APPENDIX D

WATER QUALITY AND WATER RESOURCES OPPORTUNITIES AND CONSTRAINTS REPORT

SAN LUIS REY RIVER PARK MASTER PLAN

SAN DIEGO COUNTY, CALIFORNIA

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PURPOSE

The purpose of this study is to evaluate the hazardous materials issues and water quality and water resource issues of the Core Study Area (CSA) as they relate to the development of the San Luis Rey River Park. The key issues are: the existing land uses in the CSA, existing water quality issues, current water resources uses, hazardous materials issues, and potential park programming within the CSA. The impact of the proposed park on current, potential, and future water quality and water resources is also evaluated.

The current regulatory framework of the CSA related to water quality includes oversight by the Regional Water Quality Control Board (RWQCB), San Diego Region (Region 9) for surface water quality and protection of groundwater resources by implementation of the Basin Plan, the County of San Diego Stormwater Permit for protection of surface water during construction and post construction, and the San Diego County Department of Environmental Health (DEH) for enforcement of hazardous materials regulations.

METHODOLOGY

In order to assess the water quality issues for the Core Study area, several sources were used to develop the necessary information.

The RWQCB Basin Plan for Region 9 was reviewed to compile information regarding the hydrologic units that occur in the CSA, existing or potential beneficial uses of surface and groundwater within and downstream of the CSA, and any impairments to surface water quality of the river. The San Diego County Soil Survey was reviewed to assess the soil types within the CSA, the characteristics of each soil type, and the applicability of each soil type to planned park programming. The Bonsall Geologic Quadrangle Map prepared by the United States Geological Survey was reviewed to evaluate the unconsolidated and bedrock formations that underlie the CSA. The County of San Diego Watershed Urban Runoff Management Plan (WURMP) was reviewed to assess the constraints of the park related to stormwater runoff quality. The list of 303D water bodies was reviewed to evaluate any known impairments to the San Luis Rey River and the potential to exacerbate those issues by the park programming.

Information was obtained through the Department of Water Resources, the San Diego County Department of Environmental Health, and the San Diego County Water Authority and its local member agencies regarding existing water resources uses within the CSA, and outside the CSA in the San Luis Rey watershed.

A database of known hazardous materials listings within a 1/2-mile buffer around the CSA was obtained and reviewed to evaluate the potential for hazardous materials spills and releases to affect park programming and impact water quality.

EXISTING AND FUTURE CONDITIONS WITHIN CORE STUDY AREA

Core Study Area Setting

Hydrology

The CSA is located entirely within the Bonsall Hydrologic Subarea (903.12) of the Lower San Luis Rey Hydrologic Area of the San Luis Rey Hydrologic Unit. The existing surface water beneficial uses include agricultural, industrial, contact and non-contact recreation, warm freshwater habitat, and wildlife habitat; surface water is exempted from municipal supply uses. Existing beneficial groundwater uses include municipal, agricultural, and industrial supply.

The San Luis Rey Hydrologic Unit is a rectangular 565-square mile area that contains all or portions of Oceanside, Bonsall, Rainbow, Valley Center, Fallbrook, and Camp Pendleton and several Indian reservations. The San Luis Rey River is the main stream system and flows west from the mountains of San Diego County in the Cleveland National Forest to the Pacific Ocean. The elevation of the basin ranges from sea level to approximately 6,500 feet above sea level at Hot Springs Mountain. Rainfall in the basin ranges from approximately 12 inches at the coast to 45 inches at Palomar Mountain. Lake Henshaw is the only lake of significance in the basin and is a man-made lake. The lake is used by the Vista Irrigation District for storage of pumped groundwater for downstream potable use (RWQCB, 1994).

The two significant aquifers within the Lower San Luis Rey River are the Mission and Bonsall Basins. The Mission Basin lies almost entirely within the City of Oceanside from the Pacific Ocean to approximately the Bonsall Bridge. The Bonsall Basin lies east of the Bonsall Bridge to approximately one mile west of Rice Canyon Road and State Route 76

Soils

There are six predominant soil types within and adjacent to the river valley. Table 1 summarizes the characteristics of each soil unit. The table presents information related to soil erodibility and suitability of each soil type for different recreational uses including picnic areas, play/activity areas, trails, and campsites. Each soil type is ranked according to its suitability for each recreational use type. However, given the advances in technology and available materials for development, the level of effort required to make a site suitable, given the soil type, is likely lower than the level effort may have been when the report was issued in 1973.

Geology

The San Luis Rey River Valley in the CSA is characterized by two predominant geologic units. Active channel and wash deposits are poorly consolidated sand, silt, clay, and gravel in active washes of streams, and active floodplain deposits are comprised of sand, silt, clay, and gravel in active floodplains of the streams. Older surficial deposits consist of old floodplain deposits that are well consolidated, poorly sorted, permeable floodplain deposits of sand, silt, clay, and gravel.

Outside of the active river valley, within the CSA, five geologic units are represented. South of the river valley three geologic units are present including a coarse-grained massive tonalite of Cretaceous age, metasedimentary and metavolcanic rocks of Cretaceous and Jurassic age, and in the eastern portion of the CSA, a Cretaceous-age, white, fine to medium-grained, massive granodiorite. North of the river valley is Cretaceous-age, dark gray, medium to coarse-grained, massive granodiorite, a coarse-grained, light gray tonalite of Cretaceous age, and on the east side of the CSA the same Cretaceous-age granodiorite is present on the south side of the valley.

Current Uses of Ground and Surface Water within the Basin

Surface water is not currently used for potable supply with the exception of Lake Henshaw. There may be existing uses of surface water for irrigation, however none could be documented during the research for the CSA.

Groundwater within the basin is being utilized within certain sub-basins. The Mission Basin, within the City of Oceanside currently yields approximately 2,200 acre-feet per year (AFY) for the City of Oceanside. The withdrawn groundwater is treated, due to high mineral content, as part of the City's demineralization program. The Upper San Luis Rey basin contains several small basins in which groundwater withdrawal is occurring. The Yuima Municipal Water District (MWD) is pumping an average of 2,700 AFY from the Pauma groundwater basin. The Warner basin is being pumped at a rate of approximately 9,000 AFY by the Vista Irrigation District to recharge Lake Henshaw. Lake Henshaw is used for potable water, however, it is unclear whether the water is drawn directly from the lake or is allowed to flow downstream for later extraction.

The San Diego County Water Authority (SDCWA) and it member agencies do not currently withdrawal groundwater from the Bonsall Basin within the CSA, nor does the SDCWA have wells in the Bonsall Basin. Although the scope of the Master Plan was not to determine uses of groundwater within the CSA and the project area, many wells (more than 100) are known to be present within the river valley between the Bonsall Bridge and I-15. The wells may be used for commercial, agricultural, and or residential water supply purposes. Therefore, protection of surface water and groundwater quality within this active groundwater use basin is essential.

Potential Future Ground and Surface Water Uses

Several potential future uses within the San Luis Rey River Basin are being evaluated by the SDCWA. The City of Oceanside is evaluating the expansion of groundwater extraction in Mission Basin to withdrawal an additional 4,900 AFY above the existing project capacity. In addition, the possibility of an Aquifer Storage and Recovery (ASR) program in the Lower San Luis Rey River Valley (Mission and Bonsall Basins) is being evaluated to raise production by the City of Oceanside from the planned additional 4,900 AFY to a total of 15,300 AFY.
The Rainbow (MWD) is evaluating the extraction and demineralization of 3,000 AFY from the Bonsall Basin, in which the CSA occurs. The Valley Center (MWD) is currently evaluating the extraction of 600 AFY from the lower Moosa Canyon Basin and 400 AFY from Upper Moosa Canyon which are tributary to the Bonsall and Mission Basins.

Regulatory Issues

Surface Water

The Lower San Luis Rey River is listed as a 303D water body for the pollutants of total dissolved solids and chloride, however, these are low priority pollutants that do not currently affect uses within the basin. The Clean Water Act requires states to identify waters that do not meet water quality criteria. States are required to compile a list of these water bodies and develop total maximum daily load criteria. The RWQCB monitors and assess water quality on the listed water bodies for these constituents. Any park programming should consider contribution of these pollutants to the surface water.

Any construction activities for park programming and permanent constructed programming within the park would need to consider the requirements of the County WURMP and obtain a Construction General Permit during construction of the park and a Standard Urban Stormwater Management Plan for post-park construction stormwater pollution prevention.

Groundwater

The existing downstream beneficial use of groundwater as a potable supply for the City of Oceanside suggest that any park programming be sensitive to this use and the water quality within the Bonsall Basin, since the Bonsall Basin lies upstream and contributes to Mission Basin.

The Department of Water Resources requires that all wells that are not actively being used and will not be used in the future, be abandoned (destroyed) according to DWR standards. Many wells are believed to exist within the CSA and should be abandoned if not in use.

Hazardous Materials

A total of 119 sites were listed in the hazardous materials database, however several sites had duplicate listings, and some sites listed were not actually located in the search area or were outside the CSA. Of the 119 listed sites, 33 were outside the search area, another 14 were outside the designated "Site" defined, for the purposes of the database search, as an irregular polygon that includes the CSA and areas outside but adjacent to the CSA, and 72 sites were identified within the "Site," some falling outside of the CSA but within the "Site" polygon.

Of the 72 Sites listed in the "Site" polygon, one site was listed as a federal and state site that was investigated for a potential release of hazardous materials. However, following the preliminary assessment, no further remedial action was determined to be necessary. The site was outside of the CSA. One site was identified as a generator of RCRA (federal) hazardous waste, however this does not indicate that a release of hazardous materials has occurred. One site was identified as being on the emergency response notification list for a release of red phosphorus in 1992, however, the release was cleaned up by the County. One site was listed as a solid waste disposal facility for the storage and disposal of tires. Thirty-five sites were listed as having permits to use hazardous materials and/or generate hazardous waste, however, this does not signify a release of hazardous materials. Fifteen sites have regulated underground storage tanks (USTs) or above ground storage tanks (ASTs).

Sixteen files were identified in the leaking UST database which relate to five physical locations. Nine release cases are closed, seven are open, active cases. the sites are 2370 Pala Road (SR 76), the San Luis Rey Downs at 5772 Camino Del Rey, an Arco station at 5555 Mission Road, the North County Fire Protection District at 157 Olive Hill Road, and Mobil at 4730 SR 76.

The only sites listed in the database file of concern to the park would be those with open release cases for hazardous materials. In this case, only the five leaking UST sites fall into that category. If park programming were to occur near the release sites, precautions would be necessary during construction that required significant subsurface excavation. If significant grading is not planned in these areas, then the concerns over the release cases is not significant.

Land Use

Current land uses within the CSA consist of residential, agricultural, commercial, recreational, livestock, and open space. Some of the land uses that could potentially impact water quality include golf courses which apply significant quantities of fertilizers and herbicides, and the thoroughbred horse stables which may use fertilizers and dispose of quantities of waste produced by the livestock onsite. These two operations also typically use hazardous materials and generate hazardous waste through maintenance of onsite vehicle equipment. Several of these facilities were identified in the hazardous materials databases as having hazardous materials onsite, including ASTs and USTs.

CONSTRAINTS WITHIN CORE STUDY AREA

Soil types that occur within the CSA are generally conducive to park programming as it is currently envisioned. Five of the six major soil types are slightly to moderately susceptible to erosion, only the riverwash soils within the active river channels have a severe erosion potential. However, the recreation suitability of the soils within the CSA are primarily moderate to severe, indicating that greater than normal effort and expense may be required to develop the areas. Areas with severe suitability problems should only be developed if there is an outstanding aesthetic or other similar reason to develop them. However, with advances in construction technology, construction products, and the availability of a wider range of erosion and sediment control technology, development of even severely restricted soil types may be less difficult than when the soil study was published in 1973. Therefore, some constraints posed by the soil type underlying a given site may be overcome using the best available technology and best management practices to reduce impacts to the river valley.

Criteria that should be used to determine suitability for development of Tier A sites include, but are not limited to, slope, slight to moderate erodibility, and slight to moderate recreation suitability. Tier B and C sites can be constructed on soils with severe suitability and erodibility classifications with the understanding that some ongoing maintenance will be required to keep these areas in good, useable condition. A geotechnical evaluation of sites with plans to construct permanent structures is recommended to assess the suitability of the locations for construction.

Severely erodible soils that are present within the core study can be developed with certain types of park programming that are compatible the soil type. Because the severely erodible soils occur largely within the 10-year floodplain, the considerations given to development within the 10-year floodplain would be applicable to considerations given to development on severely erodible soils. Park programming that would occur on these soils should be limited to trails (Tier C) and Tier B programming that consists of activities such as picnic tables and benches, i.e., structures of little value that may sustain damage and require replacement.

Wherever possible, park development on less suitable soils should be kept to a minimum. The Tier A sites for the park occur within five different soil types. The Tier B sites occur over three soil types, Riverwash, Tujunga Sand, and Grangeville Fine Sandy Loam. The Tier C sites primarily traverse two major soil types, Riverwash and Tujunga Sand. The opportunities and constraints of each soil type, related to each tier of park programming, are summarized in Table 2.

Areas that are being evaluated as Tier A locations should be evaluated for proximity to State Route 76. A common issue related to soils in the vicinity of heavily traveled roads is aerially deposited lead. Lead deposited from the exhaust of motor vehicles that used leaded gasoline has been documented in soils adjacent to the roadways. Caltrans has been dealing with this issue for many years and will likely be addressing this issue as it relates to the SR 76 improvements. Park programming should consider the potential for lead contaminated shallow soil in some areas.

The amount of use of the park may have a important impact on the water quality of the river. The greater the use of the park, the more opportunity for erosion to occur both during dry and wet periods. The more erodible soils that are heavily traveled may become dislodged more frequently, causing excessive sedimentation within the river. In areas where trails are created through vegetated areas, the more heavily traveled paths may experience greater vegetative loss and increased erosion. Where possible in easily erodible soils, paths should be either paved with asphalt/concrete or more modern pervious types of pavement and soil stabilizers.

Land uses within the CSA, which entirely overlies the Bonsall Basin, should be limited to those that do not have a significant potential to threaten water quality. Facilities such as septic systems, USTs or ASTs containing petroleum or hazardous materials are not recommended within the park, as an unintended release from these facilities could significantly impact the groundwater quality within the basin. Other similar, but more moderate uses including the application of fertilizers and pesticides can be tolerated, provided that best management practices are employed to minimize the negative impact of chemicals and runoff to the surface and groundwater. Human waste disposal through a sewer system is favored over a septic disposal system within the park. However, septic systems can be designed to meet criteria for protection of water quality. Septic systems have been designed for sensitive land uses in similar sensitive areas, and if the systems are designed properly, there should be no adverse impact to water quality.

Parking lots in the CSA should be designed for protection of water quality while providing a reliable service to park users. Criteria that should be considered include a firm surface for vehicles that provides some degree of infiltration of precipitation, minimizes runoff, is not easily erodible. Pervious pavements have been developed that meet these criteria. Conventional asphalt parking lots do provide a firm surface, however, they also generate runoff that can entrain sediment when the runoff leaves the pavement. Detention basins could be constructed at outflow locations where runoff is concentrated, to minimize sedimentation of the river during rain events. Unpaved, dirt lots can allow some infiltration, however, sediment is easily entrained and can discharge to the river, which may increase sedimentation in the river and reduce water quality. Dirt lots can also become compacted over time and infiltration rates may be reduced that of paved parking lots.

Because multiple groundwater wells are believed to still be present within the CSA, and the status of the wells is unknown, activity nodes should not be located close to the wells in order to prevent the wells from becoming an attractive nuisance. If the wells do not present a health and safety hazard, are located away from potential sources of contamination, the process of destroying the wells in accordance with Department of Water Resources (DWR) standards could have a significant impact to the surrounding habitat, and/or funds are not available to properly destroy the wells, the destruction of the wells may be delayed until such time as the destruction is necessary, feasible, and can be funded. When practicable, the wells should be abandoned according to DWR standards to ensure public safety and protection of groundwater quality. It could be possible to integrate one or more wells into an activity node or interpretive kiosk with an emphasis on the history of groundwater usage in the basin, if the proper precautions are taken.

The impact of existing surface water and groundwater availability to flora and fauna in sensitive habitat areas or areas that are planned for habitat creation or enhancement may be an issue for some species given the increase in dissolved solids (salts) over the past 60 years. As imported water has been brought into the watershed either directly (e.g., pumping into reservoirs) or indirectly (e.g., irrigation), the level of dissolved solids in ground and surface water has increased.

OPPORTUNITIES WITHIN CORE STUDY AREA

A common sense approach should be utilized in selecting location of higher impact park programming (Tier A) away from sensitive habitat and water bodies including the San Luis Rey River. The potential for impacts to the surface water quality can be mitigated through a combination of locations away from the open water and best management practices to minimize land disturbance and stabilization of disturbed land to the extent practicable.

Park programming should be sensitive to existing groundwater uses as a municipal supply from the downstream Mission Basin. The Bonsall Basin lies upstream of the Mission Basin, therefore, impacts to the water quality of the groundwater that occur within the Bonsall Basin could negatively impact the Mission Basin. Additionally, the Bonsall Basin is being evaluated for future use as a water supply source by the Rainbow MWD and by the Project Advisory Committee of the Rainbow MWD, Carlsbad MWD, and the City of Oceanside as a potential ASR project area.

The San Luis Rey River Park is a unique opportunity to protect and improve the surface and groundwater quality within the CSA. For protection of groundwater quality, there are few alternatives that are as appealing to protect the natural groundwater system as a relatively passive park. Reduced development and preservation of open space in a park can reduce the potential for contaminants in surface water and groundwater including siltation and dissolved chemicals including hydrocarbons, and allow for filtration and degradation of contaminants through the natural system prior to reaching water sources. The benefits of protecting surface water and groundwater quality include preservation of the aesthetic value of open spaces with water, protection of a potential and existing water supply in a semi-arid climate where water is a precious resource, protection of aquifers that may be used in the future for development of a water supply or for aquifer storage and recovery, and overall health of the habitat which utilizes surface water and groundwater for survival. It is anticipated that the local water districts would welcome a park that overlies a sensitive groundwater basin and potential water supply source (Bonsall Basin) and lies upgradient of an actively used aquifer (Mission Basin).

Given the important nature of the groundwater within the basin, an interpretive kiosk may prove helpful in explaining to the park user the importance of protecting water quality in the park. A discussion of the interaction between surface water and groundwater and the interaction of park utilization on water quality would help the user understand the importance of their activities within the park.

RECOMMENDATIONS

Soil type and slope should be considered in the park programming development stage. Soils with high potential for erodibility should be avoided for intense land uses. Erosion and sedimentation control measures should be utilized in any park programming to protect surface water quality degradation.

Park programming should be developed with stormwater pollution prevention as a high priority. Impervious areas should be minimized and utilization of pervious pavements and similar best management practices should be employed to minimize runoff and collect and treat runoff wherever possible. Stormwater collection and treatment facilities could be used in the park as an educational tool to inform park visitors of the environmental sensitivity of the river.

A water quality constraint is the possible high level of bacteria in the river, therefore, limiting the recreational use of the river itself is recommended.

Additional research should be conducted to evaluate the use and ownership of the water wells within the CSA. Once identified, the wells should either be abandoned if not in use, or properly protected so as to reduce the possibility of vandalism or potential groundwater contamination, and eliminate safety hazards.

Should future utilization of the Bonsall Basin occur for groundwater extraction or ASR, groundwater levels are likely to fluctuate. Prior to utilization, a study would likely occur that would evaluate the effects of either groundwater withdrawal or ASR. Within that study, the effect of raising or lowering the groundwater elevations in the aquifer should be analyzed. The impact of significant fluctuations of the groundwater levels on the base flow of the river and on any sensitive habitat (and flora and fauna within that habitat), including park programming that includes habitat protection, creation, and/or restoration, should be closely evaluated.

Additional information should be obtained regarding the sites with hazardous materials releases if those sites are in close proximity to park programming that will require extensive subsurface grading or excavation.

Table 1 : Soil Characteristics and Suitability

Soil Unit	Description	Erodibility	Common Uses	Recreation suitability				Tier A Site Number
				Play Areas	Campsites	Picnic Areas	Paths and Trails	
Riverwash	Sandy and gravelly, excessively drained and rapidly permeable	severe	recreation and wildlife habitat	severe	severe	severe	severe	3,6,12
Tujunga Sand	coarse sand to loamy fine sand, some gravelly sand, very rapidly permeable	slight	recreation and agriculture	severe	severe	severe	severe	8,12,15
Visalia Sandy Loam	loam, fine sandy loam, sandy loam, moderately rapid permeability	slight	agriculture	slight	slight	moderate	slight	3
Grangeville Fine Sandy Loam	very fine sandy loam to sandy loam, moderately rapid permeability	slight	recreation and agriculture	moderate	moderate	moderate	moderate	2,10,11, 12,13
Placentia Sandy Loam	sandy loam to fine sandy loam and sandy clay to heavy clay loam, very slow permeability	slight to moderate	agriculture and range	severe	severe	moderate	slight	3,5,7
Ramona Sandy Loam	sandy loam, loam, to coarse sandy loam moderately rapid permeability	slight to moderate	agriculture, housing, pasture	severe	moderate	moderate	slight	9
Greenfield Sandy Loam	sandy loam to coarse sandy loam and clay loam to sandy clay loam, moderately slow permeability	severe	agriculture and pasture	severe	moderate	moderate	slight	14
Fallbrook Sandy Loam	Sandy loam, fine sandy loan, to sandy clay loam, moderate permeability	severe	agriculture, pasture, housing	severe	moderate	moderate	slight	1
Cieneba Coarse Sandy Loam	Coarse sandy loam, rapid permeability	severe	range, wildlife habitat, recreation	severe	severe	severe	severe	4

Recreation suitability
Slight = normal site inspection and precaution during planning and construction are required
Moderate = careful site inspection, more than normal precautions
Severe = development costs may be high, esthetic value or location may justify expenditure to overcome limitations

Table 2: Tier Programming Opportunities and Constraints

	Use Type	Constraints	Opportunities
Tier A	sports fields, equestrian center, staging areas, community gathering/performance venue, parking	minimize stormwater runoff where possible with the use of permeable pavement	Create water treatment basins and explain environmental benefits in interpretive kiosk
		create detention basins for runoff of impervious areas and treatment of runoff,	
		minimize use of fertilizers/pesticides	
		bathroom and concession areas should utilize sewer	
Tier B	picnicking, bird watching, interpretive kiosks, gardens	minimize disturbance of nodes and maintain vegetative cover where possible	create kiosks to explain development of nodes with environmental sensitivity
		allow portability of infrastructure to minimize continual use of one area in node	
		avoid excessive slopes	
		provide waste receptacles for trash/recyclables	
Tier C	hiking, biking, equestrian trails	restrict paths through watercourses, dry or wet, to minimize sedimentation of river	create signs to explain environmental sensitivity of staying on path
		create bridges over watercourses and sensitive habitat/easily erodible soil where possible	
		avoid excessive slopes and use best management practices to minimize erosion/sedimentation	
		create trails within vegetated areas to trap eroded sediment before entering watercourses	
		equestrian and biking trails should be as far from the river as possible	
		biking trails could be paved with high permeability pavement	

FIGURE 1

Proposed Activity Sites, Well Locations and Soils