appear to be susceptible to predation by introduced predatory fishes, particularly centrarchids.

2.3.2 Survey Dates and Occurrence of Arroyo Chubs in the Project Areas

Table 3. The data in the following table indicates the frequency with which the arroyo chub has been encountered at each of the crossing/diversion sites over a six year period. The dates in the boxes indicate survey dates, shaded boxes indicate that arroyo chubs were captured, unshaded boxes indicate the absence of chubs on the survey dates.

YEAR	CROSSINGS						DIVERSIONS	
	Humble	Long Canyon	Alfalfa	Mayo	Salt Creek	Summer	Camulos	Isola
1992	18 May	23 May	14 May	21 May	18 May 23 May	No Data	No Data	No Data
1993	20 May 26 Oct	17 May 9 Nov	5 May 26 Oct	6 May 9 Nov	13 July 26 Oct	12 Feb 9 Nov	13 May 12 June	No Data
1994	27 May	10 Apr 9 Nov	10 Apr 27 May	8 Apr 9 Nov	6 Apr 27 May	6 Apr 9 Nov	23 June	No Data
1995	7 June 15 Dec	31 Mar 21 Apr 15 Dec	21 Apr	15 Apr 21 Apr 15 Dec	10 Apr 15 Dec	10 Apr 26 Apr 27 Nov	12 July	23 June
1996	4 Apr 11 June	4 Apr	9 Jan 4 Apr	4 Apr	4 Apr	4 Apr	No Data	No Data
1997	1 Apr	1 Apr	1 Apr	31 Mar	31 Mar	31 Mar	11 Apr	No Data

As can be seen from the data in Table 5, arroyo chubs are regularly found at all of the project sites. The Santa Clara River is a dynamic system and as a consequence, although chub habitat is always present along the river its quantity, quality, and distribution varies annually. Yet this species' abundance along the river is indicated by its presence at all project sites every year.

2.3.3 Effects of the proposed action on arroyo chubs

The proposed action is expected to have no long term effects on the arroyo chub. During installation/removal of the crossings/diversions there will be a short period of time when a plume of turbid water will be transported downstream. Such a pulse of turbidity will be no worse than that caused by a storm induced flood flow. The elevated turbidity caused by project activities lasts only a couple of hours, usually on only four days out of the year. Such a transitory increase in suspended sediment load is unlikely to significantly affect respiration, prey capture, predation or any other aspect of the chub's life history. Furthermore, the timing .of the installations/removals will also reduce the potential for impact on the chub. The work will be done outside the primary reproductive season of the chub. The implementation of the Take Avoidance Plan described later in this document will also serve to minimize take due to injury or mortality. Previous experience with the proposed procedures has resulted in a known mortality of less than 0.2% of juvenile and adult chubs captured and handled (less than 2 out of every 1,000 fish handled - Haglund, unpubl data). Therefore the project should have only a minimal effect on individual arroyo chubs in the affected stream reaches and little if any long term impacts on the species.

Additionally, the creation of slow water behind the road crossing will actually create chub habitat therefore causing a beneficial impact. The chubs lay their eggs on the emergent vegetation that develops in the pools and the warm shallows with emergent vegetation provide fry rearing habitat.

2.4 California Red-Legged Frog, *Rana* aurora draytonil Baird and Girard

2.4.1 Species Description and Overall Status

2.4.1.1 Species Description/Legal Status

The red-legged frog ranges from 4.4-13.1 cm. The frog has red on the lower abdomen and underside of the hind legs, often overlying a yellow ground color. The face has a dark mask bordered by a whitish jaw stripe. The back has many small black flecks and larger, irregular dark blotches with indistinct outlines on a brown, gray or olive ground color that may have a reddish tinge (Storer 1925). In some individuals the flecks join to form a more or less continuous network of black lines. Dark bands are present on the legs and there is usually a doarse black (gray), red and yellow mottling in the groin. Prominent dorsolateral folds are present. The young often have yellow instead of red on the underside of the legs and in the groin. Rana *aurora draytonii* has more numerous dark dorsal spots, usually with light centers than its northern counterpart whose spots frequently lack the light centers (Storer 1925). The California red-legged frog is also larger, growing to 13.1 cm (5.25 in.) while the northern red-legged frog reaches only 7.5 cm (3 in.) (Stebbins 1985).

Two species of red-legged frog were originally described by Baird and Girard; *Rana aurora* and *Rana draytonii*. Subsequently, *Rana draytonii* was synonymized with *Rana aurora*. The two forms are presently considered subspecies – *Rana aurora aurora* (northern red–legged frog) and *Rana aurora draytonii* (California red-legged frog). The California red-legged frog is morphologically, behaviorally, and probably a genetically distinct form (Hayes and Miyamoto 1984; Green 1985a). The red–legged frog was listed as Federally Endangered in 1996.

2.4.1.2 Status of the Species Throughout its Range

The red-legged frog is found primarily west of the Cascade–Sierra Nevada crest from southwestern British Columbia to Arroyo Santo Domingo in Baja California del Norte, Mexico (Linsdale 1932). The California red–legged frog occurs from northern California in the vicinity of Redding (Jennings and Hayes 1994). Its range used to include parts of California's central valley but virtually all populations have been extirpated from that region. The species may also have been extirpated in the southern Sierra Nevada of California. It has been introduced into several locations in Nye County, Nevada (Linsdale 1940; Green 1985b). The species is found from sea level to approximately 1500 meters in altitude (Jennings and Hayes 1994). The California red-legged frog occurs from northern California southward.

Between the Santa Clara River system and the Mexican border, extant populations of California red–legged frogs are known from only four relatively small areas (Jennings and Hayes 1994). These combined areas represent no more than 1% of the area historically occupied by California red-legged frogs within that region (Jennings and Hayes 1994).

2.4.1.3 Primary Threats to Continued Existence

The establishment of a diverse exotic aquatic predator fauna that includes bullfrogs, crayfish, and a diverse array of fishes likely contributed to the decline of the California red-legged frog (Hayes and Jennings 1986), although it is not understood which exotic aquatic predator or predators may have been most significant (Hayes and Jennings 1988). Furthermore, habitat alterations that are unfavorable to California red–legged frogs and favorable to most of the exotic aquatic predators are confounded with potential direct effects of predation by such exotics (Hayes and Jennings 1986).

The few remaining populations of *Rana aurora draytonii* are threatened by proposed reservoir construction, off–road vehicle use, and continued habitat degradation due to the cumulative effects of abusive land use practices, especially with regard to livestock grazing (Kauffman et *al*. 1983; Kauffman and Krueger 1984; Bohn and Buckhouse 1986; Jennings and Hayes 1994) and development of groundwater resources (Groeneveld and Griepentrog 1985).

2.4.1.4 Biology and Ecology

The red-legged frog is primarily a pond frog that inhabits humid forests, woodlands, grasslands and streamsides, especially where cattails and other aquatic vegetation provide good cover. It is most common in the lowlands and foothills. Red-legged frogs inhabit areas of permanent water (Stebbins 1951) but following rains northern red–legged frogs may disperse to damp meadows or woodlands far from permanent water (Stebbins 1985). More recent data on adult California red-legged frogs suggests they do not move far from their aquatic habitat (Jennings and Hayes 1994) but limited data suggest they move into terrestrial riparian thickets in the fall (Rathbun et *al*. 1993).

Most life history data on the red-legged frog is based on the study of the northern red-legged frog. Much less information is available on the California red-legged frog. Recently populations of the California red–legged frog have declined precipitously.

The California red-legged frog hibernates in the mud at the bottom of ponds and creeks in the winter. In central California, this frog comes out of hibernation in January or February. Based on northern red–legged frogs, the breeding period is short, often lasting only 1-2 weeks during February - April, depending on locality (Stebbins 1985). Data on southern frogs indicates a longer breeding season extending from late November to late April depending on locality (Storer 1925; Hayes and Jennings 1986; Jennings and Hayes 1994). Male northern red-legged frogs call from locations several feet apart with their bodies submerged, in water at least two feet deep and three or more feet from the water's edge. At the breeding site male California red–legged frogs typically call in small mobile groups of 3–7 individuals that attract females (Jennings and Hayes 1994). Females spawn only at night (Licht 1969). California red-legged frogs oviposit on emergent vegetation so that the surface of the egg mass is at the water surface (Hayes and Miyamoto 1984). Egg masses are compact, containing ca. 2,000-6,000 dark reddish brown eggs, about 2.0-2.8mm in diameter (Jennings and Hayes 1994). Northern red-legged frog egg masses are compact and globular with individual ova averaging 3.03 mm (Licht 1971). The eggs hatch in about 6-14 days (Storer 1925; Dickerson 1969). Limits of temperature tolerance of young embryos are about 4–21 CC. Both the upper and lower lethals are the lowest for any North American ranid (Licht 1971). The tadpoles complete metamorphosis in about four or five months (Storer 1925; Dickerson 1969), typically between July and September (Storer 1925; Jennings and Hayes 1994). Studies of a population of northern red-legged frogs in Marion Lake, British Columbia suggest that males do not defend or remain in specific territories throughout the breeding season but there is a tendency for male frogs to return to a given area of the lake each year. Calling and egg laying took place in association with submerged weed beds in the lake (Calef 1973a).

The California red-legged frog feeds on a variety of foods. It feeds readily on fish but will also eat insects, tadpoles and small frogs. This species is one of the most cannibalistic of North American frogs (Dickerson 1969). Frogs and small mammal prey may contribute significantly to the diet of adults and subadults (Arnold and Halliday 1986; Hayes and Tennant 1986) Although not common, red–legged frogs have been observed feeding at night (Wright and Wright 1949). Licht's (1986) study of feeding in northern red–legged frogs in British Columbia suggested that the species fed predominantly on land, along a river bank or along margins of rainpools, moving within plant cover. The adults are quite wary and highly nocturnal (Storer 1925; Hayes and Tennant 1986), while juveniles are much less wary and frequently diurnally active (Hayes and Tennant 1986).

Studies on the northern red-legged frog in British Columbia suggest that predatory salamanders *(Taricha granulosa* and *Ambystoma gracile)* are important tadpole predators (Calef 1973b). Other tadpole predators include fish (Calef 1973b), garter snakes (San Francisco garter snakes (Wharton 1989)/ two-striped garter snakes (Cunningham 1959)), birds (Jennings and Hayes 1994), and predatory insects (Calef 1973b).

The habitat of the California red-legged frog is characterized by dense, shrubby riparian vegetation associated with deep ($\leq$0.7m), still or slow-moving water (Jennings 1988; Hayes and Jennings 1988). The shrubby riparian vegetation that structurally seems to be most suitable for California red-legged frogs is that provided by arroyo willow *(Salix lasiolepis)*. Cattails *(Typhus* sp.) and bulrushes *(Scirpus* sp.) also provide suitable habitat (Jennings 1988). Although *Rana aurora draytonii* can occur in ephemeral or permanent streams or ponds, populations probably cannot be maintained in ephemeral streams in which all surface water disappears (Jennings and Hayes 1994). Juvenile frogs seem to favor open, shallow aquatic habitats with dense submergents (Jennings and Hayes 1994).

2.4.2 Survey Dates and Occurrence of California Red-Legged Frogs in the Project Areas

Table 3. The data in the following table indicates the frequency with which the red-legged frog has been encountered at each of the crossing/diversion sites over a six year period. The dates in the boxes indicate survey dates, shaded boxes indicate that California red-legged frogs were captured, unshaded boxes indicate the absence of chubs on the survey dates.

YEAR	CROSSINGS						DIVERSIONS	
	Humble	Long Canyon	Alfalfa	Mayo	Salt Creek	Summer	Camulos	Isola
1992	18 May	23 May	14 May	21 May	18 May	No Data	No Data	No Data
					23 May			
1993	20 May	17 May	5 May	6 May	13 July	12 Feb	13 May	No Data
	26 Oct	9 Nov	26 Oct	9 Nov	26 Oct	9 Nov	12 June	
1994	27 May	10 Apr	10 Apr	8 Apr	6 Apr	6 Apr	23 June	No Data
		9 Nov	27 May	9 Nov	27 May	9 Nov		
1995	7 June	31 Mar	21 Apr	15 Apr	10 Apr	10 Apr	12 July	23 June
		21 Apr		21 Apr	15 Dec	26 Apr		
	15 Dec	15 Dec		15 Dec		27 Nov		
1996	4 Apr	4 Apr	9 Jan	4 Apr	4 Apr	4 Apr	No Data	No Data
	11 June		4 Apr					
1997	1 Apr	1 Apr	1 Apr	31 Mar	31 Mar	31 Mar	11 Apr	No Data

Table 6 shows that no red—legged frogs have been observed at the project sites. In fact, there have been no records of the red— legged frog in the Santa Clara since the 1970s.

2.4.3 Effects of the Proposed Action on California Red-Legged Frogs

The absence of the red-legged frog from the study sites and its apparent absence from the Santa Clara River since the 1970s indicates that the proposed action is unlikely to have any effect on California red-legged frogs. The Take Avoidance Plan should minimize the take of California red-legged frogs through injury or mortality should the species reoccur on the river at one or more of the project sites. Capture and handling, by San Marino Environmental Associates' personnel, of California red-legged frog tadpoles, neonates and adults by seine and hand has never resulted in any known mortality.

2.5 Southwestern pond turtle, *Clemmys marmorata pallida* Seeliger

2.5.1 Species Description and Overall Status

2.5.1.1 Species Description/Legal Status

The southwestern pond turtle is a medium sized (120-210mm carapace length) turtle with a low carapace and a pattern of spots or lines that radiate from the centers of the scutes (Holland 1991a) - The smooth, keelless carapace is short, broad and widest at the bridge. The carapace is olive, dark brown or black and the pattern is absent in some individuals. The head is moderate with a nonprojecting snout, the color is plain gray to olive but may occasionally have numerous black speckles or reticulations (Ernst and Barbour 1989).

Two subspecies of *Clemmys marmorata* are recognized. *Clemmys marmorata marmorata* (Baird and Girard 1852) in the northern portion of the species' range and *Clemmys marmorata pallida* Seeliger, 1945 in the south. The Baja California form presently recognized as the *pallida* subspecies may deserve independent taxonomic recognition. The southwestern pond turtle is a California Species of Special Concern and a federal "watch" species.

2.5.1.2 Status of the Species Throughout its Range

The southwestern pond turtle *(Clemmys marmorata pallida)* occurs southward from San Francisco Bay to Arroyo Santo Domingo in Baja California del Norte and is the only freshwater turtle native to the area. Once common in southern California (Ventura County and south), populations of this turtle have declined dramaticly in recent years. In 1960 there were 87 known localities in southern

California, by 1987 the number had dropped to 20 (Brattstrom and Messer 1988). Although the subspecies has declined precipitously in southern California, more northerly populations appear to be more stable.

The 1988 report by Brattstrom and Messer indicated that few viable populations of *Clemmys marmorata pallida* remained in southern California. More recent fieldwork indicates that only 6–8 viable populations of the southwestern pond turtle exist south of the Santa Clara River system in California (Holland 1991a)

2.5.1.3 Primary Threats to Continued Existence

Many localities that currently harbor turtle populations may be in trouble because the nesting habitat is being impacted or altered during the incubation interval on an annual basis by agriculture or livestock activity (Jennings and Hayes 1994). These impacts probably create annual nesting failures, leading to increasingly adult—based populations. These habitat modifications coupled with the impacts of introduced exotic aquatic predators and/or competitors are damaging the few extant turtle populations.

2.5.1.4 Biology and Ecology

This is the most aquatic member of the genus *Clemmys.* In southern California the southwestern pond turtle occupies three main habitat types: major rivers and streams, seasonal streams and ponds, and lakes and reservoirs (Brattstrom and Messer 1988). However, it is found in the swift mountain streams such as the East, West and North Forks of the San Gabriel River. Life history data definitely based on observations of *Clemmys marmorata pallida. Ida* are meager. Most studies have examined more northern populations and therefore have studied *Clemmys marmorata marmorata.* The known elevation range of the western pond turtle extends from sea level to ca. 1430 meters, records from higher elevation represent introductions (Jennings and Hayes 1994).

Habitat requirements generally consist of long deep pools with plenty of cover both above and below water (Storer 1930; Bury 1972). Western pond turtles are uncommon in high gradient streams probably because water temperatures, current velocity, food resources, or any combination thereof may limit their local distribution (Holland 1991a). Furthermore, basking sites exposed to the sun for several hours per day and a stable food supply are required (G. Stewart, pers. comm.). Preferred basking sites are near deep water for quick escape from terrestrial predators. The most prominent part of western pond turtle behavior is the activities they perform to thermoregulate, which vary with ambient temperature based on time of day and season. Turtles frequently perform aerial basking on logs or other objects out of the water when temperatures are low and air temperatures are greater than water temperatures (Bury 1972; Holland 1985). The basking sites must also be easily accessible from the water and large enough so that the turtle's body rests completely out of the water (Bury 1972). Suitably well protected terrestrial sites for egg laying and winter dormancy must also be present. Suitable oviposition sites must have the proper thermal and hydric environment for incubation of the eggs. Nests are typically dug in a substrate with a high clay or silt fraction since the female moistens the site where she will excavate the nest prior to nesting (Holland 1991b). The turtles either bask or rest on the bottom during midday but may move between ponds during the early morning or late afternoon (Pope 1939). Considerable time is spent basking, but the turtle is shy and wary and retreats to the water at the least disturbance. *Clemmys marmorata* is an aquatic turtle that usually leaves the aquatic site to reproduce, to aestivate, and to overwinter (Jennings and Hayes 1994). Adults are found to be active only from mid-February through November in the north but recent fieldwork has demonstrated that western pond turtles may overwinter on land or in water, or may remain active in the water during the winter season; this pattern may vary considerably with latitude and habitat type and remains poorly understood (Holland 1985; 1991a; Rathbun et *al.* 1993). Activity periods in southern California have not been established, but western pond turtles increase their activity levels when surface water temperatures consistently reach 15^{0}C (Jennings and Hayes 1994). Thus southern California populations may be active year round (Holland 1985; 1991a; Zeiner *et al.* 1988; Rathbun et *al.* 1993).

In a pond situation, movement away from the water except to nest was rare (Rathbun et *al.* 1993). In a stream situation, turtles ere highly variable in their movements. Some individuals would nest, aestivate, or overwinter only a few meters away from the watercourse, whereas others move considerable distances (up to 350 meters) to overwinter (Rathbun et *al.* 1992; 1993). Turtles will move significant distances (at least 2 kin) if the local habitat changes/disappears. Adult turtles can tolerate at least 7 days without water (Holland cited in Jennings and Hayes 1994), but the dispersal ability of juveniles and the recolonization potential of western pond turtles following extirpation of a local population are unknown.

Nesting occurs from late April through August with a peak period of oviposition in May - June (Storer 1930; Buskirk 1992; Rathbun et *al.* 1993). Most nests are dug in the morning and are located along the margins of a stream or pond, full sunlight seems to be a requirement of the nesting site (Ernst and Barbour 1989; Rathbun *et al.* 1993). Females emigrate from the aquatic site to an upland location that may be up to 400 meters or more from the aquatic site (Holland 1991a; Rathbun et *al.* 1992; 1993). Clutch size varies from 1 to 13 eggs. The hard white eggs are elliptical to oval, measuring 30.0–42.6mm in length and 18.5–22.6mm in width and are buried in a shallow nest 10–12 cm deep (Holland 1991a; Rathbun et *al.* 1993). Females may lay more than one clutch per year (Rathbun et *al.* 1993). The incubation period is probably about 70-80 days. Hatchlings have a carapace length of approximately 25mm. The young may hatch and overwinter in the nest because hatchling–sized turtles have almost never been observed in an aquatic site in the fall (Holland 1985). Most hatchling turtles are thought to emerge from the nest and move to an aquatic site in the spring (Buskirk 1992). Neonates spend much of their time feeding in shallow water that typically has relatively dense vegetation of submergents or short emergents.

The southwestern pond turtle is omnivorous and a dietary generalist but are highly opportunistic and will eat anything they can capture. Many individuals show a strong preference for animal foods. It will feed on a wide variety of material including insects, fish, worms, crustaceans and algae (Brattstrom and Messer 1988; Ernst and Barbour 1989). Nekton, the zooplankton fauna that can occur at high densities in the water column in standing water, are an important food of hatchlings and young juveniles (Holland 1991a), and these age groups may not grow as rapidly where this food source is lacking. Much variation exists in western pond turtle growth rates, however, in most areas hatchlings typically double their length in the first year and grow relatively rapidly over the next 4-5 years (Storer 1930; Holland 1985). There is some evidence that intraspecific competition is reduced by differences in food preference between males and females. Males eat a higher proportion of insects, while females' were found to contain a higher proportion of algae in their stomachs (Bury 1986). Age and size at reproductive maturity varies with latitude. In California, reproductive maturity occurs at between 7 and 11 years of age, and approximately 110-120 mm carapace length.

The young are vulnerable to predation by large wading birds such as herons and introduced predatory fishes and the bullfrog. Bullfrogs in particular may be responsible for significant mortality of hatchling and juvenile turtles because they occupy. the shallow water habitats favored by the youngest age classes of turtles (Moyle 1973; Holland 1991a; Jennings and Hayes 1994)The adults are occasionally taken by raccoons, coyotes and black bears, they may be particularly vulnerable to predation when aquatic habitats become constricted.

2.5.2 Survey Dates and Occurrence of Southwestern Pond Turtles in the Project Areas

Table 3. The data in the following table indicates the frequency with which the southwestern pond turtle has been encountered at each of the crossing/diversion sites over a six year period. The dates in the boxes indicate survey dates, shaded boxes indicate that southwestern pond turtles were captured, unshaded boxes indicate the absence of turtles on the survey dates.

YEAR	CROSSINGS						DIVERSIONS	
	Humble	Long Canyon	Alfalfa	Mayo	Salt Creek	Summer	Camulos	Isola
1992	18 May	23 May	14 May	21 May	18 May 23 May	No Data	No Data	No Data
1993	20 May 26 Oct	17 May 9 Nov	5 May 26 Oct	6 May 9 Nov	13 July 26 Oct	12 Feb 9 Nov	13 May 12 June	No Data
1994	27 May	10 Apr 9 Nov	10 Apr 27 May	8 Apr 9 Nov	6 Apr 27 May	6 Apr 9 Nov	23 June	No Data
1995	7 June 15 Dec	31 Mar 21 Apr 15 Dec	21 Apr	15 Apr 21 Apr 15 Dec	10 Apr 15 Dec	10 Apr 26 Apr 27 Nov	12 July	23 June
1996	4 Apr 11 June	4 Apr	9 Jan 4 Apr	4 Apr	4 Apr	4 Apr	No Data	No Data
1997	1 Apr	1 Apr	1 Apr	31 Mar	31 Mar	31 Mar	11 Apr	No Data

Table 7 indicates that the southwestern pond turtle rarely occurs at the project sites. Over a six year period it has only been found twice. The inconsistency of occurrence is a function of the dynamic physical environment. The Santa Clara River is a dynamic system and as a consequence, although turtle habitat, is always present along the river its quantity, quality, and distribution varies annually and apparently turtle habitat is patchy enough that it rarely occurs at the project sites.

2.5.3 Effects of the Proposed Action on Southwestern Pond Turtles

The proposed action is expected to have no long term effects on the southwestern pond turtle. During installation/removal of the crossings/diversions there will be a short period of time when a plume of turbid water will be transported downstream. Such a pulse of turbidity will be no worse than that caused by a storm induced flood flow. The elevated turbidity caused by project activities lasts only a couple of hours, usually on only four days out of the year. Such a transitory increase in suspended sediment load is unlikely to significantly affect prey capture, predation or any other aspect of the pond turtle's life history. Turtles rarely occur at the project sites and the implementation of the Take Avoidance Plan described later in this document will also serve to minimize take due to injury or mortality. Previous experience with the proposed procedures has resulted in no known mortality of the neonate and adult turtles captured and handled. Therefore the project should have only a minimal effect on individual southwestern pond turtles in the affected stream reaches and little if any long term impacts on the species.

Finally the creation of the crossings/diversions tends to create deeper pool habitat on the upstream side of the crossing/diversion and therefore provides the deeper pool habitat that the turtles utilize and that is rare along the river. Consequently the crossings/diversions provide a beneficial impact.

2.6 Two-Striped Garter Snake, *Thaimnophis hammondii* (Kennicott)

2.6.1 Species Description and Overall Status

2.6.1.1 Species Description/Legal Status

Two-striped garter snake adults reach 60-100 cm total length. A middorsal stripe is absent. Dorsal coloration is variable ranging from olive, brown, or brownish gray, typically with 4 lengthwise rows of small, well separated dark spots between the lateral stripes. The lateral stripes are yellow and not always distinct and melanistic forms lacking lateral stripes exist (Fitch 1940; Fox 1951; Bellemin and Stewart 1977; Larson 1984).

The underside is dull yellowish to orange-red or salmon and the throat may be pale (pers obs).

Formerly considered a subspecies of the western aquatic garter snake, *Thamnophis couchii,* the two-striped garter snake was elevated to species rank as *Thamnophis hammondii* (Fox and Dessauer 1965; Rossman 1979; Lawson and Dessauer 1979; Fitch 1984; Rossman and Stewart 1987). Field observations indicate that *Thamnophis hammondii* is ecologically distinct from other sympatric *Thamnophis* species along the central California coast (Fox 1951; Bellemin and Stewart 1977; Rossman and Stewart 1987; Boundy 1990). The two-striped garter snake is a California Species of Special Concern.

2.6.1.2 Status of the Species Throughout its Range

The known range of the two-striped garter snake extends through the South Coast and Peninsular ranges west of the San Joaquin Valley and deserts from the vicinity of Salinas and Cantua Creek, south to La Presa, Baja California, Mexico (McGuire and Grismer 1992) . The known elevational range is from around sea level to about 2450 meters (Atsatt 1913).

Thamnophis hammondii has disappeared from approximately 40% of its historic range, and most of the decline has occurred since 1945 '(Jennings and Hayes 1994).

2.6.1.3 Primary Threats to Continued Existence

Most of the decline in this species is attributed to habitat destruction from urbanization, large reservoirs, destruction of riparian habitat, and the cement lining of stream channels in southern California for flood control. Other contributing factors include livestock grazing, predation by introduced fishes, bullfrogs, and loss of prey base.

2.6.1.4 Biology and Ecology

Despite the familiarity of this snake to many people there is a dearth of information on the ecology of this species. The species is highly aquatic and is rarely found far from water, which it freely enters to forage and escape predators (Fitch 1940; 1941; Stebbins 1985). Juveniles emerge from hibernation in the spring although they may occasionally be observed foraging on warm winter days (Ruthling 1915; Rathbun et al. 1993). *Thamnophis hammondii* is often observed basking during the early morning and afternoon before foraging for prey. Two-striped garter snakes mate in the spring (March) and bear from 10-25 live young during the fall (Bogert 1930; wright and Wright 1957; Cunningham 1959). Neonates have been observed from late August through November (Rathbun et al. 1993). The two-striped garter snake probably does not reach sexual maturity until 2-3 years of age (Jennings and Hayes 1994).

Juveniles and adults feed primarily on fish *(Cottus* sp. and *Eucyclogobius* newberryi: Rathbun et *al.* 1993; *Gasterosteus aculeatus:* Bell and Haglund 1978, Bell 1982, Rathbun et *al.* 1993; *Onchorhynchus mykiss:* Fitch 1941), fish eggs (Fitch 1940), and the tadpoles and metamorphs of anurans (Grinnell and Grinnell 1907; Klauber 1931; Fitch 1940; Cunningham 1959) have been recorded as prey. Potential predators include: hawks, shrikes, herons, raccoons, coyotes, and introduced exotic fishes and bullfrogs. Bullfrogs are known to eat all life stages of *Thamnophis hammondii (S.* Sweet cited in Jennings and Hayes 1994).

Adult snakes utilize different areas and habitats in summer and winter (Rathbun et al. 1993). During summer, snakes utilized streamside sites and had home ranges that varied from approximately $80m^2$ to over $5,000m^2$ (mean ca. $1,500m^2$ n=7). During winter, they occupied coastal sage scrub and grassland locations in upland adjacent riparian areas, and had home ranges that varied from 80~9,0Q0I112 (mean ca. $3,400m^2$ n=3). Colonization abilities are poorly understood.

Two—striped garter snakes commonly inhabit perennial and intermittent streams having rocky beds bordered by willow thickets or other dense vegetation (Grinnell and Grinell 1907; Fitch 1940; Fitch 1941). They may also inhabit large sandy river beds such as the Santa Clara River, if a strip of riparian vegetation is present along the stream course (Jennings and Hayes 1994).

2.6.2 Survey Dates and Occurrence of Two-Striped Garter Snakes in the Project Areas

Table 3. The data in the following table indicates the frequency with which the two-striped garter snakes have been encountered at each of the crossing/diversion sites over a six year period. The dates in the boxes indicate survey dates, shaded boxes indicate that two-striped garter snakes were captured, unshaded boxes indicate the absence of snakes on the survey dates.

YEAR	CROSSINGS						DIVERSIONS	
	Humble	Long Canyon	Alfalfa	Mayo	Salt Creek	Summer	Camulos	Isola
1992	18 May	23 May	14 May	21 May	18 May 23 May	No Data	No Data	No Data
1993	20 May 26 Oct	17 May 9 Nov	5 May 26 Oct	6 May 9 Nov	13 July 26 Oct	12 Feb 9 Nov	13 May 12 June	No Data
1994	27 May	10 Apr 9 Nov	10 Apr 27 May	8 Apr 9 Nov	6 Apr 27 May	6 Apr 9 Nov	23 June	No Data
1995	7 June 15 Dec	31 Mar 21 Apr 15 Dec	21 Apr	15 Apr 21 Apr 15 Dec	10 Apr 15 Dec	10 Apr 26 Apr 27 Nov	12 July	23 June
1996	4 Apr 11 June	4 Apr	9 Jan 4 Apr	4 Apr	4 Apr	4 Apr	No Data	No Data
1997	1 Apr	1 Apr	1 Apr	31 Mar	31 Mar	31 Mar	11 Apr	No Data

Table 8 clearly indicates that two-striped garter snakes are rarely found at the project sites. It is not clear if this is due to rarity of this species along the Santa Clara River or to extreme habitat patchiness which rarely coincides with the project sites.

2.6.3 Effects of the Proposed Action on Two—Striped Garter Snakes

The proposed action is expected to have no long term effects on the two-striped garter snake. During installation/removal of the crossings/diversions there will be a short period of time when a plume of turbid water will be transported downstream. Such a pulse of turbidity will be no worse than that caused by a storm induced flood flow. The elevated turbidity caused by project activities lasts only a few hours on two days out of the year. Such a transitory increase in suspended sediment load is unlikely to significantly affect prey capture, predation or any other aspect of the garter snake's life history. Garter snakes rarely occur at the project sites and the implementation of the Take Avoidance Plan described later in this document will also serve to minimize take due to injury or mortality if they do appear at a project site. Previous experience with the proposed procedures has resulted in no known mortality of the juvenile and adult snakes captured and handled. Therefore the project should have only a minimal effect on individual two—striped garter snakes in the affected stream reaches and little if any long term impacts on the species.

Finally the creation of the crossings/diversions tends to create deeper pool and slow water habitat on the upstream side of the crossing/diversion and therefore provides habitat that the snakes could utilize and that is rare along the river. Consequently the crossings/diversions provide a beneficial impact.

3.0 MEASURES INTENDED TO MINIMIZE AND MITIGATE THE TAKE OF COVERED SPECIES

This Take Avoidance Plan (TAP) has been designed to provide a consistent mechanism for the installation and removal of culverted earthen crossings and water diversions along the Santa Clara River. The TAP describes techniques that will be utilized when working in or adjacent to the flowing water of the Santa Clara River such that construction/removal activities will minimize impacts to the following sensitive aquatic species:

1. Unarmored threespine stickleback
2. Santa Ana sucker
3. Arroyo chub
4. California red-legged frog
5. Southwestern pond turtle
6. Two—striped garter snake

The TAP is based upon reviewing field operations and aquatic species survey data collected over the past several years. These data combined with knowledge of the life histories and habitat requirements of the sensitive species have been used to develop a, Take Avoidance Plan which provides a work site which has been cleared of all fish and other sensitive aquatic species, thus minimizing the risk of direct impacts to any of the sensitive aquatic species. By adhering to this TAP, the installation and removal of river crossings and water diversions will cause minimal impacts to the aquatic resources of the Santa Clara River and minimize the risk of take through injury or mortality of any endangered species.

The following Take Avoidance Plan provides a methodology which will minimize all impacts to any sensitive aquatic species which may be located at defined crossing/diversion locations during installation or removal. The premise is to minimize the risk of take through injury or mortality of any sensitive species which may have moved downstream into these sites from upstream nursery areas, been washed downstream during high winter flood flows, or which may have established a new territory within the work areas. Because river channel habitat conditions differ between the spring months when the crossings are installed and the fall months when they are removed, installation and removal are discussed separately.

All blocking nets, seines, or dip nets will be constructed of mesh netting with openings not to exceed 0.25-inch. These nets will be free of any rips, tears, or holes. Blocking nets will be of sufficient length and height to prevent water from flowing around the ends or over the top, and will be anchored to prevent water from flowing underneath. The seines used to capture/remove fish along the flowing channel edges will be constructed of mesh not to exceed 0.125—inch. Captured fish will be handled minimally prior to being placed into an aerated container. Water temperatures within the container will be maintained at ambient river temperatures.

3.2. Crossing Installation

Winter flood flows scour the banks removing annual aquatic vegetation along the edges of the low flow channel which typically provides fish habitat. As winter flood flows decrease, the river confines itself to a narrow low flow channel. Therefore, during the spring months the Santa Clara River provides limited suitable habitat for many of the sensitive species especially the federally endangered unarmored threespine stickleback and consequently fewer fish are encountered. In the case of the stickleback which is largely an annual fish, reproduction does not occur until flows recede and aquatic vegetation and algae develop, further accounting for the lower numbers of individuals encountered.

A blocking net will be installed across the low flow channel upstream of the work area. Qualified fishery personnel will then seine along the channel margins for a distance of 50 meters upstream and downstream of the axis of the crossing site. This seining will be conducted at least twice. If no unarmored threespine stickleback or Santa Ana suckers are captured during the second seining, the area will be considered clear. Should either of these two species be collected during the second seining, additional seine hauls will be performed until no individuals of either species are netted. Unusual conditions such as dense vegetation could result in additional seining passes, however, two seining passes by experienced careful workers are usually sufficient to remove the fish based on past experience (Haglund and Baskin). Sticklebacks and suckers have rarely been found stranded in dewatered areas that were seined following this methodology prior to dewatering. All fish captured during this removal seining will be identified, counted, measured (standard length), and placed within an aerated container until they can be released at least 100 feet downstream from the work area. All handling of fish captured within the work area will be minimized.

Once the work area is cleared of fish, steel pipes will be installed within the low flow channel. Sand and gravel material collected from local sources will be used to anchor the pipes. Care will be taken to slowly fill the open areas between the pipes with material to prevent downstream sedimentation. The upstream blocking net will be removed when work in the low flow channel is complete. The final step is adding material to the top of the structure to create the roadway.

Alternatively, if conditions at the work site permit, the steel pipes can be installed within the dry river channel lateral to the low flow channel and covered with road material (see Figure 12 on page 54). Crews working along the low flow channel edges could carefully remove any debris that is making direct contact with the flowing water, which would be carefully rinsed out to permit any trapped fish to swim away. This will result in creation of a clear work corridor along the low flow channel edges. This approach will minimize the work time within the low flow channel. After the pipes are installed within the dry river channel, blocking nets will be installed within the low flow channel upstream of the work area. The low flow channel will be seined (a minimum of twice, see above) and any fish captured will be placed into a aerated container until they can be released at suitable downstream locations. Once the low flow channel is clear of fish, the river flow can be diverted into the pipes previously placed in the dry river channel and back into the low flow channel downstream of the pipes (see Figure 12 on page 54). Such diversion would result in the drying of previously wetted channel. In no case would more than 100 feet of wetted channel be dried by such a diversion procedure. Following the stream diversion, the work area would be checked by a qualified fishery biologist to confirm that no fish are trapped within any pools left by receding water. Any fish encountered will be captured and held in an aerated containers until released downstream of the work area. The roadway will then be constructed over the pipes as previously described. This procedure can also be coupled with the procedure suggested in the preceding paragraph such that one or two culverts can be installed within the original low flow channel to provide continuity of flow to downstream areas. Each crossing will have to be evaluated annually by a qualified fishery biologist to determine which method would cause the least impact to the aquatic system.

In all cases the collection of materials with which to construct the crossings will be limited to a 200 foot wide area, measured as 100 feet on either side of the crossing axis. During collection of the materials and construction of the crossing, no off channel pools will be created that might serve as reproductive sites for the african clawed frog, *Xenopus laevis*.

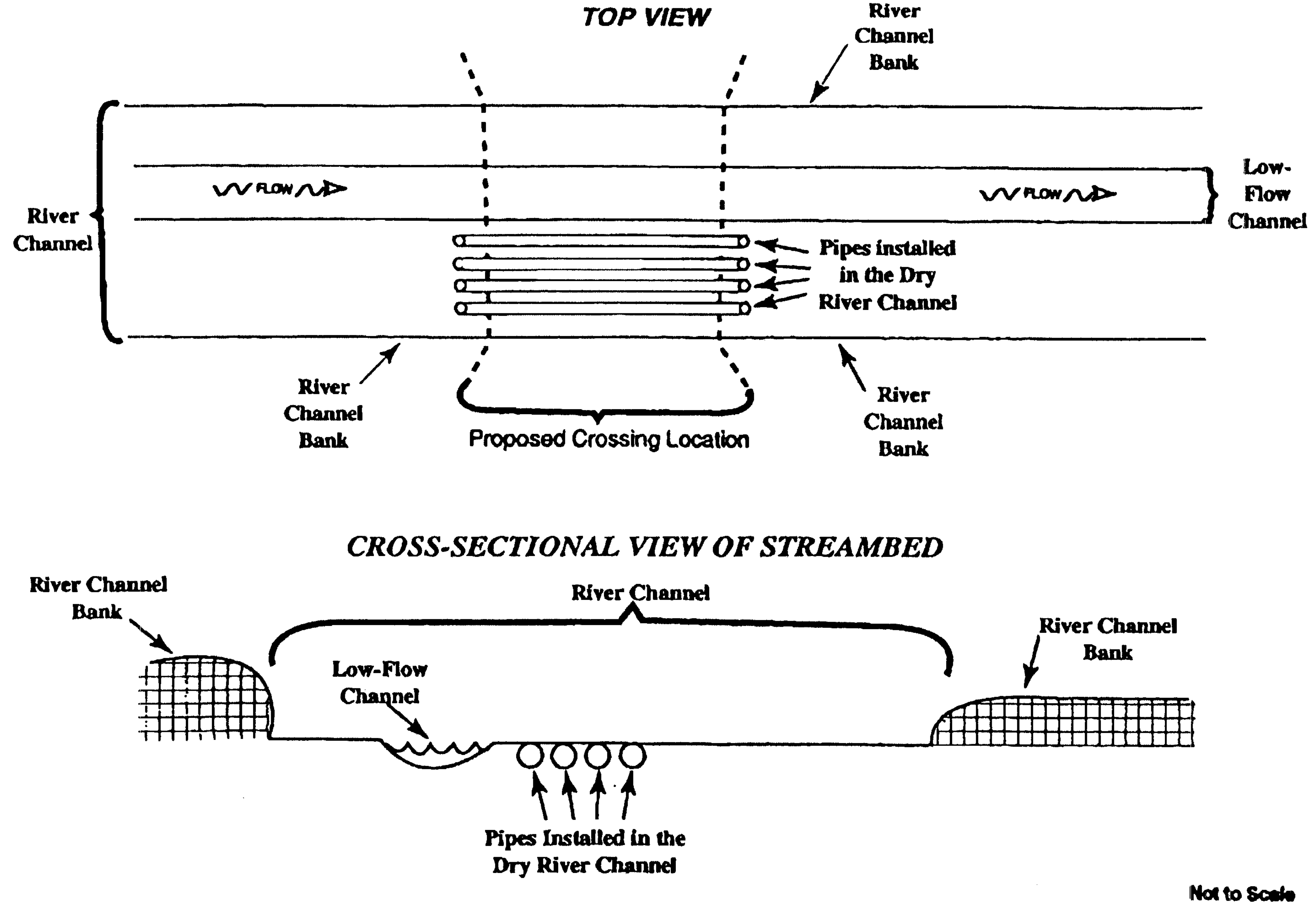


Diagram by ACS, revised 4/97 by SMEA

Diagram Showing Alternative Placement of Steel Pipes Within the Dry River Channel Lateral to the Low-Flow Channel

FIGURE 18

3.2 Crossing Removal

By the Fall, the river has been confined within the low flow channel for several months, and aquatic emergent vegetation has grown within the shallow waters and along the edges of the channel at each crossing. Each individual crossing will need to be evaluated to determine the best way to remove the existing pipes since changing flow patterns can create a variety of conditions. The following describes the typical removal methods.

A blocking net would be installed across the low flow channel upstream of the work area. Qualified fishery personnel will then seine along the channel margins for a distance of 50 meters upstream and downstream of the axis of the crossing site. This seining will be conducted at least twice. If no unarmored threespine stickleback or Santa Ana suckers are captured during the second seining, the area will be considered clear. Should either of these two species be collected during the second seining, additional seine hauls will be performed until no individuals of either species are netted.. All fish captured during this removal seining will be identified, counted, measured (standard length), and placed within an aerated container until they can be released at least 150 feet downstream from the work area. All handling of fish captured within the work area will be minimized. Once the work area is cleared of fish, the roadway surface will be removed with equipment. Each of the exposed steel pipes will then be carefully removed from the river channel and hauled to an upland storage area. Final activities will include returning the river channel to its pre-existing contours.

In emergency situations, when rising water is expected, the roadway over the pipes can be removed and the crossings breached away from the pipes. The pipes can then be removed and placed outside the river channel without entering the low flow channel.

3.3 Time of Installation/Removal

The timing of the installation and removal activities occurs in accord with the life histories of the sensitive species. Installation typically takes place in early–mid April before fish reproduction and before the turtle and snake become very active. This timing then does not interfere with the sensitive species and minimizes the chance that they will be impacted at the project sites. The removal takes place following the reproduction of the fishes and at a time when the turtles and snakes may be leaving the river for over–wintering sites.

3.4 Self Mitigation

These crossing and diversions are essentially self mitigating. The construction of these crossings/diversions while not interfering with the river as a corridor of movement for the sensitive species do typically provide some pooling of water. The creation of these slow flow areas or pools adjacent to the current flow provides potential reproductive habitat for the stickleback and arroyo chub, habitat for the southwestern pond turtle which requires pools and good hunting areas for the two-striped garter snake. The sticklebacks use the fine substrate, algae, and still water for nesting. The arroyo chubs lay their eggs on the emergent vegetation and the still vegetated margins of the pools provide excellent fry rearing habitat. The downstream side of the crossings tends to provide scoured areas with greater flow velocity and eddies. The higher flow areas are utilized by suckers and the eddies provide habitat for all three fish species. By creating a habitat (pool) that would be absent from these stream sites, the crossings/diversions actually have a beneficial impact on the sensitive aquatic species (see Figure 13 on page 57). In addition, the crossings prevent repeated vehicle entry into the river.

3.5 Conclusion

The proposed procedures are less likely to negatively impact the stickleback or the other sensitive species than alternative methods. The consistent use of these procedures for installation and removal of the stream crossings will prevent any long term or cumulative adverse effects on the populations of the sensitive aquatic species, including the unarmored threespine stickleback, in the stream reach in which the project sites occur.

Table 9 on page 60 contains the requested permitted take under an Endangered Species Act section 10(a) (1) (B) permit.

Figure 13. This is a photograph of Humble crossing taken approximately 2 months following installation of the road crossing. Note the development of pool habitat upstream of the crossing edged with emergent annual vegetation and the algal development. This is potential reproductive and rearing habitat for sticklebacks. Downstream of the crossing, note the "run" habitat with back water eddies, this is potential habitat for all three fish species. The habitats shown here also provide potential habitat for the southwestern pond turtle and two-striped garter snake. Comparison of this figure with Figure 2 (page 11) clearly demonstrates the self mitigating nature of these road crossings. (Photo: May 1997)

Table 9. Requested annual permitted take under an Endangered Species Act section 10(a) (1) (B) permit at The Newhall Land and Farming Company project sites during the installation and removal of road crossings and water diversions.

SPECIES	**ESTIMATED TAKE**	
	injury or mortality[1]	**capture or handling**[2]
unarmored threespine stickleback	14	All present
Santa Ana sucker	14	All present
arroyo chub	42	All present
California red-legged frog	2	All present
southwestern pond turtle	2	All present
two-striped garter snake	2	All present

[1] Cumulative take for the installation and removal at all sites during a calendar year.

[2] It is not possible to accurately quantify the number of individuals that may be captured, measured and moved because habitat conditions, and therefore the populations of these species, vary greatly within and between years at the project sites.

4.0 FUNDING FOR AND IMPLEMENTATION OF THE HABITAT CONSERVATION PLAN

The crossing/diversion installation and removal is part of the operating budget of The Newhall Land and Farming Company. Utilization of a qualified biologist has been a practice because of conditions in the California Department of Fish and Game streambed alteration agreement and as such has been incorporated into the annual budget for the last six years. Because the mitigation includes the Take Avoidance Plan and the operating budget already includes a provision to hire a biologist to do the exclusion work in order to install and remove the crossings/diversions these funds will remain part of the annual operating budget. In the absence of this budget allocation the crossings could not be installed.

The Newhall Land and Farming Company will inform the U.S. Fish and Wildlife Service Ventura Field Office of the name of the biologist hired to implement the Take Avoidance Plan prior to the commencement of either installation or removal of the crossings.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

Section 10(a) (1) (B) (iii) of the Endangered Species Act of 1973, as amended, requires that alternatives to the ~taking of species be considered and reasons why such alternatives are not implemented be discussed. In this case no viable alternatives are available to The Newhall Land and Farming Company. The "no take" alternative and "no action" alternative are discussed below. It should be noted that The Newhall Land and Farming Company's project sites are considered nonjurisdictional by the U.S. Army Corps of Engineers (see Appendix 2).

5.1 No Action/No Take Alternative

There is no viable "no take/no action" option available to The Newhall Land and Farming Company. They must have access to farmland on both sides of the river. There are no existing permanent bridges or other access routes to the farm fields that could. be used by equipment and man-power. Thus access to the fields necessitates crossing the river. Consequently they must build a crossing (preferred option) or ford the river ("no action" alternative). Fording the river would result in a near constant disturbance of the river in the crossing areas during the farming season. The purchase of additional equipment so that there is equipment on both sides of the river is not economically feasible. Purchasing additional equipment would be a huge cost relative to the revenue generated. Additionally, the topography on the south side of the river is such that even farming areas along that one side are isolated from one another so that equipment and man—power access must be from the north side of the river. The fields are not actively farmed during the high flow season and crossing the stream during high flows usually would only occur for safety reasons. Fording the river during the active farming season is not a viable "no take" option. During the active farming season machinery would have to be crossing the river almost daily. Some of the fields are being organically farmed which requires significant man—power. On some days as many as 200 people would have to cross the river. This level of disturbance would cause frequent short duration increases in the turbidity and prevent development of stream margin habitat. Furthermore, this would all occur during the reproductive season of the three sensitive fish species. And the absence of the crossings would eliminate pool habitat from some of these stream reaches. The preferred option described elsewhere in this document is designed so that there is -virtually no chance of any mortality of the sensitive aquatic species. The only take involved in the preferred option is the capture and temporary holding of the sensitive species and, these "take" activities should not result in mortality.

6.0 OTHER MEASURES REQUIRED BY THE U.S. FISH AND WILDLIFE SERVICE

Section 10(a) (2) (A) (iv) of the Endangered Species Act of 1973, as amended, states a Conservation Plan must specify "such other measures that the Secretary may require as being necessary or appropriate for purposes of the plan." Because HCPs often include relatively complex systems of phased mitigation and involve multiple parties, the Service normally requires that an Implementation Agreement be drafted and signed by each party to the HCP. However, because there is only one party to the HCP and because of the simple nature of the HCP and its implementation no Implementation Agreement was deemed necessary and no special measures have been suggested or required by the Service.

7.0 Changed and Unforeseen Circumstances

Section 10 regulations (50 CFR 17.22(b)(2)(iii) require that an HCP specify the procedures to be used for dealing with changed and unforeseen circumstances that may arise during the implementation of the HCP. In addition, the Habitat Conservation Plan Assurances ("No Surprises") Rule (50 CFR 17.2, 17.22 (b)(5) and (6); 63 FR 8859) defines "unforeseen circumstances" and "changed circumstances" and describes the obligations of the permitee and the Service.

The purpose of the No Surprises Rule is to provide assurances to non-federal landowners participating in a properly implemented habitat conservation plan under the ESA that; the Services will not require without the consent of the permittee, the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources beyond the level otherwise agreed to for the species covered in the plan.

On September 30, 2003, Judge Sullivan of the District Court, District of Columbia, issued an order granting plaintiffs' motion for summary judgment in the *Spirit of the Sage Council v. Norton* case (Civil Action Number 98-1873), which challenges the "No Surprises" rule and associated permit revocation provision in the Service's permitting regulations. Although the court's final decision or opinion has not been issued as of November 4, 2003, the Service may issue new incidental take permits, permit amendments, renewals, and transfers, provided that explanatory language was included in the terms and conditions of any permit and implementing agreement issued by the Service.

"Changed Circumstances" are those changes in circumstances affecting a species or geographic area covered by the HCP that can reasonably be anticipated by Newhall and the Service at the time of preparation of the HCP, and for which the Parties can plan (e.g., the listing of new species, or a natural catastrophic event in areas prone to such events). If additional conservation and mitigation measures are deemed necessary by the Service to respond to Changed Circumstances that are provided for in the HCP, Newhall shall implement those measures as specified in the plan. "Unforeseen Circumstances" are defined changes in circumstances that affect a species or geographic area covered by the HCP that could not reasonably be anticipated by plan developers and the Service at the time of the plan's negotiation and development and that result in a substantial and adverse change in the status of the covered species.

Changed Circumstances: Newhall in consultation with the Service has identified the listing of a new species, a spill of pesticide from farming operations, and an oil spill from pipelines upstream of the project area as potential Changed Circumstances. If a new species that is not covered by the HCP(but that may be affected by activities covered by the HCP) is listed under the federal ESA during the term of the section 10(a)(1)(B) permit, the permit will be reevaluated and the HCP covered activities may be modified, as necessary, to minimize the likelihood for activities covered under the HCP to result in the take of newly listed uncovered species and to insure that these activities are not likely to jeopardize the continued existence of the species or adversely modify designated critical habitat of such species. Notwithstanding the above, and as provided in 50 CFR 17.22(b)(5)(II), if additional conservation and mitigation measures, are deemed necessary to respond to changed circumstances, and were not provided for in the Plan, no additional conservation and mitigation measures beyond those provided in the Plan will be required without the consent of Newhall so long as the Plan is being properly implemented. In the event of an oil or pesticide spill, Newhall shall coordinate with the Service and other agencies with regard to access to its property for emergency response personnel. Initially, through the State Office of Emergency Services, the Service would be apprised of the situation and recommend measures to reduce the impact to Plan species of both the spill and response activities.

Unforeseen Circumstances: In the case of an unforeseen circumstance that precludes implementation of the terms of the HCP, or that would result in a substantial and adverse change in the status of a species or the geographic area covered by the plan, Newhall shall immediately notify the Service staff who have functioned as the principal contacts for the proposed action.

In determining whether such an event constitutes an unforeseen circumstance, the Service will have the burden of demonstrating that such unforeseen circumstances exist, using the best scientific and commercial date available. The Service shall consider, but not be limited to, the following factors: size of the current range of the affected species; percentage of range adversely affected by the HCP; percentage of range conserved by the HCP; ecological significance of that portion of the range affected by the HCP; level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP; and whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

If unforeseen circumstances are encountered they shall be resolved through the coordination of Newhall, staff from the Service in Ventura office and the CDFG and result in letter agreement or the formal amendment of the HCP conservation program. If an unforeseen circumstance develops, which could cause undue additional mortality or injury to a plan species or listed species beyond the limits permitted in the plan and such unforeseen circumstance is due to activities conducted by Newhall then Newhall shall cease such activity which may be causing the unforeseen circumstance until such circumstance is resolved.

If the Service determines that additional conservation and mitigation measures are necessary to respond to the unforeseen circumstance where the HCP is being properly implemented, the additional measures required of the permittee must be as close as possible to the terms of the original HCP and must be limited to modifications within any conserved habitat area or to adjustments within lands or waters that are already set-aside in the HCP's operating conservation program.

Additional conservation and mitigation measures shall not involve the commitment of additional land, water or financial compensation or restrictions on the use of land or other natural resources otherwise available for development or use under the original terms of the HCP without the consent of Newhall. Resolution of the situation shall be documented by letters between the Service and Newhall.

Thus, in the event that unforeseen circumstances adversely affecting the Plan Species occur during the term of the Permit, Newhall would not be required to provide additional financial mitigation or additional land use restrictions above those measures specified in the HCP, provided that the HCP is being properly implemented. However, the Service or other entities may take additional actions at their own expense, consistent with the terms of the original HCP, to protect or conserve a species included in the plan.

8.0 Modifications and Amendments

Minor Modifications

a. Any party may propose minor modifications to the HCP by providing notice to all other parties. Such notice shall include a statement of the reason for the proposed modification and an analysis of its environmental effects, including its effects on operations Under the HCP and on covered species. The parties will use best efforts to respond to proposed modifications within 60 days of receipt of such notice. Proposed modifications will become effective upon all other parties' written approval. If, for any reason, a receiving party objects to a proposed modification, it must be processed as and amendment of the permit in accordance with subsection "amendment of the permit" of this section. The Service will not propose or approve minor modifications to the HCP if we determine that such modifications would result in operations or adverse effects on the environment that are :significantly different from those analyzed in connection with the original HCP, or additional take not analyzed in connection with the original HCP.

b. Minor modifications to the HCP processed pursuant to this subsection may include, but are not limited to, the following circumstances.

    1. corrections of typographic, grammatical, and similar editing errors that do not change the intended meaning;

    2. corrections of any maps or exhibits to correct errors in mapping or to reflect previously approved changes in the permit or HCP;

    3. minor changes to survey, monitoring or reporting protocols; and

4. other types of types of modifications that are minor in relation to the HCP, that the Service has analyzed and agreed to, and on which the public has had an opportunity to comment.

c. Any other modifications to the HCP will be processed as amendments of the permit in accordance with the following section.

Amendment of the Permit

The permit may be amended in accordance with all applicable legal requirements, including but not limited to the federal ESA, the National Environmental Policy Act, and the Service's permit regulations. The party proposing the amendment shall provide a statement of the reasons for the amendment and an analysis of its environmental effects, including its effects on operations under the HCP and on covered species.

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APPENDIX 1

Sample report on road crossing installation that documents the presence of sensitive aquatic species at the project site during the installation. Reproduced field drawings have been omitted for convenience.

Report on the Installation of Four Road Crossings on the Santa Clara River by Newhall Land and Farming Company
6 - 10 April, 1994

Prepared by: Thomas R. Haglund, Ph.D.
and
Jonathan N. Baskin, Ph.D.

Summer Crossing

6 April 1994

Exclusion supervisor: Dr. Thomas R. Haglund

Upon arrival at the site, San Marino Environmental Associate's (SMEA) exclusion supervisor discussed the positioning of the road crossing and the grading necessary to complete the road crossing with a Newhall Land and Farming Company representative (Terry Bressler). Once the exact position of the grading was determined, SMEA personnel installed upstream blocking nets and then seined the work area to remove fish prior to the beginning of work. The areas seined are indicated on the reproduction of a field drawn map on page 2. Fifty meters upstream and downstream of the road crossing were seined. In addition, a side channel entering the stream from a southside pipe was also seined and the fish removed. All fish captured during the removal work were maintained in insulated containers until completion of the work, at which time they were released. There was no mortality associated with the handling and maintenance of the fish. Two sensitive fish species were removed from the work site: arroyo chub, *Gila orcutti* and unarmored threespine stickleback, *Gasterosteus aculeatus williamsoni*. No other fish species were captured during the removal operation, nor were any other sensitive species located during the seining. The table on page 3 indicates the number of each species that were removed from the work area and the table on page 4 provides the size distribution of these specimens. Placement of the pipes and completion of the road crossing did not result in the dewatering of any stream section and thus rescue of stranded fishes was not necessary.

Reproduction of Field Drawing-Summer Crossing

Size Distribution of the Captured Fish
Summer Crossing

Standard Length	Threespine Stickleback	Arroyo Chub	Santa Ana Sucker
0.0 - 5.0			
5.1 - 10.0			
10.1 - 15.0			
15.1 - 20.0			
20.1 - 25.0			
25.1 - 30.0		3	
30.1 - 35.0	4	11	
35.1 - 40.0	4	18	
40.1 - 45.0		51	
45.1 - 50.0	1	65	
50.1 - 55.0		47	
55.1 - 60.0		13	
60.1 - 65.0		7	
65.1 - 70.0		3	
70.1 - 75.0		4	
75.0 - 80.0		1	
80.1 - 85.0		2	
85.1 - 90.0			
90.1 - 95.0			
95.1 - 100.0			
100.1 - 105.0			
105.1 - 110.0			
110.1 - 115.0			
115.1 - 120.0			
120.1 - 125.0			

Salt Creek Crossing
6 April 1994

Exclusion supervisor: Dr. Thomas R. Haglund

Upon arrival at the site, San Marino Environmental Associate's (SMEA) exclusion supervisor discussed the positioning of the road crossing and the grading necessary to complete the road crossing with a Newhall Land and Farming Company representative (Terry Bressler). Once the exact position of the grading was determined, SMEA personnel installed upstream blocking nets and then seined the work area to remove fish prior to the beginning of work. The areas seined are indicated on the reproduction of a field drawn map on page 6. Fifty meters upstream and downstream of the road crossing were seined in each of the three channels. All fish captured during the removal work were maintained in insulated containers until completion of the work, at which time they were released. There was no mortality associated with the handling and maintenance of the fish. Two sensitive fish species were removed from the work site: arroyo chub, *Gilla orcutti* and unarmored threespine stickleback, *Gasterosteus aculeatus williamsoni.* No other fish species were captured during the removal operation, nor were any other sensitive species located during the seining. The table on page 7 indicates the number of each species that were removed from the work area and the table on page 8 provides the size distribution of these specimens. Placement of the pipes and completion of the road crossing resulted in the dewatering of the small stream channel along the southern bank (dewatered area is indicated on the map on page 6). However, this section was gradually dewatered and thus rescue of stranded fishes was not necessary, as they were able escape down channel as the upper portions of the channel dried.

Reproduction of Field Drawing-Salt Creek Crossing

Total Fish Removed From Worksite
Salt Creek Crossing

SPECIES	NUMBER REMOVED
Unarmored Threespine Stickleback *Gasterosteus aculeatus williamsoni*	1
Arroyo Chub *Gila orcutta*	45
Santa Ana Sucker *Catostomus santaanae*	0
Mosquitofish *Gambusia affinis affinis*	0

Size Distribution of the Captured Fish
Salt Creek Crossing

Standard Length	Threespine Stickleback	Arroyo Chub	Santa Ana Sucker
0.0 - 5.0			
5.1 - 10.0			
10.1 - 15.0			
15.1 - 20.0			
20.1 - 25.0			
25.1 - 30.0		2	
30.1 - 35.0		3	
35.1 - 40.0		3	
40.1 - 45.0		9	
45.1 - 50.0	1	13	
50.1 - 55.0		9	
55.1 - 60.0		3	
60.1 - 65.0		1	
65.1 - 70.0		1	
70.1 - 75.0		1	
75.1 - 80.0			
80.1 - 85.0			
85.1 - 90.0			
90.1 - 95.0			
95.1 - 100.0			
100.1 - 105.0			
105.1 - 110.0			
110.1 - 115.0			
115.1 - 120.0			
120.1 - 125.0			

Mayo Crossing
8 April 1994

Exclusion supervisor: Dr. Jonathan N. Baskin

Upon arrival at the site, San Marino Environmental Associate's (SMEA) exclusion supervisor discussed the positioning of the road crossing and the grading necessary to complete the road crossing with a Newhall Land and Farming Company representative (Terry Bressler). Once the exact position of the grading was determined, SMEA personnel installed upstream blocking nets and then seined the work area to remove fish prior to the beginning of work. The areas seined are indicated on the reproduction of a field drawn map on page 10. Forty—five meters upstream and downstream of the road crossing were seined in both the main channel and the smaller channel along the south bank. All fish captured during the removal work were maintained in insulated containers until completion of the work, at which time they were released. There was no mortality associated with the handling and maintenance of the fish. Two sensitive fish species were removed from the work site: arroyo chub, *Gila orcutti* and unarmored threespine stickleback, *Gasterosteus aculeatus williamsoni.* No other fish species were captured during the removal operation, nor were any other sensitive species located during the seining. The table on page 11 indicates the number of each species that were removed from the work area and the table on page 12 provides the size distribution of these specimens. Placement of the pipes and completion of the road crossing resulted in the dewatering of small areas downstream of the pipes, as indicated on the map on page 10. However, these areas were gradually dewatered and were always marginal to flow, thus rescue of stranded fishes was not necessary, as they were able escape as the margins dried.

Reproduction of Field Drawing- Mayo Crossing

Total Fish Removed From Worksite
Mayo Crossing

SPECIES	NUMBER REMOVED
Unarmored Threespine Stickleback *Gasterosteus aculeatus williamsoni*	1
Arroyo Chub *Gila orcutta*	12
Santa Ana Sucker *Catostomus santaanae*	0
Mosquitofish *Gambusia affinis affinis*	0

Size Distribution of the Captured Fish
Mayo Crossing

Standard Length	Threespine Stickleback	Arroyo Chub	Santa Ana Sucker
0.0 - 5.0			
5.1 - 10.0			
10.1 - 15.0			
15.1 - 20.0			
20.1 - 25.0			
25.1 - 30.0			
30.1 - 35.0			
35.1 - 40.0	1	1	
40.1 - 45.0		2	
45.1 - 50.0		5	
50.1 - 55.0		3	
55.1 - 60.0			
60.1 - 65.0		1	
65.1 - 70.0			
70.1 - 75.0			
75.1 - 80.0			
80.1 - 85.0			
85.1 - 90.0			
90.1 - 95.0			
95.1 - 100.0			
100.1 - 105.0			
105.1 - 110.0			
110.1 - 115.0			
115.1 - 120.0			
120.1 - 125.0			

Alfalfa Crossing
10 April 1994

Exclusion supervisor: Dr. Camm C. Swift

Upon arrival at the site, San Marino Environmental Associate's (SMEA) exclusion supervisor discussed the positioning of the road crossing and the grading necessary to complete the road crossing with a Newhall Land and Farming Company representative (Terry Bressler). Once the exact position of the grading was determined, SMEA personnel installed upstream blocking nets and then seined the work area to remove fish prior to the beginning of work. The areas seined are indicated on the reproduction of a field drawn map on page 2. Fifty meters upstream and downstream of the road crossing were seined. All fish captured during the removal work were maintained in insulated containers until completion of the work, at which time they were released. There was no mortality associated with the handling and maintenance of the fish. One sensitive fish species was removed from the work site; arroyo chub, *Gila orcutti.* No other fish species were captured during the removal operation, nor were any other sensitive species located during the seining. The table on page 15 indicates the number of each species that were removed from the work area and the table on page 16 provides the size distribution of these specimens. Placement of the pipes and completion of the road crossing did not result in the dewatering of any stream section and thus rescue of stranded fishes was not necessary.

Reproduction of Field Drawing-Alfalfa Crossing

Total Fish Removed From Worksite
Alfalfa Crossing

SPECIES	NUMBER REMOVED
Unarmored Threespine Stickleback *Gasterosteus aculeatus williamsoni*	0
Arroyo Chub *Gila orcutta*	18
Santa Ana Sucker *Catostomus santaanae*	0
Mosquitofish *Gambusia affinis affinis*	0

Size Distribution of the Captured Fish
Alfalfa Crossing

Standard Length	Threespine Stickleback	Arroyo Chub	Santa Ana Sucker
0.0 - 5.0			
5.1 - 10.0			
10.1 - 15.0			
15.1 - 20.0			
20.1 - 25.0			
25.1 - 30.0			
30.1 - 35.0			
35.1 - 40.0			
40.1 - 45.0		1	
45.1 - 50.0		4	
50.1 - 55.0		5	
55.1 - 60.0		3	
60.1 - 65.0		4	
65.1 - 70.0			
70.1 - 75.0			
75.1 - 80.0			
80.1 - 85.0			
85.1 - 90.0		1	
90.1 - 95.0			
95.1 - 100.0			
100.1 - 105.0			
105.1 - 110.0			
110.1 - 115.0			
115.1 - 120.0			
120.1 - 125.0			

APPENDIX 2

Letter from the U.S. Army Corps of Engineers indicating that it would consider The Newhall Land and Farming Company's crossings as nonjurisdictional.

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2711
LOS ANGELES, CALIFORNIA 90053-2325

May 9, 1992

REPLY TO
ATTENTION OF:

Office of the Chief
Regulatory Branch

RECEIVED
MAY 13 1992

Newhall Land and Farming Company
Attention: Bob Braly
P.O. Box 55000
Valencia, CA 91385

Dear Mr. Braly:

This is in response to your notification to us (no. 92-386-EV) that Newhall Land and Farming Company will replace six minor road crossings in the Santa Clara River. Based on your verbal assertion that these road crossings predate the implementation of the Section 404 regulatory program, these activities are exempt from Section 404 regulation as long as the area of impacted river bed from the construction of these crossings is limited to 100 feet on either side of the crossing and each crossing is replaced in the same location and in the same design as before they were washed out. (Please refer to the attached map.) Movement of sediment within the riverbed in excess of this specified area will trigger permit evaluation by the Corps pursuant to Section 404 of the Clean Water Act.

Although maintenance and replacement of these specified road crossings as described are exempt from our regulation, we strongly recommend that you attempt to anchor the metal culverts used for the roads to the bottom substrate of the river as much as possible to prevent them from washing downstream during storm flows. The resource agencies have expressed concern that the retrieval of the washed out culverts causes further damage to the riparian vegetation in the riverbed. The Corps concurs and advises you to minimize overall impacts to the aquatic ecosystem and endangered species habitat as much as possible.

Once again, your cooperation is greatly appreciated. If you have any questions please contact Liz Varnhagen at (213) 894-5606.

Sincerely,

David J. Castanon
David J. Castanon
Chief, Northern Section

cc: Ken Wilson, CDFG
John Hanlon, USFWS
Cat Brown, USFWS