PHASE I – SOUTH BRANCH
Existing Creek Conditions

San Diego has unique geographic and topographic features that give our region a truly special character. Our system of mesas, coastal plains, canyons and creeks are the elements that comprise this landscape. Of these elements, only canyons and creeks have the capability to link one area with another. Although considerably threatened by development, the many forks of Chollas Creek still present opportunities to create biologically functional wetlands while allowing for human use. Chollas Creek is the drainage channel that traverses Southeastern San Diego from Mid-City and Lemon Grove to San Diego Bay. The creek was once well known to Native Americans, who used it as their major trail through this portion of the region. The natural drainage channel has been substantially modified in the past 50 years following urban development and now consists of both earthen and concrete lined inverts. Residential development, business complexes, roads and freeways have segmented the creek's geography to the extent that almost all of its surrounding open space has been lost. Therefore, the City of San Diego and the communities surrounding the creek have made the management and restoration of Chollas Creek and its associated wetlands a high priority. With the projected growth of the Southeastern San Diego communities to reach over 300,000 people in the next ten years, Chollas Creek may hold the key for the revitalization of these communities. Design/Development Guidelines and management measures to reach this goal are described in the wider range Chollas Creek Enhancement Program, and are further detailed in this Phase I Wetlands Management Plan for Chollas Creek.

Existing Conditions

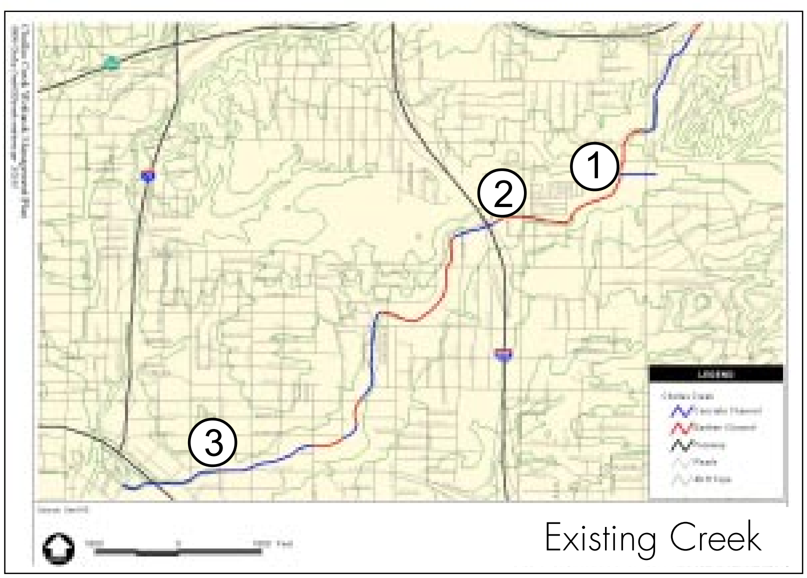
The South Branch Boundaries

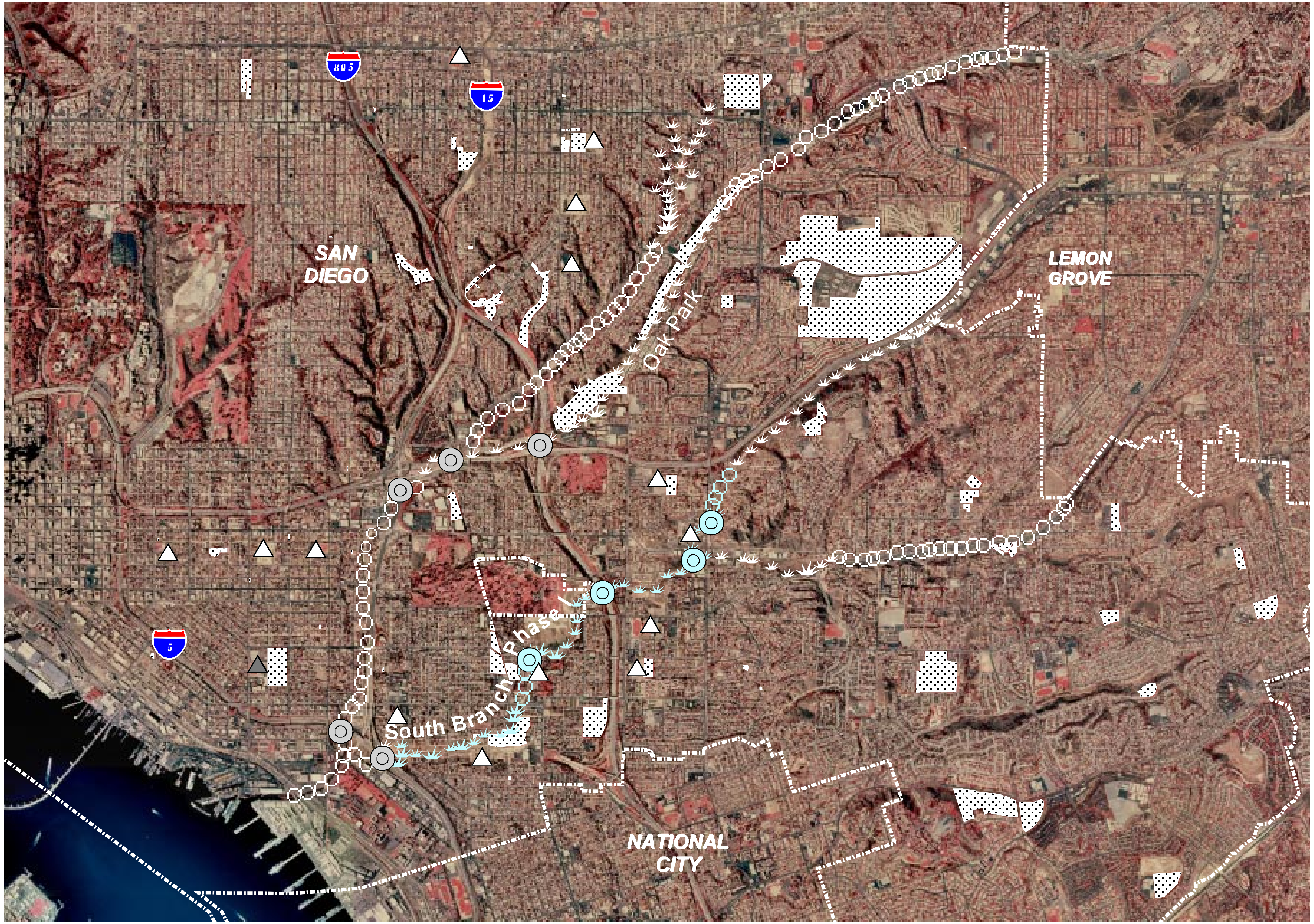
The Chollas Creek South Branch (Phase I) spans from Martin Luther King Jr. Freeway (State Highway 94) at the Kelton Road intersection, to Interstate 5 (I-5) south of downtown San Diego at the junction with State Highway 15. The creek then empties into San Diego Bay. The creek flows through a portion of Emerald Hills and the neighborhoods of Lincoln Park and Southcrest. The study area is mostly developed; therefore, for analysis purposes, a 500-foot buffer on either side of the creek was used as the study area boundary. The majority of the study

area consists of roads (including three freeways: I-5, I-805 and SR-94), high-density residential development, commercial development, public services, utilities, a transportation terminal and a cemetery. Open space is limited, however, a large expanse of open space still exists at the west end of the study area close to I-5 and in the middle section of the study area east of I-805. Both areas are planned for development.

The study area is also located just south of the Multiple Habitat Planning Area (MHPA) of the City's Multiple Species Conservation Program (MSCP), which extends north of the northernmost study area boundary along Highway 94 on both sides of the creek. At the beginning of this study in early 2000, two areas containing the last remnants of riparian habitat have since been developed: the Imperial Marketplace south of Imperial Avenue and the Market Creek Plaza of the Jacobs Family Foundation south of Market Street and the trolley station.

For the most part, the creek runs through a human-made channel that in two sections has been recently encased in concrete. In some places flood walls and flood dividers have been constructed, while in other places the creek bed is concrete-lined on at least one of the banks. Phase I Chollas Creek South Branch flows through an earthen channel in three places within the study area, (1) from Euclid Avenue to I-805, (2) from 45th Street to Imperial Avenue; and (3) for a very small stretch between Z Street and Boston Avenue.





Chollas Creek South Branch - Phase I Areas

Study Methods

KEA Environmental Consultants biologists first reviewed aerial photographs of the creek area and based on this information, conducted several field investigations to identify biological and wetland resources within the study area. Field investigations took place on May 15 and 22, and July 6, 2000, and included a biological site assessment including the delineation of vegetation communities, identification of potential sensitive plants and animals and delineation of wetlands resources using the 1987 Corps Wetlands Manual. The consultants mapped all biological resources in the field using 1:24,000 scale United States Geological Survey (USGS) topographic maps of the project area. All plant and animal species were identified to the level possible and recorded. The biological resources were also evaluated based on existing biological data sources for the project vicinity (i.e., the California Natural Diversity Data Base (NDDB); Multiple Species Conservation Program (MSCP) sensitive species lists and maps; Bauder 1995; Sakrison and Bauder 1997; and, Skinner and Pavlik 1994). In addition, Nasland Engineering undertook a hydrological field assessment on May 22, 2000.

Plant and animal species were identified by direct observation and indirect signs such as the evidence of scat, tracks, calls, nests, or burrows. Scientific nomenclatute used throughout this report conforms to Hickman (1993) and Skinner and Pavlik (1994) for plants; and Laudenslayer et al. (1991) for amphibians, reptiles, birds, and mammals.

Following field investigations, baseline conditions were determined by mapping field data in a Geographic Information System (GIS) database. These data were overlaid with existing GIS data acquired from SanGIS (i.e. 2-foot topography, existing and proposed land use, vegetation, biological resources, creek conditions, FEMA flood conditions, parcels, roads, etc.). Based on this composite graphic, the consultants identified wetlands management opportunities (e.g., suitable areas for wetlands expansion, creation and restoration, preferably on City property or on available land) and constraints (e.g., already protected or developed areas or areas planned for development or constrained by flood risk) that were verified in the field. This field confirmation allowed the consultants to update the data and include them in the modeling effort. The consultants then

determined trail configurations and enhancement and management treatments for each of the areas identified in the model that are compatible with the Chollas Creek Enhancement Program. Hydraulic effects from proposed modifications were assessed using a HEC II computer model.

Existing and in process development within the study area was verified in the field and updated on GIS land use overlays acquired from SanGIS (1999). Land use types were categorized in residential, commercial, utilities, public open space, parks, and vacant-not graded, among others. Vegetation overlays were also updated with information gathered in the field, including pockets of jurisdictional wetlands and riparian habitats. Areas of slopes greater than 25 percent were excluded from the model, as these areas would be precluded from restoration and enhancement treatments. Weed management will be necessary along the entire reach of the creek within the study area.

Biological Conditions

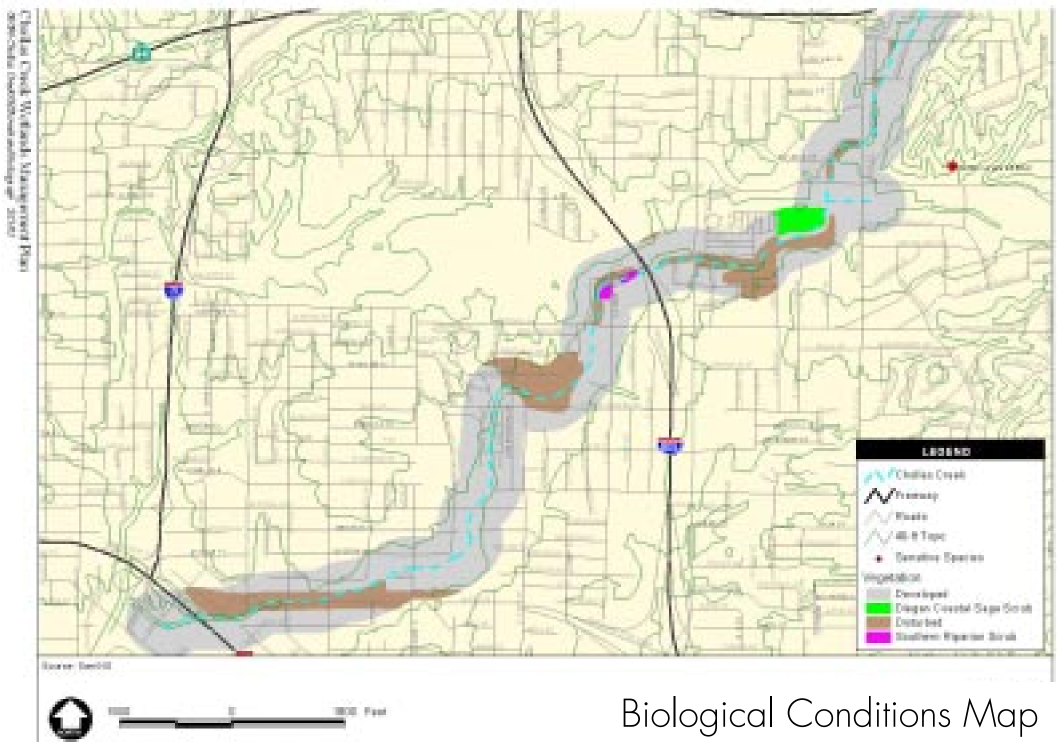
Due to the urbanization of the area, biological resources are scarce. Biological conditions of Phase I are depicted on a map on page 13. This map was derived from a digital database (SanGIS 1999) and has been updated with information collected in the field.

Vegetation Communities

The majority of the creek within the study area has been altered by development. As a result, only small pockets of native vegetation are present as exotic vegetation and disturbed vegetation communities characterize the majority of the creek alignment.

Riparian and Wetland Communities

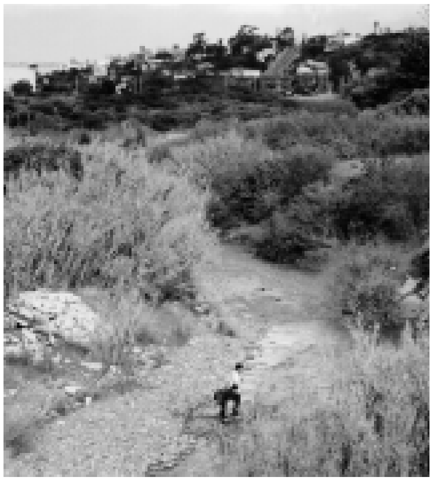
Much of the channel invert of Chollas Creek is unvegetated. In these areas the channel invert is characterized by large cobbles, gravel and sand. Portions of the stream had standing water, but to a depth of only a few inches. It is assumed that much of the hydrologic flow is associated with urban runoff. Flood control maintenance activities and scouring from rain events are the two primary factors hindering the development of vegetation along the invert of the creek. Though seedlings of various species may become established within the channel invert, they do not seem to persist, as evidenced by the lack of juveniles and mature individuals.



Biological Conditions Map

Riparian scrub is a shrub-dominated community that occurs along stream and river corridors. Along Chollas Creek this community is situated at the outer edges of the channel invert and the lower slopes of the creek's bank. Mulefat *(Baccharis salicifolia)* is the sole dominant, native shrub within this community and its distribution is relatively patchy along the creek. Individuals of Goodding's black willow *(Salix gooddingii)* are also scattered within this community. A high number of non-native species are also associated with mulefat, which is indicative of the disturbed condition of this community. In most instances, the cover of non-native species is much higher than the native cover. Giant cane *(Arundo donax)*, spiny cockelbur *(Xanthium spinosum)*, white sweetclover *(Melilotus alba)*, Bermuda grass *(Cynodon dactylon)*, castor bean *(Ricinus communis)*, and sweet fennel *(Foeniculum vulgare)* are all non-native species that may be present within this community.

Freshwater Marsh in areas where there is a more constant water source, emergent wetland species may persist. They primarily exist in the channel invert, preempting the establishment of juveniles and mature individuals due to frequent scour events. Freshwater marsh habitat along the creek is characterized by herbaceous species such as: cattails *(Typha latifolia)*, umbrella



sedge *(Cyperus sp.)*, bulrush *(Scirpus sp.)* and spike sedge *(Eleocharis sp.)* Similar to the riparian scrub described above, cover of non-native species is usually much higher than native cover, indicative of the disturbed condition of the creek.

Disturbed Wetlands are areas dominated almost exclusively by non-native wetland indicator species. Large patches of giant reed, white sweetclover, and spiny cockelbur occur all along the creek.

Ornamental Riparian Woodlands exist in at least one place along Phase I (Segment 4 - a section east of I-805 separating two condominium complexes), at this point the creek is surrounded by planted cottonwood trees *(Populus fremontii)* intermixed with eucalyptus and other ornamentals. In addition, it appears that two developments that are currently being built, the Imperial Marketplace and the Market Creek Plaza, will also be fitted with ornamental plantings adjacent to riparian areas in park settings. Development of the Market Creek Plaza will include restoration of the riparian creek corridor west of the development. The Imperial Marketplace project will be planting native riparian trees on creek slopes equipped with Armorflex.

Upland Communities on the majority of slopes surrounding the creek are dominated by non-native species, either ruderal weedy species or ornamentals that have been planted for aesthetic value(s).

A high number of ornamentals occur along the upper slopes of the creek. Eucalyptus *(Eucalyptus sp.)*, acacia *(Acacia sp.)*, Peruvian pepper tree *(Schinus molle)* and fan palms *(Washingtonia sp.)* are all present along these slopes. Most of these individuals were intentionally planted but some are likely to be opportunistic colonizers.

Ruderal Communities are ones that are dominated by early seral, non-natives that depend upon a regime of frequent disturbance for their continued persistence. Sweet fennel, castor bean, fountain grass *(Pennisetum setaceum)*, ripgut grass *(Bromus diandrus)*, wild oat *(Avena sp.)*, tree tobacco *(Nicotiana glauca)* and giant cane are the most common non-natives in these areas. Some native shrub elements are present within these areas but are so scattered that they do not represent native shrub habitats, such as chaparral or sage scrub. Some of the more conspicuous natives include: lemonade-berry *(Rhus integrifolia)*, toyon *(Heteromeles arbutifolia)*, cholla *(Opuntia sp.)*, broom baccharis *(Baccharis sarothroides)*, and flat-top buckwheat *(Eriogonum fasciculatum)*.

Sensitive Species not presently found in the study area (SanGIS 1999). However, there are several sensitive species that are known in proximity of the study area. One site of the federal threatened coastal California gnatcatcher *(Polioptila Californica californica)* is known from a large patch of coastal sage scrub between Roswell and Market streets along the Encanto Branch, approximately 1,500 feet to the east of Chollas Creek. This species is not expected to occur within the study area due to the lack of suitable habitat and the disturbed condition of the study area. Several populations of coast barrel cactus (Ferocactus viridescens), a California Native Plant Society (CNPS) List 2 species, are known from approximately 6,000 feet north of the study area along the slopes of the northern fork of Chollas Creek at the Emerald Hills Branch. This species would have a low to moderate potential to occur in small population numbers in the disturbed upland areas that still have some coastal sage scrub or chaparral elements associated with them. Though not reported from the project vicinity, there are several other sensitive plant species that potentially could occur, albeit in small numbers, within the study area. Western dichondra (Dichondra occidentalis), a CNPS List 4 species, could occur in those disturbed areas that still have coastal sage scrub or chaparral elements. Southwestern spiny rush (Juncus acutus ssp. leopoldii) another CNPS List 4 species, could occur in small numbers along portions of the creek with a more permanent water supply. However, this species was not observed within the study area during the reconnaissance surveys.

Hydrology

The hydrology for Phase I Chollas Creek South Branch has been studied, and the floodplain mapped by FEMA. According to data furnished by the City of San Diego, the watershed for Phase I above the confluence with the Main Branch of Chollas Creek west of Interstate 15, is 10.9 square miles. South of Market Street near the transit center, Chollas Creek splits. The southerly fork is known as the Encanto Branch. Above the confluence, the Phase I watershed is 3.3 square miles. The watershed for the Encanto Branch above the confluence is approximately 6 square miles.

Flood Insurance Rate Maps (FIRMs) were prepared for Chollas Creek by FEMA in June 1997. These maps show various Flood Hazard Zones based on 100-year and 500-year floods. Flood control measures for this type of creek are normally aimed at providing protection from the 100-year flood. The peak 100-year

discharge for Chollas Creek used for FEMA's floodplain mapping is as follows:

- Above confluence with the Main Branch of Chollas Creek: 5,300 cubic feet per second (CFS)
- Above confluence with Encanto Branch: 1,900 CFS
- At Kelton Road Emerald Hills Branch: 1,500 CFS
- Encanto Branch above the confluence: 3,500 CFS.

Chollas Creek exhibits varying degrees of streamflow. Certain reaches of the creek have an intermittent flow, with water flowing only during the rainy season, while other reaches of the creek are more perennial, where flow occurs more continuously throughout the year. Since rainfall patterns are consistent throughout the creek's watershed, variation in streamflow would be attributable to differences in urban runoff, differences in perched groundwater levels, and differences in the channel's substrate texture that would effect percolation rates.

Creek conditions along Chollas Creek within the study area vary between concrete-lined channel, concrete on one bank only, and earthen channel. The creek flows through an earthen channel in three places within the study area: 1) from Euclid Avenue to I-805; 2) from 45th Street to Imperial Avenue; and, 3) for a very small stretch between Z Street and Boston Avenue. Residences border the creek within the entire northern portion of the study area (Segment 1). In this area, the creek is controlled by concrete channels, often equipped with flood walls and flood dividers to protect surrounding land uses from flood risk.

Water Quality

The following section is based on the Characterization of Stormwater Toxicity in Chollas Creek, San Diego, a Southern California Coastal Water Research Project Prepared in collaboration with the City of San Diego, the Port of San Diego and the Regional Water Quality Control Board (RWQCB), San Diego Region (1999). Although the data collected for this study was from the National Pollutant Discharge Elimination System (NPDES) monitoring station on the North Fork of Chollas Creek, it is assumed that the data, conclusions and management recommendations are pertinent to Phase I (i.e., the study area). However, the study did state that the toxicants observed in this study may not be the primary toxicants in other regions of the watershed.

Urban runoff from the Chollas Creek watershed has been monitored since the 1993-94 wet season. Over this period, samples of wet weather runoff have consistently exhibited chronic toxicity to the native freshwater invertebrate (Ceriodaphnia dubia). Sediment collected at the mouth of the creek following the wet season, were toxic to the native marine amphipod *(Eohaustorius estuarius)*. These toxicity levels have led the RWQCB to add Chollas Creek to the State's list of impaired waterbodies, the 303(d) list that requires the RWQCB to proceed with a Total Maximum Daily Load (TMDL) to control toxicity within the watershed. The aforementioned study:

- Observed that toxic responses differed between freshwater and marine species after exposure to stormwater;
- Preliminarily identified the organophosphate pesticide diazinon in the stormwater runoff as the agent most likely responsible for the toxicity observed in the freshwater species Ceriodaphnia dubia;
- Identified trace metals, most likely zinc, in the stormwater runoff from Chollas Creek as responsible for toxicity observed in the marine species Strongylocentrotus purpuratus.

This study recommended that:

- Additional Toxicity Identification Evaluations (TIEs) testing be conducted to confirm toxicants and improve confidence in management actions. The study hypothesized that other toxicants may be responsible for the toxicity found in early season storm events;

- A connection needs to be made between the in-channel sampling and the effects on the receiving water environment. In order to assume impairments of beneficial uses in the receiving waters, one needs to extrapolate these samples either upstream of the current NPDES monitoring station on the North Fork of Chollas Creek or downstream to the marine habitat in San Diego Bay;
- Toxicological and chemical testing should be used jointly for tracking the source of these toxicants. One of the initial steps in the TMDL is identifying sources

within the watershed for assigning load allocations. Although this study identified a small handful of constituents that play a role in the observed toxicity, these toxicants may not be the primary toxicants in other regions of the watershed. Also the toxicants may vary in their toxicity due to changes in bioavailability.

Small streams remove more nutrients, such as nitrogen, from water than do their larger counterparts, according to researchers who have applied sampling methods developed in a National Science Foundation (NSF) Arctic area ecological study to waterways across the nation. The finding could have important implications for land-use policies in watersheds from the Chesapeake Bay on the East Coast to Puget Sound in the west. While excess nitrogen has many sources, including runoff from residential lawns and byproducts of automobile combustion, taking greater care to insure that small streams can work effectively to clean the water will reduce the overall nitrogen load that makes its way into larger bodies of water.

Evolving runoff control regulations should be applied to this area. These coupled with wetland and upland enhancements will help to correct water pollution conditions over a long period of time.