BIOTIC ASSESSMENT

TUCKER ROAD FORD REPLACMENT PROJECT, WEST BRANCH SOQUEL CREEK

PROJECT DESCRIPTION

The project will remove an existing at grade concrete ford on Tucker Road at the West Branch of Soquel Creek. The project is located in the Santa Cruz Mountains off Sugarloaf Road approximately ½ mile east of Highway 17. A site location map is included as Figure 1. The ford will be replaced by a 120-foot bridge that will pass the 100-year flood event. The purpose of the project is to provide access to residential parcels east of the creek and remove a partial barrier to steelhead migration (ford and drop below concrete ledge).

The presence of bedrock in the downstream reach should provide substantial grade control once the ford is removed. Based on this condition, the channel upstream of the ford will be reshaped to a 3% slope to form and restore a stable bedform and the former channel morphology. Channel banks will be shaped to a minimum 2:1 slope, stabilized with temporary erosion control measures and revegetated. Other areas disturbed by construction will also be revegetated. No heavy equipment will be operated within the live stream channel.

Staging and Material Handling

A temporary material staging and handling area will be set up on the north side of Tucker Road and on the west side of Soquel Creek. This area is already disturbed with a garden and raised beds, so no native vegetation will need to be removed. The storage area will be used to temporarily store materials, including piping, steel beams, decking materials, steel rebar, tools, form wood and miscellaneous hardware. Construction vehicles will also be parked on the north side of Tucker Road, but in a location that is further west, at least 100 feet from the stream. To reduce congestion on the narrow Sugerloaf and Tucker Roads, and parking problems at the job site, some worker vehicles will be parked at the pullout along Highway 17 and Sugarloaf Road and workers carpooled to the site.

Fish Clearing Activities

Prior to construction activities a qualified fisheries biologist will be retained to set up block nets and clear the construction area of fish. This activity should be completed within an 8-hour day.

Water Diversion

After the site is cleared of fish, a temporary water diversion system will be set up to divert Soquel Creek flows around the construction zone. The system will include installation of a small cofferdam to divert the water to gravity flow pipeline(s) or pump system to dewater the construction area. NOAA-Fisheries (NMFS) fish screening criteria (NMFS 1997) will be used for screens on the intake pipe(s). Diverted water will be discharged downstream of the construction site. During periods of construction in the stream channel it is likely that the pumping system will be used. However, during non-work periods (late afternoon through early morning) the gravity lines will be employed. Installation of the stream diversion facility will occur over a three to four day period.

Removal of Concrete Ford

The initial construction activity will involve the removal of the existing concrete ford. Either a hydraulic hammer (jackhammer) or a backhoe-mounted demolition hammer will be used to dismantle the ford. Approximately 285 cubic yards of concrete debris will be removed from the site to an appropriate landfill or recycling facility. Ford removal should take between 3 to 5 days.

Channel Grading, Stabilization and Revegetation

The proposed project will reshape the upstream channel to a 3 percent (%) gradient with side slopes of 2:1 or less. In order to reshape the upstream channel to the desired dimensions, approximately 215 feet of channel will be graded. The channel grading and shaping will most likely be completed using a small or medium size bulldozer. Preliminary grading calculations indicate that approximately 400 cubic yards of sediment will be removed, stockpiled, and then disposed at an appropriate landfill. Grading and reshaping the channel should be completed within 3 to 5 days.

The channel banks will be shaped and then stabilized with temporary erosion control measures (blankets and wattles) and later revegetated with willow and alder trees, and native understory species All proposed plant species are native to the immediate West Soquel Creek project area. Revegetation will take place in fall months after construction activities are concluded. Further details on revegetation are included in the Restoration Plan below.

Bridge Construction

The proposed bridge is a three-pin design (See Figures 2 and 3). The bridge deck will be installed in two sections, a 40-foot section connected to an 80-foot long deck. The bridge deck will be constructed with continuous steel beams and a grated steel deck. A continuous tire rub plate will be installed along the full length of the bridge deck to protect the bridge and keep vehicles on the bridge. A steel railing will also be connected to the deck to protect pedestrians using the bridge.

The substructure will consist of six piers, including two sets of piers on both ends and a set of piers to support and connect the 80 and 40-foot deck sections. The piers have been located outside of the active stream channel. The piers will be drilled at least 12 to 17 feet into the bedrock. The holes for the piers will be drilled using a caisson drill that will use either an auger or rotary type drill capable of drilling at least a 36-inch diameter hole. A concrete grade beam will be formed on top of the piers and the bridge deck will sit on the grade beams. A crane will be used to set the bridge decks on the piers.

The intermediate piers are located above bank full stage discharge, which is estimated to be the 2.3-year return flow. The height of the bridge deck is at least two feet higher than the 50-year return flow and above the 100-year peak flood event.

The entire bridge construction project will take between four to six weeks to complete. Figures 2 and 3 show the bridge plan view and cross-section (profile) view.

METHODOLOGY

A reconnaissance-level biotic survey was conducted by John Gilchrist on 2/2/05, documenting the major riparian plant species and presence of sensitive animal species and habitat and on and near the project area. A reconnaissance-level survey for California red-legged frog, western pond turtle and foothill yellow-legged frog was also performed by John Gilchrist and wildlife biologist, Mark Allaback, on 3/8/05. John Gilchrist re-reviewed the site for presence of rare plants during this visit. Both site visits evaluated habitat potential for California red-legged frog, foothill yellow-legged frog and western pond turtle. M. Allaback also conducted a brief literature review and had conversations with other knowledgeable biologists with the specific purpose of gaining information about yellow-legged and red-legged frogs in the project vicinity. A standardized survey for California red-legged frog according to the U.S. Fish and Wildlife (USFWS 1997) survey protocol was not performed because surveys conducted for this project, and previous surveys of the creek indicated low likelihood for breeding presence of this species. Nesting surveys for sensitive birds, including raptors, was also not conducted due to the time of year field surveys were performed. A search of the California Natural Diversity Data Base (CNDDB) for listed/sensitive fish, wildlife and plant species was accomplished with results listed in Table 1. A separate fish and stream habitat survey within the project area was conducted by Jeff Hagar, Hagar Environmental Science, on February 2, 2005. Results of that survey and fish passage analysis are contained in this document and in the Tucker Road Assessment Report (4/27/05).

VEGETATION

Vegetation at the Tucker Road ford project site consists of a mix of riparian and upland forest communities. As expected, riparian trees are found in high and low flood terrace locations near the creek. Dominant species include white alder (Alnus rhombifolia), redwood (*Sequoia sempervirens*), red alder (Alnus rubra), arroyo willow (Salix lasiolepis) and yellow willow (Salix lucida spp. lasiandra). Western sycamore (*Platanus racemosa*) is also found on the east bank downstream of the ford. Canopy closure above the creek was difficult to determine due to timing of field surveys (tree foliage was absent) but during spring summer and fall months it appeared that canopy closure would be about 60 to 70%. The shaded riverine canopy was far less upstream near the log jam. Not far downstream, the canopy becomes mostly closed under redwoods. At somewhat higher elevations at the site, a mixed-evergreen community in predominant, consisting of redwood, bay (*Umbellularia californica*), tan oak (*Lithocarpus densiflora*), and coast live oak (*Quercus agrifolia*). Several dead tan oaks (affected by sudden oak death) were also noted in the vicinity. All tree species identified in the project vicinity are native.

Understory species within the riparian zone include California blackberry (*Rubus ursinus*), Himalayan blackberry (*Rubus discolor*)*, English ivy (*Hedera helix*)*, horsetail fern (*Equisetum arense*), wood fern (*Dryopteris arguta*), giant chain fern (*Woodwardia fimbriata*), coffeeberry (*Rhamnus californica*), swordfern (*Polystichum munitum*), French broom (*Genista monspessulana*)*, periwinkle (*Vinca major*)*, elderberry (*Sambucus mexicana*) and German ivy (*Senecio mikanioides*)*. A single specimen of pampas grass (Cortaderia jubata)* was also found. Understory species with an asterisk are non-native; most are also highly invasive and can be expected to spread into adjacent native habitats.

Sensitive Plant Species

CNDDB plant records for the Laurel Quad were checked for potential rare, threatened or endangered plants in the project vicinity (Table 1). Ten species are known to occur; however all

Rare Plants

Prior to the commencement of work, the Operator will employ one or more of the following protective measures:

a) Fencing to prevent accidental disturbance of rare plants during construction,

b) On-site monitoring by a qualified biologist during construction to assure that rare plants are not disturbed, and

c) Redesign of proposed work to avoid disturbance of rare plants.

If it becomes impossible to implement the project at the work site without potentially significant impacts to rare plants, then activity at that work site will be discontinued.

FISH

Background Information on Anadromous Fish Species

The Soquel Creek system supports one anadromous fish species, steelhead trout (*Oncorhynchus mykiss*), and has the potential to support a second species, coho salmon (*Oncorhynchus kisutch*). Steelhead spawn and rear in Soquel Creek, and coho salmon are believed to have been present historically in the Soquel Creek watershed. The California Department of Fish and Game believes the species can be restored in the future (P. Anderson, CDFG, personal communication 1999). Both fish species in the central coast are listed as threatened under the federal Endangered Species Act. In addition, coho salmon is listed as endangered by the state under the California Endangered Species Act. California red-legged frog is listed as threatened under the federal act, and is a state species of concern. These species are listed in the CNDDB.

Coho Salmon. Coho salmon is an anadromous fish species which spends its initial 12-18 months in freshwater and up to 2 years in the ocean, returning to spawn in its natal stream in the third year (Shapovalov and Taft, 1954). Because this 3-year cycle is fairly rigid spawning runs with relatively poor reproductive success can result in poor spawning runs three years later. The upstream migration of adult coho in the central California coast usually occurs in November and December, with a peak times of entry in December. However, migration timing is dependent upon flows, and therefore may vary widely according to local rainfall and runoff (USFWS, 1994).

Coho have slightly lower swimming and leaping ability than steelhead, with cruising speeds up to 3.5 fps and burst speed of 10-21 fps (Bell 1986). Maximum jumping height for coho is reported by Bell (1986) at just over 7 feet. These differences in swimming ability may limit coho to relatively lower gradient reaches of coastal streams. In Waddell Creek, Shapovalov and Taft (1954) found that coho consistently spawned lower in the creek.

Coho salmon usually spawn at the heads of, or in riffles with gravel substrate (Moyle, 1976). Following spawning adult coho die. Juvenile coho typically emerge from the spawning redds the following spring and rear in the stream for one year before they migrate to the ocean (Shapovalov and Taft, 1954). Juveniles often occupy habitat at the heads of pools, which in general provide an optimum mix of food availability and cover with low energy expenditure. Juvenile coho depend upon cool water and abundant invertebrate food to rear successfully. Warmer water requires more abundant food resources for fish survival, because of the resultant increase in their metabolic rate. In later summer, coho often move into deeper pools with overhanging vegetation and woody debris (Bryant, 1994). Seaward migration of juvenile coho salmon typically occurs between April and late May (Trihey & Associates, 1997).

Coho salmon populations in California have declined to less than one-third of their 1965 levels (Bryant, 1994). Most of the natural production of coho salmon in streams south of San Francisco Bay have been lost. Of the 13 streams that supported coho salmon into the 1970's, only 3 creeks presently have returning runs. Scott Creek and Waddell Creek are documented to have natural runs, while the San Lorenzo River supports a hatchery population from the Monterey Bay Salmon and Trout Project (located on Big Creek, tributary to Scott Creek). San Vicente Creek (Davenport) may also have a small native coho population (M. Baldzikowski, County Planning Dept., personal communication, 1999). In the San Lorenzo River, data available from the Felton Diversion Dam in the late 1970's indicate 174 coho adults were trapped in 1976-77, and 77 adults caught in 1979-80 (Kelley & Dettman, 1981). Stocking records indicate between 20,000 and 25,000 coho were planted annually in the San Lorenzo during the years 1969 to1973. Whether the

San Lorenzo River system can support a sustaining coho population without hatchery stocking is a matter of conjecture (Alley, 2000).

The decline of coho salmon in streams south of San Francisco has been due to several factors. Dr. Jerry Smith indicates the principal causes have been: (1) decline of habitat quality from loss of large woody debris, streamflow diversion and increase in sedimentation; and (2) castastrophic events such as floods and drought which have severely reduced or eliminated brood years by destroying redds or blocking migration (Smith, 1998). In studies on Scott and Waddell Creeks, access during drought and redd destruction during storms appear to be more important factors than summmer rearing habitat (Smith, 1999).

Steelhead Trout. Steelhead trout are an anadromous form of rainbow trout. Steelhead spend one to two years in the ocean before returning to their natal stream to spawn. Unlike other salmonids, steelhead are capable of spawning more than once before dying (Shapovalov and Taft, 1954; Moyle, 1976). Steelhead spawning in the central coast including Soquel Creek, typically begins in December and continues into April, with a peak between late December and March (Trihey & Associates, 1997). Upstream migration occurs slightly later during dry years. Steelhead spawn in similar habitat as coho, except that gravels that steelhead use for spawning can be smaller (Moyle, 1976).

Juvenile steelhead generally spend one to two years in freshwater before migrating to the ocean. Young of the year steelhead often utilize riffle and run habitat during the growing season and move to deeper, slower water habitat during the high flow months. Larger steelhead use the same areas as well as heads of pools for feeding. Juvenile steelhead can typically tolerate warmer temperatures that coho (Moyle, 1976). In these ways, steelhead are more adaptable to adverse habitat conditions than coho.

Downstream migration of smolts and adults generally occurs between April and early June. Typically 90 percent of the migration is completed by the end of May; however, the outmigration is dependent on stream flows and is often earlier in dry years (Turner, 1994; Trihey & Associates, 1997). Lagoons and estuaries at the mouths of creeks are also used for rearing by juvenile steelhead (Smith, 1990). Juvenile steelhead are known to use the Soquel Creek Lagoon for rearing (HRG, 1990).

Steelhead have strong swimming and leaping abilities that allow them to ascend streams into small tributary and headwater reaches. Steelhead can swim at rates of up to 4.5 feet per second (fps) for extended periods of time and can achieve burst speeds of 14 to 26 fps during passage through difficult areas (Bell 1986). Leaping ability is dependent on the size and condition of fish and hydraulic conditions at the jump. Stuart (Bjornn and Reiser 1991) determined that ideal leaping conditions for fish are obtained when jumping from a pool with a depth that is 1.25 times the height of the jump (water surface to crest). Given satisfactory conditions, a conservative estimate of steelhead leaping ability is a height of 6 feet to 9 feet (Bjornn and Reiser 1991), though other estimates range from 11 feet (Bell 1986) to as high as 15 feet (McEwan 1999). Juvenile steelhead and resident rainbow trout have lower swimming rates and jumping ability than steelhead. Trout are capable of sustained speeds up to 6.2 fps and burst speeds up to 12.7 fps (Bjornn and Reiser 1991). Maximum jumping height increases with size but is not likely to be greater than about 2.5 feet for larger resident trout.

Steelhead have also suffered significant population declines in recent years. The Central Coast Evolutionarily Significant Unit (ESU) steelhead population was estimated at 94,000 historically

(Busby, 1996), but has declined to less than 9,000. Steelhead runs in Soquel, Aptos Creeks and similar central coast watersheds have seen similar declines.

The same environmental factors listed above as reasons for decline of coho salmon are responsible for the decline of steelhead. However because steelhead have extended spawning periods, can spawn more than once, and have variable smolting and maturation ages, they are generally less affected by poor spawning years than are coho (Smith, 1998).

Project Site Stream Habitat and Fish Passage Conditions

Instream Habitat. The Tucker Road project area does provide salmonid spawning and rearing habitat. The reconnaissance survey by J. Hagar (2/2/05) revealed W. Branch Soquel Creek stream bottom substrate dominated by gravel and cobble, but also with relatively large amounts of sand in some areas. The active channel was relatively wide downstream of the ford, with shallow pools upstream and downstream of the ford. Potential spawning habitat was relatively extensive upstream of the ford but impaired in some areas by sand. The stream reach at the project site is relatively well shaded by riparian trees and the surrounding steep topography. Salmonid habitat has been documented upstream of the project site although the extent and quality of such habitat was not reviewed for this study.

Fish Passage. The Tucker Road Ford presents a passage impediment to anadromous salmonids. Additional passage impediments exist in downstream reaches including the Olson Road Ford (approximately 1.9 miles downstream), and Girl Scout Falls, a natural falls (approximately 1.5 miles downstream). Complete barriers to salmonid passage can eliminate spawning access to desirable upstream reaches. Obstacles that are partial barriers can impair populations by delaying migration rates, causing fatigue and stress, and exposing fish to potential predation or poaching. Instream movement of rearing juveniles is also important, as rearing juveniles need to disperse from spawning areas to rearing habitat.

Field measurements and analytical computer modeling indicate conditions at the Tucker Road ford become suitable for upstream passage of adult salmonids when stream flow exceeds approximately 116 cubic feet per second (cfs). Adult rainbow trout would only be able to pass the ford when flows reach 180 cfs. The ford appears to be a complete barrier to upstream migration of juvenile steelhead and trout. Removal of this barrier is the primary reason the bridge project has been proposed. Further information on fish passage conditions at this barrier are contained in the Hagar Environmental Science Technical Memorandum (2005).

WILDLIFE

Wildlife habitat values in the project area are generally high given the significant and diverse native riparian canopy. Except for limited vehicle traffic across the ford and presence of a single family residence, human use of the project study area is relatively sparse. The presence of a multi-layered riparian tree canopy increases wildlife habitat values, while invasive non-native understory plant species has slightly reduced these values of in the immediate project site area.

Mammals

Small mammals expected to be present in the project area include California mouse (*Peromyscus californicus*), pocket gopher (*Thomomys bottae*), striped skunk (*Mephitis mephitis*) and raccoon (*Procyon lotor*). Coyote, bobcat, mountain lion and black-tailed deer can be expected

occasionally in the project vicinity. Several bat species, including the Townsend's big-eared bat (a state and federal species of concern) and California myotis can be expected to forage nightly along the riparian corridor although roosting and nesting habitat is absent in the immediate project vicinity.

Amphibians and Reptiles

The amphibian community of the study area is apparently rather small due to the disturbed nature of the area due to landslide debris and the scouring floods that occur periodically in the river. Amphibians were not observed during field visits, but Pacific tree frog, California slender salamander, California newt and arboreal salamander are expected to occur. Habitat conditions are poor for breeding California red-legged frogs along the creek within the immediate area of the proposed project site (see further discussion below).

Reptiles occurring in the project area include western fence lizard, southern alligator lizard, western aquatic garter snake, western terrestrial garter snake, and ring-necked snake. The creek may be suitable for western pond turtles but the species has not been identified in the vicinity (see below for further discussion).

Birds

The project area supports a diverse assemblage of birds. The deciduous riparian trees along the river provide nesting cavities and food sources for a variety of birds, including neo-tropical migrant species. Breeding birds in the riparian forest include downy woodpecker, Pacific-slope flycatcher, warbling vireo, bushtit, winter wren, Swainson's thrush, American robin, yellow and Wilson's warblers, and song sparrow. Of these, the warbling vireo, Swainson's thrush, and yellow warbler are of special interest. Warbling vireo, Swainson's thrush, and yellow warbler have the potential to breed within the riparian corridor and therefore are of special interest. The vireo and thrush are proposed state species of special concern, and the yellow warbler is presently a state species of special concern. For unknown reasons, these species, and other neo-tropical migrants such as olive-sided flycatcher, have declined in local riparian habitats (D.Suddjian, pers. comm., 2003). Birds using the redwood forest above the creek include owls, chestnut-backed chickadee, Bewick's wren, plain titmouse and acorn woodpeckers. Raptors, including Cooper's hawk, red-tailed hawk, pygmy owl and great-horned owl could also be present in this habitat.

The aquatic habitat of the creek probably also attracts waterbirds over the seasons, although the number of waterbirds using the creek is never large. Great blue heron, and snowy egrets forage in or near the channel. The principal ducks on the west branch of Soquel Creek are mallard and common merganser.

WILDLIFE SPECIES OF CONCERN

Table 1 shows wildlife species that occur or may occur within a one-mile radius of the site as indicated on the California Natural Diversity Data Base records (CNDDB). This information was supplemented with project field visits that evaluated site and vicinity habitat conditions, and potential species that could occur at the site or in the vicinity.

Table 2. Habitat suitability for special-status wildlife at the Tucker Road ford, W. Branch of Soquel Creek, Santa Cruz County

Common Name *Scientific Name*	Federal/State Status	Habitat Affinities	Potential for Occurrence on Project Site
Threatened & Endangered Species			
California red-legged frog *Rana aurora draytonii*	FT/ CSC, CP	Breed in slow creeks, ponds and marshes; use uplands during wet months	Unlikely; no breeding habitat; CRLF may forage or travel through area during summer months.
Coho salmon *Oncorhynchus kisutch*	FT/SE	Spawns in loose silt-free coarse gravel; requires sufficient fall streamflow for spawning	Native stock extirpated from Soquel Creek system; CDFG wants to re-establish coho run.
Steelhead trout *Oncorhynchus mykiss*	FT/-	Requires silt-free gravel for spawning; juveniles need cover, cool water, sufficient dissolved oxygen	High; migrates up Soquel Creek; W. Branch in project area provides spawning and summer rearing habitat.
Other Special-Status Species			
Western pond turtle *Clemmys marmorata*	FSC / CSC, CP	Permanent ponds, creeks and rivers; nest in uplands 400m or more from water	Low-Moderate; perennial stream provides appropriate habitat but up and downstream largely shaded; little available upland nesting habitat in project area
Foothill yellow-legged frog *Rana boylii*	FSC/CSC	Breeds in creeks and rivers; uses both creeks and streambanks to forage	High; FYLF observed 4000' upstream and in lower Soquel Creek; breeding possible in project area
Cooper's hawk (nesting) *Accipiter cooperi*	- / CSC	Nest and forage in woodlands; nests 20-60 feet high, lined w/ flakes of outer bark	Moderate; nesting habitat in riparian woodlands and nearby areas
Nesting Birds of Prey *Various species*	- / 3503.5	Variety of woodland and savanna habitats	Moderate; potential nest trees in larger redwood and riparian trees.
Yellow warbler *Dendroica petechia brewsteri*	MNBMC/ CSC	Nests in riparian habitats; prefer willows and cottonwoods near water	Low; willows too sparse to provide nesting habitat along stream corridor near site.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	-/ CSC	Deciduous woodlands,scrub, thickets	Low; marginal habitat present in project site stream corridor

Status -	Federal	FE	Federally-listed as Endangered under Federal Endangered Species Act (ESA)
		FT	Federally-listed as Threatened under ESA
		FC	Federal candidate species (former Category 1 candidates)
		FSC	Federal species of concern
		MNBMC	Fish and Wildlife Service: Migratory Nongame Birds of Management Concern
Status -	State	SE	State-listed as Endangered under California Endangered Species Act (CESA)
		ST	State-listed as Threatened under CESA
		CSC	Species of Special Concern designated by California Department of Fish and Game
		CFP	Fully Protected Species under the Fish and Game Code of California
		CP	Protected Species under the California Code of Regulations
		3503.5	Protected birds of prey (Orders Falconiformes and Strigiformes) under Fish and Game Code Sec. 3503.5

NATURAL HISTORY AND STATUS OF SPECIAL-STATUS SPECIES

California Red-legged Frog

Background Information. The California red-legged frog (*Rana aurora draytonii*) is the largest native frog in California (85-138 mm) and was historically widely distributed in the central and southern portions of the state (Jennings & Hayes 1994). The species requires still or slow-moving water during the breeding season, where it deposits large egg masses, usually attached to submergent or emergent vegetation. Breeding typically occurs between December and April, depending on annual environmental conditions and locality. Radio-telemetry data indicates that adults engage in straight-line breeding season movements irrespective of riparian corridors or topography, and they may move up to two miles between non-breeding and breeding sites (Bulger 1999). Adults generally inhabit aquatic habitats with riparian vegetation, overhanging banks or plunge pools for cover, especially during the breeding season (Hayes and Jennings 1988). They may take refuge in small mammal burrows, leaf litter or other moist areas during periods of inactivity or to avoid dessication (Rathbun, *et al.* 1993; Jennings and Hayes 1994). Red-legged frogs may move up to 300 feet from aquatic habitats into surrounding uplands, especially following rains, when individuals may spend days or weeks in upland habitats (Bulger 1999). Eggs require 6 to 12 days before hatching and metamorphosis generally occurs 3.5 to 7 months after hatching, although larvae are capable of over-wintering. Following metamorphosis, generally between July and September, juveniles are 25-35 mm in size. Movements and habitat associations of juveniles are poorly understood.

During the non-breeding season, a wider variety of aquatic habitats are used by California red-legged frogs, including small pools in coastal streams, springs, water traps and other ephemeral water bodies (M. Allaback, J. Gilchrist pers. observ.). Occurrence of this frog is negatively correlated with presence of non-native bullfrogs (*Rana catesbeiana*) (Hayes & Jennings 1986, 1988), although both species appear to persist at certain locations, particularly in the coastal zone (M. Allaback, pers. observ.). It is estimated that the California red-legged frog has disappeared from approximately 75% of its former range, and has nearly been extirpated from the Sierra Nevada, Central Valley and much of southern California (Miller, *et. al.* 1996). The species continues to persist and is locally common in some areas of the Coast Zone from Marin County south through Santa Barbara County.

On May 23, 1996, the California red-legged frog was listed as threatened by the United States Fish and Wildlife Service (Miller, *et. al.* 1996). The USFWS proposed critical habitat for red-legged frog on September 11, 2000 (McCasland and Twedt 2000), and then published a final designation on March 13, 2001. The designation defined land considered most important to the species' long-term survival. On 11/6/02 a federal judge vacated the critical habitat designation and sent the issue back to the Service to redesignate. The final redesignation has not yet been made. The project site is not within an area previously designated as Critical Habitat. The U. S. Fish and Wildlife Service (2002) finalized a recovery plan for the species.

Habitat Suitability Onsite for Red-legged Frog. The project site is not likely to provide breeding habitat for California red-legged frogs, since it typically contains high flows during the egg-laying season. However, California red-legged frogs are known to inhabit or are considered likely to inhabit the Summit region in the Santa Cruz Mountains throughout Santa Cruz County. They typically use man-made ponds or natural sag ponds for breeding and will regularly move between ponds and nearby riparian areas. Therefore, the project site may provide foraging and sheltering habitat ("summer habitat") for California red-legged frogs moving from breeding

ponds several miles away in the Summit, or from a breeding pond in closer proximity to the project site.

Foothill yellow-legged frog (*Rana boylii*).

Background Information. The foothill yellow-legged frog is a moderate-sized (37-82 mm) frog that inhabits the Coast Range from the Oregon border to San Luis Obispo County and the western foothills of the Sierra Nevada in California. It lays egg masses during spring in small- to medium-sized streams and rivers with cobble-sized or greater substrate, a significant amount of riffle habitat and partial shade (Hayes & Jennings 1988; Kupferberg 1996). Females lay single clutches of greater than 1000 eggs usually in the same general locations each year, often at a stream confluence or in other microhabitats where boulders create below average flow (Kupferberg 1996). Tadpoles are cryptically colored and difficult to observe in a flowing stream environment. Metamorphosis occurs between July and September. At some locations near breeding sites, metamorphs (post-metamorphic juveniles) can be observed relatively easily in late summer and early fall along stream banks (M. Allaback, pers. observ.). Bullfrogs and predatory, introduced fishes negatively affect tadpoles (Hayes & Jennings 1988). The foothill yellow-legged frog has been extirpated from most historic locations in southern California and throughout much of the foothills in the Sierra Nevada (Jennings and Hayes 1994). The California Department of Fish and Game lists the foothill yellow-legged frog as a Species of Special Concern, and the species is a federal Species of Concern.

Habitat Suitability On-Site and in the Project Vicinity. At the project site, the stream channel averages roughly 10-20 feet in width during the rainy season and the substrate near the project site is dominated by both sediment and cobbles. Scattered pools are present, including one immediately below the fish barrier formed by the existing road crossing. The stream habitat in the vicinity of the project site provides potential habitat for foothill yellow-legged frogs due primarily to the cobble substrate in the perennial stream under a mix of open and partially closed canopy. Not far upstream and downstream of the project site, much of the West Branch of Soquel Creek is deeply entrenched under a mostly closed canopy, which is less desirable for foothill yellow-legged frogs. Downstream conditions are less suitable until the creek approaches the confluence with Soquel Creek (approximately 2.3 miles downstream). On August 30, 2002, foothill yellow-legged frogs were observed approximately 4,000 feet upstream (following the channel meander using a hip-chain) near the base of a landslide (Alley, pers. comm. to M.Allaback). The distribution of foothill yellow-legged frogs in the upper West Branch of Soquel Creek may be more widespread since Mr. Alley was assessing stream habitat primarily for steelhead (*Oncorhynchus mykiss*) and the frogs were observed incidentally. Approximately 10 individuals were seen in a localized area, which, given the late-summer observation suggests that they were post-metamorphic juveniles at a breeding location. Given the known yellow-legged frog breeding location upstream, and the potential for breeding at the project site, the site may provide both breeding and summer foraging and sheltering habitat for the species

Western Pond Turtle

The western pond turtle (*Clemmys marmorata*) originally inhabited many of the pacific drainage basins in California. It ranges from western Washington to northern Baja California, mostly west of the Sierra Nevada-Cascade crest (Stebbins 2003). It ranges in size to just over 8 inches (21cm) with a low carapace that is generally olive, brownish or blackish (Stebbins 2003, Jennings and Hayes 1994). Western pond turtles area found in ponds, marshes, streams and irrigation ditches containing aquatic vegetation. It is often seen basking on logs, mud banks or mats of vegetation

on lower streambanks, although wild populations are wary and individuals will often plunge for cover after detecting movement from a considerable distance (M. Allaback, pers. observ.). Sometimes the species is difficult to detect, particularly if no obvious basking sites are present or if the environmental conditions are not favorable. Although it is an aquatic species with webbed feet, it will move overland to terrestrial habitats to overwinter in response to fluctuating water levels, an apparent adaptation to the variable rainfall and unpredictable flows that occur in many coastal California drainage basins (Rathbun *et al.* 1993). In addition, it can over-winter on land or in water or remain active in the winter, depending on environmental conditions (Rathbun *et al.* 1993; Jennings and Hayes 1994). Although a highly aquatic species, pond turtles are also tied to terrestrial habitats. Females typically leave a watercourse between late April and July to lay eggs. Females travel up several hundred feet or more from the aquatic habitat to a suitable grassland or open woodland and create a nest burrow. Major pond turtle predators include skunks, racoons, coyotes, gulls, snakes, bullfrogs and introduced fishes. Western pond turtle is in a general state of decline through most of its range. Primary reasons for decline are loss of aquatic and terrestrial habitat, competition for available prey base, and predation of hatchling turtles by bullfrog and other non-native aquatic species. The western pond turtle has been separated into two subspecies (*C. m. marmorata* is the northwestern subspecies and *C. m. pallida* is the southwestern subspecies), both of which are listed as state Species of Special Concern by the CDFG. Current research suggests, however, that the taxon may be represented by three distinct populations throughout its range in California and may therefore require a taxonomic revision (Jennings and Hayes 1994). Western pond turtle is also a federal Species of Concern.

Somewhat suitable riverine habitat occurs within the project area, as the area has some escape cover such as deep pools, undercut banks, overhanging vegetation and exposed tree roots. Therefore, western pond turtles may be present, although there are no reports from the vicinity (CNDDB). No pond turtles were observed in the project area during the site visits. Nevertheless, pond turtles are often difficult to detect in riparian systems without conducting focused surveys that include trapping and/or snorkeling. High winter flows in the creek would limit pond turtle occurrence in the creek during that time of year. Also the stream is steeply entrenched up and downstream, and lacks large open woodland or grassland areas for breeding, although some riparian woodland (suitable for breeding) is found on upper flood terraces near the site.

Raptors

Nesting raptors (birds of prey) that could occur in the project area include red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiteer cooperii*) and great horned owl (*Bubo virginianus*). Large riparian trees including redwoods and alders occur along the West Branch of Soquel Creek near the project site, and could provide nest sites for these species. No nests were detected during field surveys, although as noted, surveys were conducted outside the nesting season.

IMPACTS AND RECOMMENDATIONS

Sensitive Salmonid Species

Potential Impact: Replacement of the existing concrete ford with a bridge will eliminate the partial barrier to salmonid species—a beneficial impact. Adverse impacts could occur if construction occurs during salmonid migration periods, or if salmonids are present during dewatering or construction within the stream channel.

Recommended Mitigation: All project construction will occur between July 1st and October 15th, outside of the time periods for salmonid migration.

Prior to removal of the ford and construction within the stream channel a permitted biologist shall rescue and remove all native fish within the work site. Rescued fish shall be moved to the nearest appropriate site on the W. Branch of Soquel outside the work area. A record of fish rescued and removed shall be maintained and provided to CDFG and NMFS. Any non-native exotic species shall be dispatched.

Immediately after the fish rescue operation, a temporary water diversion system will be installed to divert creek flows around the construction zone. The intake pipe shall be fitted with a fish screen meeting CDFG and NMFS criteria to prevent entrainment or impingement of small fish. Any turbid water from the site shall be pumped to an upland filtration basin where it does not drain directly into the stream channel.

Other species' avoidance, minimization and mitigation measures are contained in Appendix A and will be carried out by the contractor.

Sensitive Amphibians and Reptiles

Potential Impact: Construction activities in the creek, including grading and ford removal, could adversely affect California red-legged frog, foothill yellow-legged frog or western pond turtle if species are in the area. California red-legged frog breeding habitat is not present at the site, but summer forage habitat is present. Breeding and forage habitat are available at the site and in the larger W. Soquel Cr. watershed for foothill yellow-legged frog. Although somewhat less likely, breeding and forage habitat is present at the site for western pond turtle.

Recommended Mitigation: For construction in streams and wetlands where the presence of California red-legged frog is known from the larger region but unknown at the project site, a pre-construction survey, worker education seminar and limited construction monitoring is typically required. If, however, the California red-legged frog is found prior to or at any time during construction of the project, further guidance from the USFWS and CDFG will be necessary. Daily biological monitoring and authorization to relocate frogs may be necessary. These recommendations would be applicable to other sensitive aquatic reptile and amphibian species found in the area.

1. Preconstruction Survey and Construction Monitoring. It is recommended that a qualified biologist conduct one daytime and one nighttime survey for California red-legged frogs within 2-4 weeks of construction. If California red-legged frogs are detected, the regulatory agencies should be contacted for guidance. In addition, a biological monitor should be present during the initial construction activities that involve any disturbance of vegetation or potential cover-sites,

during removal of the concrete ford, during channel grading, and again during the entire portion of the project that involves logjam removal, if part of this project. The work areas should be delineated by temporary flags or fencing to minimize affecting any more habitat than is necessary to perform the project.

It is recommended that the presence of foothill yellow-legged frogs within the project footprint be assumed unless both pre-construction surveys and at least 5 consecutive days of biological monitoring studies are negative. Assuming that the project is scheduled to start in the summer or early fall, daily biological monitoring for the first 5 days should also include focused in-stream searches at least ¼ mile upstream and downstream of the project site for all age classes of foothill yellow-legged frogs. If daily searches for the first 5 days of construction are negative and it seems unlikely that foothill yellow-legged frogs are present within the localized work area, daily biological monitored may be terminated unless considered necessary to minimize take of other special-status species.

If foothill yellow-legged frogs are present within the work area, all reasonable efforts should be made to avoid direct take by delaying construction until August 1 (presently planned) or preferably September 1, when it is likely all tadpoles will have transformed. Any tadpoles, metamorphs or adult frogs will be relocated to a suitable site outside the construction zone prior to de-watering and any in-stream construction work. Approval to relocate foothill yellow-legged frogs will be acquired from CDFG prior to construction. Since relocated animals may return, a CDFG-approved biological monitor will be present to conduct daily-monitoring studies during the entire construction period. CDFG will be contacted to determine if additional details regarding any proposed relocation of special-status amphibians or reptiles are needed.

If western pond turtles are found during pre-construction surveys or during construction, a qualified biologist will relocate them to the nearest appropriate habitat following approval of CDFG. If this species is present, a biological monitor will be needed during the full construction period as the species is likely to return and construction fencing will not an effective deterrent.

2. Worker Education Program. Regardless of the results of the preconstruction surveys, a worker education seminar should be delivered to all construction personnel regarding the status and identification of the target species. Prior to the start of construction, an education program will be presented at the project site by a qualified biologist. Onsite construction managers must attend and are responsible for passing on the information to workers, since new personnel may arrive during the course of the project. If the onsite manager changes during the construction project, then another seminar must be provided. At every seminar, written material will be distributed. It will be the onsite manager's responsibility to ensure that all construction personnel and subcontractors receive a copy of the education program. The biological monitor will be available to deliver worker education programs as necessary for the duration of the project. All personnel must sign and date their program, keep a copy onsite and submit a signed form to document the training they received. The education program will include a description of each special-status species and its habitat, the general provisions of the Endangered Species Act, the necessity of adhering to the Act to avoid penalty, measures implemented to avoid affecting species specific to the project and the work boundaries of the project.

Other species' avoidance, minimization and mitigation measures are contained in Appendix A and will be carried out by the contractor.

Raptors and Riparian Birds

Potential Impact: Bridge construction is presently planned after August 1st, outside of the normal the nesting season of riparian birds and raptors. Some riparian species may re-nest through August in some years. Noise and construction activities could disrupt the normal breeding activities of birds within 200 feet of the project site.

Recommended Mitigation-- Raptor Nesting Survey. A qualified wildlife biologist will conduct a raptor and riparian bird nesting survey prior to construction, if construction occurs during the nesting season (Feb.- August).

If nest(s) are found within 200 feet of the construction zone, construction may need to be delayed until the biologist can determine nesting has ended, or an appropriate construction buffer established around active nests. Minimum buffers recommended by CDFG are 50' although in some cases smaller buffers are approved. The Department of Fish and Game can be consulted to determine appropriate alternate mitigation. If construction is planned after August, no survey is required.

Vegetation

Potential Impact: Some lower bank riparian vegetation, including immature yellow willow and white alder trees, will be removed from the streambanks during channel regarding. Other vegetation including mature riparian trees on upper flood terrace slopes should not be affected by construction. Construction staging will occur in an existing "garden plot" area adjacent to Tucker Road that has already been disturbed.

1. Recommended Mitigation-- Riparian Vegetation Protection and Exotics Removal. The work areas will be delineated by temporary fencing to minimize incursion by construction staging or construction activities into native plant communities beyond what is necessary to perform the project. All non-native understory vegetation in the construction zone and immediate vicinity of the project site should be removed. Species removed will include English ivy, German ivy, Himalayan blackberry, vinca, pampas grass and French broom. Once removed these areas can be considered for additional construction staging, if needed. A restoration ecologist or botanist should be on-site at the beginning of construction to identify species to be removed and natives that will be protected. To minimize disturbance, hand removal is preferred.

2. Recommended Mitigation-- Restoration Plan. All native riparian trees and understory vegetation removed will be replanted on a minimum 3:1 (three planted for one lost) basis. The primary objectives of revegetation are to replace native plant species in construction zones, or areas where non-natives were removed, and provide a root structure for long-term bank protection and stabilization. Erosion control measures will be provided after construction; however, the erosion control blanket, wattling and temporary erosion control seeding will not be relied upon beyond the 2 to 3 year life span of the blanket. Native species will be planted on all areas disturbed by construction, including the any temporary access road(s), and lower bank slopes presently unvegetated due to bank erosion or scour. Generally, riparian species (willow, alder) will be planted on the lower bank slopes, with lower growing shrub and herbaceous species interspersed with the riparian trees. Upland or semi-riparian species (redwood, elderberry, bay, tan oak) will be planted on the disturbed upper slopes. Unvegetated spaces between existing native plants will be interplanted with riparian cuttings or native container species, as needed.

The revegetation species list should include plants native to the project site or vicinity. Lower bank tree species should include white alder (*Alnus rhombifolia*), red alder (*Alnus rubra*), arroyo willow (*Salix lasiolepis*) and yellow willow (*Salix lucida* spp. *lasiandra*). Shrubs and herbaceous plants should include California blackberry (*Rubus ursinus*), horsetail fern (*Equisetum arense*), giant chain fern (*Woodwardia fimbriata*), blue elderberry (*Sambucus mexicana*) and thimbleberry (*Rubus parviflorus*). Upper bank trees can include redwood (*Sequoia sempervirens*), bay (*Umbellularia californica*), tan oak (*Lithocarpus densiflora*), and coast live oak (*Quercus agrifolia*). Shrubs should include species normally found in mixed evergreen forests such as California blackberry, western sword fern (*Polystichum munitum*), wood fern (*Dryopteris arguta*), coffeeberry (*Rhamnus californica*) hazelnut (*Corylus cornuta*) and coyote brush (*Baccharis pilularis*).

Willows can be planted from cuttings taken from mature plants in nearby areas. Healthy, straight and live wood that is at least 1 year old is recommended. Cuttings should be spaced randomly on 3-foot centers. Additional specifications for cuttings can be provided. All other species should be planted from container stock grown by a local nursery from locally collected seed and cutting sources. Optimum installation period for container installation is October 1 – November 15 following an early rainfall event that provides moist soil conditions. Willow cuttings on the lower bank slope can be installed during installation this time period, or during the December 15 to February 1 winter dormant season. A revegetation specialist should provide input on species selection, spacing, location and timing of installation. Typical cutting and container installation specifications should also be part of this plan.

Dry season irrigation is critical to revegetation success. All container-installed plants should be irrigated for 3 years after planting during the spring-summer-fall dry season. Irrigation should occur at least twice each week, but may need to be adjusted for climatic conditions. Soil moisture conditions should dictate watering requirements for riparian species. Recommended irrigation is by drip emitters to each plant. If a water connection is not available at the site, plants may be hand-watered. Inspection by a native plant revegetation specialist should occur during plant installation and quarterly during the first year after installation. Annual inspection is recommended during the years 2 and 3.

A revegetation maintenance program is recommended for a period of at least 3 years after completion of plant installation. The specific maintenance tasks are summarized below:

- Conduct routine maintenance of the irrigation system
- Remove any trash or debris that may hinder vegetation establishment
- Inspect erosion control blanket
- Review low bank plantings for damage or removal from creek scour
- Review plantings for herbivore damage and add screens as necessary
- Remove any invasive non-native vegetation
- Replace any shrubs or trees that do not survive the first year
- Maintain complete notes on maintenance activities and dates

BIBLIOGRAPHY ON FILE AT PLANNING DEPT

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