

APPENDIX E:
Environmental Assessment for the
Eagleland Restoration Project, 2002

FINDING OF NO SIGNIFICANT IMPACT

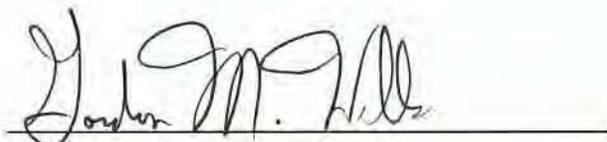
PROPOSED IMPLEMENTATION OF THE EAGLELAND SECTION 1135 ECOSYSTEM RESTORATION PROJECT SAN ANTONIO, BEXAR COUNTY, TEXAS

Description of Proposed Action. The purpose of the Federal action is to restore approximately three-quarter river miles of the San Antonio River that was adversely affected by previous Federal actions. Implementation of the proposed project would allow the U.S. Army Corps of Engineers (USACE) to restore terrestrial and aquatic habitats that have degraded since construction of the San Antonio Channel Improvement Project. Ecosystem restoration would consist of restoring native vegetation within the flood channel right-of-way, restoring meanders in the river channel and creating a riffle-pool complex. The intended result would be a more natural, meandering river corridor that would also continue to provide flood control. Native trees and shrubs would be planted along the side slopes, the top of bank, and within the flood control channel wherever channel flood flow capacity would be available. Open areas would be planted with native grasses and forbs. A rock riffle structure would be placed in the base flow channel to create a riffle-pool complex. The proposed project would restore approximately thirteen acres of terrestrial and nine acre-feet of aquatic habitat within the project area.

Anticipated Environmental Effects. Alternatives considered include the proposed action, no action, and other alternatives as described in the environmental assessment (EA). The proposed action would restore approximately thirteen acres of native vegetation, consisting of native grasses, forbs, shrub and trees. Planting solutions would emphasize native and/or naturalized species in order to reduce long-term maintenance requirements. The no action alternative would allow the project area to remain in its present condition. Proposed project measures would not be implemented under this alternative. The existing flood control channel and river channel would continue to degrade due to soil erosion and non-native plant species that would continue to dominate the existing plant community. Other alternatives addressed varying degrees of river channel restoration. Two technically feasible alternatives were identified, but were eliminated from detailed study because they did not meet the objectives of the proposed restoration project.

There will be no adverse impacts on the human and natural environment associated with proper implementation of the proposed action. No significant adverse impacts are anticipated on biological, water, cultural or natural resources. No adverse impact is expected to occur to any plant or animal species that are proposed or listed as threatened or endangered according to the Endangered Species Act. The proposed action is authorized under Nationwide Permit Number 27, Stream and Wetland Restoration Activities. Under the proposed action, potential impacts to vegetation, wildlife and aquatic organisms would be positive due to an increase in feeding and nesting habitat, improved instream habitat and improved water quality due to decreased soil erosion. Proposed project measures would avoid existing cultural resources and fragile alluvial sediments. Minor short-term impacts to water quality, vegetation, and wildlife species could occur during project construction due to unforeseen conditions and occurrences. Minimal amounts of dust and noise would also be generated during construction of the proposed action but would not have a significant impact on the environment or surrounding public.

Facts and Conclusions. Based on a review of the information contained in this EA, it is concluded that the implementation of the Eagleland Ecosystem Restoration Project is not a major Federal action, which would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended. This action would therefore not warrant the preparation of an environmental impact statement (EIS).



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Colonel, Corps of Engineers
District Engineer

**ENVIRONMENTAL ASSESSMENT
EAGLELAND ECOSYSTEM RESTORATION PROJECT
SAN ANTONIO, BEXAR COUNTY, TEXAS**



Prepared by

**US Army Corps of Engineers
Fort Worth District**

July 2002

INTRODUCTION

Project Authority

The existing San Antonio River channel was designed and constructed by the U. S. Army Corps of Engineers (USACE) to effectively and efficiently control flood events. Congress authorized the San Antonio Channel Improvement Project (SACIP) in 1954. Public Law 780 (P.L. 780) provided for the deepening, widening, and straightening of thirty-one miles of the San Antonio River and its tributaries. Channel construction occurred in phases with the first phase being completed in 1968. The Corps of Engineers flood control channel and City of San Antonio (CoSA) improvements from South Alamo Street to Nueva Street were completed in 1987.

Section 1135 of WRDA 1986, as amended by Section 204 of WRDA 1996, P.L. 104-303, (33 U.S.C. 2309a(a)), includes provisions authorizing measures for restoration of environmental quality and measures for enhancement of environmental quality that are associated with the restoration, through modifications either at an existing project site or at other locations that have been affected by the construction or operation of the project, if such measures do not conflict with authorized project purposes.

1.0 Purpose of and Need for Action

1.1 Summary

The U.S. Army Corps of Engineers (USACE) in partnership with the San Antonio River Authority (SARA) proposes to implement an ecosystem restoration project within the San Antonio River flood control channel. The project, otherwise known as the Eagleland Ecosystem Restoration Project, would restore an approximately three-quarter mile section of the San Antonio River from South Alamo Street to the Union Pacific railroad tracks immediately upstream of the San Antonio River Tunnel (SART) outlet near Lone Star Boulevard (See Figure 1.1 in Appendix A). The existing San Antonio River flood control channel was designed based on the 1946 flood that occurred in the area. Projected 100-year flood flows exceed the flows that occurred in the 1946 flood, and the 100-year floodplain extends outside the limits of the improved channel in some locations. However, the SART, completed in 1998, protects the proposed ecosystem restoration area from 100-year flood flows.

1.2 Purpose of the Action

The SARA, City of San Antonio (CoSA), Bexar County and stakeholders in the community formed the San Antonio River Oversight Committee (SAROC) in 1998. One of the SAROC's tasks is to identify concepts for river improvements. Consequently, the *San Antonio River Improvements Project (SARIP) Concept Design – Design Guidelines*, dated July 2001, was developed from previous conceptual plans, technical documents, and community input to serve as the SAROC vision and guideline for preserving and restoring the San Antonio River. The SAROC charter and the purpose of the SARIP is to preserve and restore approximately thirteen linear miles of the San Antonio River from Hildebrand Avenue to the North to the Espada Mission to the South, exclusive of the River Walk. The North and South ends of the River Walk are bound by Lexington Street and South Alamo Street, respectively. The northern four miles and southern nine miles are referred to as the Museum Reach and Mission Reach, respectively.

The Eagleland Ecosystem Restoration Project is located at the northern end of the Mission Reach. The proposed action would be located within the right-of-way boundary of the San Antonio River flood control channel from the weir impounding the Alamo Pool approximately two hundred feet downstream of South Alamo Street to the Union Pacific railroad tracks immediately upstream of the San Antonio River Tunnel (SART) outlet near Lone Star Boulevard. Due to budgetary and real estate property constraints, it is not possible to restore the river channel based on a fully geomorphic design, which would require acquisition of additional rights-of-way. The meandering base flow channel would not only appear more natural, but it would also reduce the potential for bank erosion and maintenance. In addition, the value of this area would be considerably improved with the restoration of riffle-pool complexes and native vegetation without compromising the existing flood protection of the original channel.

1.3 Need for the Action

Prior to the construction of the SACIP, the floodway along the San Antonio River was comprised of a meandering river with a high quality riparian habitat. The clearing of floodways and channel realignments destroyed the high quality riparian habitat. Presently, the San Antonio River flows through a slightly meandering grass-lined

trapezoidal base flow channel. In the proposed project area, the base flow channel is approximately forty feet wide from top of bank to top of bank and approximately four to six feet deep. The flood control channel is approximately one hundred eighty feet wide from top of bank to top of bank and approximately sixteen feet high from the top of bank to the channel 'toe'. The base flow channel is not stable, and it has a limited flow capacity. Consequently, the river's instability is causing bank erosion. In recent years, the CoSA has utilized irregular sizes of broken concrete slab to stabilize eroding banks. The channelization, along with the addition of concrete slab to line and stabilize the channel, eliminated the natural riffle-pool complexes that further degraded the aquatic habitat. In addition, there are only a few trees interspersed within the existing floodway (See Figure 1.3 in Appendix A). Consequently, channels, such as this one, are frequently ecologically impoverished and aesthetically displeasing because they lack the local instream and riparian heterogeneity and complexity found in naturally meandering rivers.

1.4 Objectives of the Action

Project objectives include the following to the maximum extent practicable: 1) restoring native vegetation within the flood channel right-of-way; 2) restoring meanders in the base flow channel; 3) and creating a riffle-pool complex. The objectives would be accomplished through implementation of the following proposed project measures: 1) eradicating non-native species and planting native species of trees, shrubs, grasses, and forbs where possible; 2) modifying the base flow channel; and 3) constructing an instream naturalized rock riffle structure capped with stepping rocks.

1.5 Scope of this Environmental Assessment

This Environmental Assessment (EA) has been prepared pursuant to Section 102 of the National Environmental Policy Act (NEPA) of 1969 as implemented by the regulations promulgated by the President's Council on Environmental Quality (40 Code of Federal Regulations Parts 1500-1508 and Engineer Regulations 200-2-2). The objectives of NEPA are to ensure consideration of the environmental aspects of proposed actions in Federal decision-making processes and to make environmental information available to the public before decisions are made and actions are taken. The EA provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). This EA evaluates the potential environmental impacts associated with two alternatives, including the no action alternative. The scope of this EA is limited to the area within the right-of-way boundary of the San Antonio River flood control channel from the weir impounding the Alamo Pool near South Alamo Street to the Union Pacific railroad tracks immediately upstream of the SART outlet near Lone Star Boulevard.

1.6 Decision That Must Be Made

The decision to be made by the District Engineer, U.S. Army Corps of Engineers – Fort Worth District, is to make a FONSI determination based on the information provided in this EA.

1.7 Applicable Regulatory Requirements and Required Coordination

This EA was prepared in accordance with the Federal laws and executive orders listed below. An initial coordination letter concerning the proposed ecosystem restoration project has been sent to the U.S. Fish and Wildlife Service (USFWS), and the USFWS has expressed its support.

Archeological and Historic Preservation Act
Clean Water Act, Sections 404 and 401
Endangered Species Act
Fish and Wildlife Coordination Act
Executive Order 11988 - Floodplain Management
Executive Order 11593 - Protection and Enhancement of the Cultural Environment
Executive Order 11990 - Protection of Wetlands
Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations And Low-Income Populations

2.0 Alternatives Including the Proposed Action

This chapter describes alternatives considered and alternatives considered but eliminated from detailed study. This chapter also summarizes the environmental consequences of the alternatives. Four alternatives, including the proposed action and no action alternative, were evaluated under the scope of this environmental assessment. Two of the alternatives were eliminated from further analysis due to budgetary and real estate property acquisition constraints. The budgetary requirements for each of the two alternatives would greatly exceed the funds available. The proposed project area would be located in a heavily urbanized area. The real estate property acquisition necessary for each of these two alternatives would be cost prohibitive and would have the potential to adversely impact historic properties. Historic properties in the vicinity of the proposed project area include two historic districts and a collection of railroad buildings. The districts include the King William Historic District (KWHD) and the Blue Star Street Industrial Historic District (BSSIHD). Both districts have been documented and are listed in the National Register of Historic Places. The KWHD is located along the eastern edge of the San Antonio River, while the BSSIHD is located along the upper northwest corner of the proposed project area.

2.2 Description of Alternatives, Including the Proposed Action and No Action

2.2.1 Alternative A – Proposed Action

The proposed action would restore an approximately three-quarter mile reach of the San Antonio River. The proposed action includes minor river channel realignment limited to the area within the existing flood control channel right-of-way. This alternative would relocate the existing base flow channel to meander primarily along the outside of existing meander bends. The side slopes on two meander bends would be armored with tabular limestone rip-rap as required to minimize erosion. The inside slopes would be laid back and recontoured where adequate land area is available. The intended result would be a more natural, meandering river corridor that would also continue to provide flood control. Non-native vegetation would be eradicated and be replaced with native vegetation. Native species of grasses and trees would be planted along the side slopes, the top of

bank, and within the flood control channel. Wherever channel flood flow capacity would be available, trees would be brought down toward the river's edge along the outside meander bends to enable river habitat to develop. A rock riffle structure would be constructed in the base flow channel to create a riffle-pool complex. Concrete debris would be removed from the river channel bottom and the riverbanks. Riverbanks would be revegetated with native vegetation to minimize bank erosion and maintenance. Concrete stormwater outfalls would be removed and replaced with native grass-lined chutes. Wetland plants would also be planted in pooled areas. Shallow water areas would be established within the river channel to improve the river's velocity/depth regime. Finally, a soil cement trail would be placed over an existing secondary unimproved trail within the flood control channel right-of-way to provide easier access to the river (See Figure 2.2.1 in Appendix A).

2.2.2 Alternative B - No Action

The No Action alternative would result in not implementing the proposed action. The proposed ecosystem restoration area would continue to degrade due to soil erosion and generalist plant species that would continue to dominate the existing plant community. The Eagleland Ecosystem Restoration Project is located within the SARIP study area. The USACE, along with the SAROC, are in the process of identifying potential ecosystem restoration alternatives in both the Museum and Mission Reach. Failure to implement the proposed ecosystem restoration project would not be consistent with the SAROC charter and the SARIP purpose to preserve and restore approximately thirteen linear miles of the San Antonio River upstream and downstream of the River Walk. In addition, it would not be consistent with current USACE ecosystem restoration practices.

2.3 Description of Alternatives Considered but Eliminated from Detailed Study

2.3.1 Expanded River Channel

This alternative included acquiring a small amount of land outside of the existing flood control channel right-of-way so that the river meanders could be closer to a natural form. This alternative was eliminated from further analysis due to the inability to acquire the necessary land within the proposed project area. The land adjacent and along the banks of the flood control channel is heavily developed. The KWHD and Brackenridge High School flank the eastern edge of the proposed project area, while the BSSIHD and the Big Tex Feed & Grain Company flank the western edge.

2.3.2 Fully Restored River Channel

Full river restoration to pre-disturbance conditions is an ideal concept but would not be a viable alternative in practice as hydrology and land use patterns in the proposed project area have changed over time. Fully restored meanders would require more space and a substantially larger channel. This is because meanders reduce flow velocities. The lower velocities mean more area is needed to convey the same discharge. Due to the extensive amount of land needed outside the existing right-of-way, both public and private, and the large quantity of excavation, it was apparent that fully restoring the base flow channel to a stable, natural river would not be feasible.

3.0 Affected Environment

3.1 Introduction

This chapter presents relevant environmental resource components of the study area. Furthermore, this chapter describes the resources of the area that would be affected by the alternatives and would affect the alternatives if they were implemented. The intent of this chapter is not to present effects, but rather to describe the baseline environment.

3.2 Description of Relevant Affected Resources

3.2.1 Land Use

The proposed project area consists of a reach of the San Antonio River and its associated hydrologic floodplain. Land use within the proposed project area is used primarily for flood control. However, the need for flood control within the proposed project area has decreased due to construction of the SART. Floodwaters enter the SART upstream of the proposed project area and are discharged immediately downstream of the proposed project area. Land use adjacent to the proposed project area is mixed. The KWHD and Brackenridge High School flank the eastern edge of the proposed project area, while the BSSIHD and the Big Tex Feed & Grain Company flank the western edge. Pioneer Flour Mill is located to the North. The Lone Star Brewery, which is closed, and Roosevelt Park are located to the South.

3.2.2 Natural Regions, Geology, and Soils

3.2.2.1 Natural Regions

The proposed project area is located in central Bexar County. Bexar County lies within three of the eleven Texas Natural Regions: 1) South Texas Brush Country; 2) Edwards Plateau; and 3) Blackland Prairies. The southern two-thirds of the county is a relatively level or undulating plain sloping upward from the southeast to the northwest rising from about 500 to 1000 feet in elevation. The northern third is an old eroded plateau that has been dissected by numerous streams that generally flow in a northwest to southeast direction. According to the 1992 San Antonio East, Tex. 7.5 Minute Quadrangle, the surface topography of the proposed project area is approximately 625 feet above mean sea level (msl) with gentle sloping to the South.

3.2.2.2 Geology

The formations exposed at the surface in San Antonio are those of the Mesozoic and Cenozoic eras. The geology underlying the proposed project area is fluvial terrace deposits. These deposits are streambed deposits typically consisting of clays, gravels, sands, and silts.

3.2.2.3 Soils

The soils in the proposed project area are part of the Venus-Frio-Trinity association. This association is comprised of deep, calcareous soils that occupy bottomlands and low terraces along the rivers and major streams and their tributaries. The proposed project area is mainly comprised of the Frio soil series. The Frio series consists of limy alluvial

soils that are moderately deep, grayish brown or dark grayish brown, and nearly level to gently sloping. Frio clay loam occurs mainly on the flood plains of the Medina River and the San Antonio River and their chief tributaries, or on low terraces bordering the flood plains. The parent material is limy, friable, loamy alluvium that is easily penetrated by plant roots. Furthermore, these soils have a good capacity for holding water. However, these soils are only occasionally flooded due to moderate internal drainage and permeability.

3.2.3 Water Quality

3.2.3.1 Surface Water

The proposed project area includes a reach of the San Antonio River. The San Antonio River derives its base flow from four sources – base flow, stormwater runoff, rainfall, and recycled water. There are eleven stormwater outfalls within the proposed project area. During wet months, numerous springs feed a marshy area of Olmos Creek northwest of the city. Secondly, Olmos Creek joins the flow from San Antonio Springs. Finally, San Pedro Creek, fed by San Pedro Springs, joins the river in south central San Antonio. However, recycled water is the primary source of the river's base flow. The SART is utilized as part of a water reuse system to reduce reliance upon the Edwards Aquifer. Base flow is provided primarily by recycled water that is pumped into the river in Brackenridge Park near the Witte Museum. Using the tunnel recirculation system and San Antonio Water System (SAWS) recycling program, the water flow at South Alamo Street is approximately 8-10 cubic feet per second. If it were not for this continuous water supply, the river would normally be dry.

Existing water quality in the San Antonio River is affected by rainfall and associated stormwater flows originating from both industrial and non-industrial nonpoint sources. The State of Texas List of Impaired Water Bodies, also known as the Clean Water Act (CWA) Section 303(d) List, identifies: 1) water bodies that do not meet the standards set for their use, or are expected not to meet their use in the near future; 2) which pollutants are responsible for the failure of a water body to meet standards; and 3) water bodies that are targeted for clean-up activities within the next two state fiscal years. The development of a Total Maximum Daily Load (TMDL) is required for those pollutants that exceed established water quality standards. A TMDL is an estimate of the maximum amount of pollution a body of water can receive and still meet water quality standards set for its use. The major parameters that are measured to determine whether a water body meets the standard for its use are metals, organics, fecal coliform bacteria, dissolved oxygen, and dissolved solids. Based on the Final Draft Texas 2000 CWA Section 303(d) List, dated August 31, 2000, the Upper San Antonio River, Segment 1911, exceeds the water quality standard for fecal coliform bacteria. Bacteria levels sometimes exceed the criterion established to assure the safety of contact recreation. Consequently, a medium overall priority has been established for TMDL development for bacteria levels in the Upper San Antonio River.

3.2.3.2 Ground Water

The proposed project area lies over the Edwards Aquifer Artesian Zone. The Edwards Aquifer is the primary source of groundwater within the proposed project area. It is a Federally-designated 'sole source' aquifer, serving as the only source of drinking water for the CoSA. The aquifer is a limestone formation associated with the Balcones Fault

Zone. The aquifer is divided into three parts: the drainage area, the recharge zone, and the artesian zone. Runoff from the drainage area provides recharge to the artesian zone via the recharge zone. Discharge from the aquifer is both from springs and artesian wells. The natural discharge of the aquifer is primarily from five major springs: 1) San Marcos; 2) Comal; 3) Leon; 4) San Antonio; and 5) San Pedro. San Antonio Springs and San Pedro Springs are dry most of the time due to large amounts of water being pumped from artesian wells. However, the springs flow when aquifer levels are very high.

3.2.4 Floodplains

The proposed project area lies exclusively within the San Antonio River 100-year floodplain. The floodplain is a grass-lined flood control channel approximately one hundred eighty feet wide and sixteen feet high from the top of bank to the flood control channel 'toe'. The 'toes' of the flood control channel are approximately fifteen feet either side of the base flow channel. The flood control channel side slopes are approximately 3:1. In addition, floodwaters in the proposed project area rarely exceed the bankfull elevation of the base flow channel due to protection from the SART.

3.2.5 Wetlands

According to the EPA and USACE, wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soils. According to the USFWS National Wetlands Inventory (NWI) map, San Antonio, TX East sheet, no wetlands are located within the proposed project area.

3.2.6 Biological Resources

3.2.6.1 Vegetation

Vegetation within the proposed project area is indicative of a typical urban setting. Terrestrial vegetation within the proposed project area is primarily Johnson grass and Bermuda grass and a variety of other non-native species. Some remnants of the original riparian vegetation can be found along the proposed project area, mostly in the forms of large native trees such as bald cypress, live oak, pecan, and sycamore. Aquatic vegetation that may occur in the San Antonio River includes pondweed, water milfoil, water hyacinth, and arrowhead.

3.2.6.2 Wildlife

Bexar County lies within the Texan, Tamaulipan and Balconian biotic provinces. The proposed project area lies entirely within an urbanized area with limited wildlife. Terrestrial animals that would normally be found in this type of environment are: raccoon, cottontail, fox squirrel, Mexican ground squirrel, cotton rat, and striped skunk. There are many species of birds, both migrant and resident, in Bexar County and the proposed project area. Some of the most common are: greater roadrunner, northern cardinal, northern mockingbird, red-tailed hawk, and turkey vulture. Common reptiles and amphibians likely to inhabit the proposed project area are: cricket and leopard frogs, Gulf coast toad, red-ear turtle, yellow mud turtle, and diamondback water snake. Fish species that may occur in the San Antonio River include largemouth bass,

Guadalupe bass, channel catfish, and blue gill. Exotic species that may occur are carp, sunfish and shad. Other tolerant species such as Mozambique Tilapia, Rio Grande Cichlids and Suckermouth Catfish may also occur.

3.2.6.3 Threatened and Endangered Species

There are currently eleven Federally-listed endangered species and one Federally-proposed threatened species in Bexar County as shown in the table below. In addition, several species designated by the Texas Parks and Wildlife Department (TPWD) as threatened, endangered, or rare are located within Bexar County. A complete list of these species can be found in Appendix B.

Federally-listed Endangered Species	
Blacked-capped vireo	<i>Vireo atricapillus</i>
Braken Bat Cave meshweaver	<i>Cicurina venii</i>
Cokendolpher cave harvestmen	<i>Texella cokendolpheri</i>
Golden-cheeked warbler	<i>Dendroica chrysoparia</i>
Government Canyon Bat Cave meshweaver	<i>Cicurina vespera</i>
Government Canyon Bat Cave spider	<i>Neoleptoneta microps</i>
Ground beetle (no common name)	<i>Rhadine exilis</i>
Ground beetle (no common name)	<i>Rhadine infernalis</i>
Helotes mold beetle	<i>Batrisodes venyivi</i>
Madla's cave meshweaver	<i>Cicurina madla</i>
Robber Baron Cave meshweaver	<i>Cicurina baronia</i>
Federally-proposed Threatened Species	
Mountain plover	<i>Charadrius montanus</i>

Based on respective habitat requirements and field observations, no Federally-listed endangered species or Federally-proposed threatened species would be expected to be encountered within the proposed project area. In addition, the probability of encountering TPWD-designated threatened, endangered, or rare species would be very low.

3.2.7 Cultural Resources

3.2.7.1 Archeological

A number of archeological sites and sites of historic importance exist along the river. The major sites have been identified per the City of San Antonio Comprehensive Planning Division Community Development Office "Archeological Site Map, Map 4". However, this information is very general in nature and does not pinpoint exact locations. Additionally, the files of the Texas Archeological Research Laboratory and the Texas Historical Commission have been reviewed and no previously identified sites are located within the proposed project area. A USACE archaeologist conducted a visual reconnaissance of the area and identified no historic structures within the proposed project area. The project is located within the previously impacted channel. Due to the previous channelization activities, no intact buried cultural resources are anticipated in this area. Coordination with the SHPO will determine if a more detailed study of the proposed project area may have to be conducted prior to any surface disturbance.

3.2.7.2 Historical

Historic-age properties in the vicinity of the proposed project area include two historic districts and a collection of railroad buildings. The districts include the KWHD and the BSSIHD as previously mentioned in Section 2.0. Both districts have been documented and are listed in the National Register of Historic Places. The KWHD is located along the eastern edge of the San Antonio River, while the BSSIHD is located along the upper northwest corner of the proposed project area. None of these areas are located within the proposed project area.

3.2.8 Air Quality

The Environmental Protection Agency (EPA) uses six "criteria pollutants" as indicators of air quality, and has established for each of them a maximum concentration above which adverse effects on human health may occur. These threshold concentrations are called National Ambient Air Quality Standards (NAAQS). Areas of the country where air pollution levels persistently exceed the NAAQS may be designated as nonattainment areas. Conversely, areas of the country that do not persistently exceed the NAAQS are designated as attainment areas. The proposed project area would be located entirely within the Metropolitan San Antonio Intrastate Air Quality Control Region (AQCR), AQCR #217. AQCR #217 is currently designated as either in attainment or unclassifiable for all criteria pollutants.

3.2.9 Noise

Pursuant to Article III, Chapter 21 of the City of San Antonio Municipal Code, maximum permissible noise levels depend on the land use of the property that contains the noise source (e.g., industrial, commercial, or residential) and the land use of the property receiving that noise. Maximum permissible noise levels range from 63 average weighted decibels (dBA) in residential zoning districts to 85 dBA in the Entertainment zoned districts. Baseline noise levels within the immediate vicinity of the proposed project area would not be expected to exceed the maximum permissible noise levels for a prolonged period of time.

3.2.10 Hazardous, Toxic, and Radioactive Waste

Based on the information reviewed from environmental regulatory agency databases, there was no evidence that the proposed project area or any adjacent properties were under environmental regulatory review or enforcement action. However, a previous site assessment recommended soil testing adjacent to the 300-400 block of Blue Star Street, inclusive of the container storage area at Big Tex Feed & Grain Company. (Environmental Site Assessment conducted by Raba-Kistner Consultants, Inc. in December 2000). Consequently, soil and sediment samples were collected on 9 April 2002. Based on the results of the samples, no disposal problems or Hazardous, Toxic, and Radioactive Waste (HTRW) sites were identified from any of the areas of planned excavation for this project. Results from samples from the southern half of the west bank indicated elevated amounts of the pesticides Chlordane and Heptachlor.

3.2.11 Visual Aesthetics

This proposed project area consists of a somewhat straightened, engineered grass-lined trapezoidal channel, devoid of trees or understory plantings. A channel, such as this one, is frequently ecologically impoverished and perceived as aesthetically displeasing because it lacks the local instream and riparian heterogeneity and complexity found in naturally meandering rivers.

3.2.12 Environmental Justice

Based on the U.S. Census Bureau, Census 2000 Redistricting Data, the CoSA population is 58.7% Hispanic, 31.8% White, 6.5% Black, and 3.0% Other. In accordance with the provisions of Executive Order 12898, each Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin.

3.3 Description of Non-Affected But Relevant Resources

3.3.1 Climatology

San Antonio has a modified subtropical climate because of its location on the edge of the Gulf Coastal Plains. The average temperature (based on 100-year figures) is 69.9 degrees. The humidity varies from an average of 80 percent in the early morning to an afternoon level of 50 percent. San Antonio averages about 28 inches of rain per year, with the heaviest amounts in May and September. Winter temperatures dip below freezing only about 20 days on the average.

3.3.2 Socioeconomic Conditions

The 2000 Census population for San Antonio was 1,144,646. The unemployment rate for April 2002 was 4.5 percent with a civilian labor workforce of 798,315. The average unemployment rate for the past twelve months was 4.1 percent (Texas Workforce Commission). According to the U. S. Department of Housing and Urban Development (HUD), the median annual household income for San Antonio in 2000 was \$43,100.

4.0 Environmental Consequences

4.1 Introduction

The purpose of this chapter is to provide the scientific and analytic basis for the comparison of the alternatives. This section describes the probable consequences of each alternative on selected environmental resources.

4.2 Effects of the Proposed Action

4.2.1 Land Use

The current land use within the flood control channel may be temporarily affected in some places due to the proposed action, but long-term impacts are not expected to be significant. Land use along the top of bank, but within the existing right-of-way, would be converted to hike and bike trails as part of separate projects scheduled for construction by the City of San Antonio. The addition of hike and bike trails would have a beneficial impact on recreation along and within the river. The increase in recreation along and within the river would not have a significant adverse impact on the flood control channel and the base flow channel, both of which would continue to be used for their intended purposes.

4.2.2 Natural Regions, Geology, and Soils

The proposed action would have no impact on the natural regions or geology of the area. Impacts to the soil would be limited within the flood control channel right of way. The proposed project area encompasses approximately seventeen surface acres of land and water. Approximately seven acres along the base flow channel would be disturbed to make necessary channel modifications. The new base flow channel would be approximately 4.5 acres, whereas the existing base flow channel is approximately 3.5 acres. Approximately 3,920 linear feet of the base flow channel would be modified. The area would be recontoured in some areas with channel banks being laid back per the base flow channel modification specifications.

The base flow channel edges would be protected in locations where storm flows have the potential to erode the banks. Native vegetation adapted to growing along riverbanks would be planted along the edge of the base flow channel, especially on the outside of meanders, to provide erosion control. Additional erosion control would be accomplished through soil bioengineering methods that include the use of natural materials to create an erosion control mat and natural rock formation. The rock would be placed at the toe of slopes where the highest shear stresses occur. A few locations may require retaining walls using natural materials where the river's edge is tucked up against the channel bank.

4.2.3 Water Quality

4.2.3.1 Surface Water

Construction-related activities associated with the proposed action may temporarily affect surface water quality due to sedimentation and siltation. Silt removal would be accomplished where necessary. However, standard engineering and construction best management practices (BMPs) for stormwater control would be used to minimize erosion during construction. Construction associated with the proposed action would be in accordance with the provisions of Nationwide Permit 27, Stream and Wetland Restoration Activities.

The proposed action would construct one rock riffle structure within the base flow channel. The rock riffle would be located 760 feet downstream from the South Alamo weir. The installation of an instream rock riffle structure would create a riffle-pool

complex. The riffle-pool complex would create a low flow condition, improve aeration and dissolved oxygen levels and encourage development of aquatic and benthic habitat.

The proposed project area includes eleven tributary outfall structures that deliver stormwater runoff to the base flow channel. The outfall structures would be 'naturalized' to not only provide stormwater outfall, but to also improve filtration and aeration, to a small degree, through revegetation of the areas where the concrete debris has been removed. This would improve the water quality and encourage development of aquatic habitat. Where possible, in-channel vegetation would shade the surface of the water, lowering average water temperatures. This would enable the water to maintain a higher dissolved oxygen content.

4.2.3.2 Ground Water

The proposed project area is not located over the Edwards Aquifer Recharge Zone. Therefore, ground water quality within the project area would not be adversely impacted.

4.2.4 Floodplains

The proposed action would restore a section of the San Antonio River and its riparian habitat. Consequently, the proposed action would be entirely located within the 100-year floodplain. Consistent with Executive Order 11988, Floodplain Management, siting the proposed action in the floodplain would be the only practicable alternative. As such, modifications to the river would be designed to minimize potential harm to or within the floodplain. In addition, the proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations or ordinances

4.2.5 Wetlands

The proposed action would not impact any jurisdictional wetlands.

4.2.6 Biological Resources

4.2.6.1 Vegetation

The proposed action would restore approximately seventeen acres of native vegetation, consisting of native grasses, forbs, shrub and trees. Invasive species would be eradicated to the maximum extent practicable within the proposed project area. Planting solutions would emphasize native and/or naturalized species in order to reduce long-term maintenance requirements. However, light-wheeled vehicular access within the flood control channel would be required to perform periodic mowing of vegetation to a height of 18-24 inches.

Due to the critical nature of the flood control channel side slope and high potential for sedimentation of aquatic systems, herbicide application would be used to prepare the seedbed. Application of Rodeo™ would be the preferred method of chemical treatment due to the neighboring aquatic system and the type of vegetation that would be treated. The application of Roundup™ would be suitable alternative for sites farther removed from the river. The existing Bermuda grass turf and bamboo would be eradicated with herbicide application. One growing season would be allotted to obtain a satisfactory kill

and more than one application of herbicide may be needed to address expected seed germination.

By August eradication of the turf should be obtained and a native wildflower mix would be broadcasted into the existing grass residue. Native grass mixes would be interseeded into the grass residue in early spring as recommended by the Natural Resources Conservation Service. A minimum of two mixes would be used, with one containing tall grass species suitable for the mesic streamside areas (one drill width). The second and dominant mix would consist of mid and short grass species mix which is suitable for more xeric uplands. Tall grasses would be allowed to grow taller than the 18-24 inch limit and clumping of unmowed areas is desirable.

Mowing would be utilized to maintain the grass stand to the desired 18-24 inches height. It would occur after the end of June to allow spring wildflowers to set viable seed. Mowing may be needed during drought periods to reduce potential fire hazards.

Wetland and aquatic vegetation would be established where feasible and would incorporate naturalistic features such as ponds and crossings. Wetland vegetation would be established in the designed rock-armoring (outer bends) to mask this engineered feature and to maximize shade and other habitat potentials. Seeds and transplants would be utilized as needed to rapidly establish a cover.

Tree and shrub plantings would be maximized to the extent practicable and coordinated with the appropriate river hydraulic capacity to provide a variety of scales and spaces. As recommended for conservation plantings, trees would be spaced according to their maximum potential adult spread. (This would result in a significant reduction of the number of trees used as proposed by *SARIP Concept Design* guidelines). Native shrubs would be placed in the appropriate zones between the trees. A mixture of species and age groups would be utilized, thus increasing the ecological benefits of the site, while providing some immediate visual effects. Urban trees (larger trunk diameters) typically live for 10-15 years, because of stresses to their root systems. Therefore, saplings and mixed ages would be planted to increase the lifespan of the plantings. As recommended by the National Crime Prevention Institute, tree limbs would be pruned to a minimum 10-foot height. (This of course applies to trees that have reached this height). Planting techniques such as basins, berms would be utilized to catch additional rainfall that would otherwise escape downhill. Drip irrigation would be utilized to establish the tree and shrub plantings. However, the City should consider using a water truck, rather than drip hoses, to provide supplemental water to the trees and shrubs.

Restoring native vegetation within the flood channel right-of-way would maximize species diversity and vertical stratification by enhancing wildlife habitat and liveability for humans. Species selected would be native to Bexar County and compatible with the San Antonio River Corridor. This corridor consists primarily of deciduous vegetation, and thus emphasis would be given to species that maintain this character. Species selected would also supply food and cover for a wide range of wildlife species, thus mast-producing species would receive higher consideration. Shade would be developed to the extent possible to increase aquatic habitat quality and to provide shaded areas for citizens to enjoy riverside recreation and relaxation.

Plants suitable for neighboring riparian lands may not survive on this site due to soil, hydrology and slope modifications. A major assumption made in the *SARIP Concept Design* guidelines and this planting plan is that a more naturalistic landscape can be created by maximizing the diversity of species used to vegetate the site. Over time the site and climatic factors would dictate the final landscape. Humans would still exert some control over this new landscape to increase the safety, live-ability and aesthetics of the site and to maintain and improve the flood conveyance objective that the levee was designed to provide the City of San Antonio.

4.2.6.2 Wildlife

The preservation of existing tree masses and planting of new ones would promote species diversity and encourage wildlife to forage within the proposed project area. The base flow channel meanders would naturally create deeper ponds at the outside edges where aquatic organisms could thrive. The river edges would also promote epifaunal substrate and waterfowl habitat. In addition, streambank vegetation would restore the wildlife and aquatic habitat by lowering water temperatures, by creating cover, and by supplying nutrients and food sources directly into the base flow channel.

It is estimated that the proposed action would increase riparian corridor habitat value by 920% in the first ten years with an output of 6.1 Habitat Units (HUs). It also estimated that 50 years after implementation of the proposed action the riparian corridor habitat values would increase by 1320% over the no action alternative with an output of 9.9 HUs.

It is estimated that the proposed action would increase the aquatic habitat value by 444% by the first year after implementation with an output of 4 HUs. It is also estimated that two years after implementation of the proposed action, the aquatic habitat value would increase by 528% over the no action alternative with an output of 4.75 HUs.

The proposed action may cause the limited urban wildlife in the proposed project area to leave during construction, but species would be expected to return when construction is complete.

4.2.6.3 Threatened and Endangered Species

The proposed action would not adversely impact any species Federally-listed or proposed for listing, or species designated by the TPWD as threatened, endangered, or rare. In addition, none of the aforementioned species' habitat would be adversely impacted.

4.2.7 Cultural Resources

4.2.7.1 Archaeological

The proposed action would not be expected to impact any cultural resources. Any cultural resources previously identified would be avoided during construction activities. If any cultural resources were found during construction, all construction activities would be halted until further examination by a qualified archeologist.

4.2.7.2 Historical

The proposed action would not adversely impact any historical resources.

4.2.8 Air Quality

Dust and exhaust emissions from construction-related activities associated with the proposed action may temporarily affect the air quality in the immediate vicinity of the proposed project area. However, BMP's, such as the periodic watering of loose soil, would be employed to minimize the release of dust into the air.

4.2.9 Noise

Construction-related activities are considered to be noise nuisances anytime other than during the daytime on weekdays and anytime the sound level at or across a real property boundary exceeds 80 dBA. Daytime is defined as those hours from 6 am to 11 pm. Noise associated with the construction of this project is difficult to predict. Heavy machinery, the major source of noise in construction, would be constantly moving in unpredictable patterns. However, no extended disruption of normal activities would be expected. Furthermore, every reasonable effort would be made to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

4.2.10 Hazardous, Toxic, and Radioactive Waste

Based on the soil and sediment samples collected on 9 April 2002, HTRW discovery or disposal would not be expected from any of the areas where excavation is planned. However, as mentioned in Section 3.2.10, results from samples from the southern half of the west bank indicated elevated amounts of the pesticides Chlordane and Heptachlor. Consequently, some soils from this area may be hazardous and should be further characterized if any future excavations are planned. If any HTRW was encountered or excavated, construction would cease and appropriate agencies would be notified.

4.2.11 Visual Aesthetics

Engineered channels typically have low aesthetic value based on public perception. The proposed action would restore the environmental attributes that are characteristic of similar meandering rivers and would improve the visual quality of the riverine landscape. In addition, native vegetation plantings would also improve the visual aesthetics along this reach of the river.

4.2.12 Environmental Justice

In accordance with the provisions of Executive Order 12898, the proposed action would not substantially affect human health or the environment. Furthermore, the proposed action would not have the effect of excluding persons from participation in, deny persons the benefits of, or subject persons to discrimination under the proposed action because of their race, color, or national origin.

4.3 Effects of No Action on Affected Environment

Under the no action alternative, the environmental resources within the proposed project area would remain in their existing state with little or no improvement, and possibly, minor degradation over time.

4.4 Unavoidable Adverse Effects

The proposed action would not cause any unavoidable adverse effects.

4.5 Relationship of Short-Term Uses and Long-Term Productivity

The proposed action would restore or improve aquatic and wildlife habitat. The principal goal of the proposed action would be to achieve long-term sustainability and maximum diversity of biological and natural resources within the restoration area.

4.6 Irreversible and Irretrievable Commitments of Resources

The proposed action would not entail any significant irretrievable or irreversible commitments of resources. Construction of the habitat improvements would require minor consumption of petroleum products, and importing materials such as rock, soil, gravel, and vegetation. However, the proposed action would entail long-term commitment and environmental stewardship to ensure the long-term sustainability of restored environmental resources.

4.7 Cumulative Impacts

Cumulative impact is the impact on the environment that results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The SARA would be adding complementary ecosystem restoration measures within the Eagleland Ecosystem Restoration Project area in addition to measures included under the proposed action. The measures that would be implemented in conjunction with the proposed action include: 1) terracing the grass-lined chutes described in Section 2.2.1 with wetland plants to "polish" the water before it enters the river; 2) repairing the existing plunge pool immediately downstream of the South Alamo Street floodgates; 3) repairing eroded channel banks along the north end of the proposed project area; 4) stabilizing the base flow channel banks where slopes exceed 3:1 (three foot horizontal: one foot vertical); 5) planting native vegetation in addition to the vegetation proposed under to proposed action; and 6) constructing retaining walls or other retaining systems to protect the existing Bald Cypress trees along the north end of the proposed project area.

The complementary ecosystem restoration measures described in the previous paragraph are reasonably foreseeable future actions within the same geographic area as the proposed action. Therefore, the cumulative impacts of the proposed action and the proposed complementary measures must be evaluated to determine if the human environment would be affected by reasonably foreseeable significant impacts. A

beneficial incremental impact would be expected with the implementation of the proposed action. Since the ecosystem restoration measures as described above would be complementary to the proposed action, beneficial cumulative impacts would be expected. Therefore, no adverse cumulative impacts would be expected.

As mentioned in Section 1.2, the proposed action would be located within the San Antonio River Improvements Project (SARIP) study area. The USACE, along with the SAROC, are in the process of identifying potential ecosystem restoration alternatives as part of the SARIP. The SARIP is a reasonably foreseeable future action within the same geographic area as the proposed action. Therefore, the cumulative impacts of the proposed action and the proposed SARIP must be evaluated to determine if the human environment would be affected by reasonably foreseeable significant impacts. A beneficial incremental impact would be expected with the implementation of the proposed action. In addition, beneficial cumulative impacts would be expected with the implementation of the proposed action and the SARIP. No adverse cumulative impacts would be expected with the implementation of the proposed action and the SARIP. However, the information relevant to determine if the SARIP would cause reasonably foreseeable significant impacts is currently unavailable. The SARA has previously agreed on the scope and funding of the work, and the SARA has previously authorized the work in cooperation with the USACE. Consequently, a separate environmental impact statement will be prepared to assess the impacts of the SARIP.

4.8 Mitigation Requirements

No mitigation would be required with the implementation of the proposed action.

5.0 List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent

Mr. Robert Lawrence
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U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
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Acting Field Supervisor
Austin Ecological Services Field Office
U.S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin, Texas 78758

Mr. F. Lawrence Oaks
State Historic Preservation Office
P.O. Box 12276
Capital Station
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Mr. Mark Fisher
Research and Environmental Assessment Section
Water Planning and Assessment Division
Texas Natural Resource Conservation Commission MC 150
12100 Park Circle 35, Building F
P.O. Box 13087, Capitol Station
Austin, Texas 78711

Mr. Robert Spain
Resource Protection Division
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

Mr. Steve Graham
San Antonio River Authority
100 East Guenther St.
San Antonio, Texas 78204

San Antonio Public Library
600 Soledad
San Antonio, Texas 78205

APPENDIX A

APPENDIX B

Bexar County Threatened, Endangered, and Rare Species List

Endangered

American Peregrine Falcon	<i>Falco peregrinus anatum</i>
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Threatened

Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>
Black Spotted Newt	<i>Notophthalmus meridionalis</i>
Cagle's Map Turtle	<i>Graptemys caglei</i>
Comal Blind Salamander	<i>Eurycea tridentifera</i>
Indigo Snake	<i>Drymarchon corais</i>
Texas Horned Lizard	<i>Phrynosoma cornutum</i>
Texas Tortoise	<i>Gopherus berlandieri</i>
Timber/Canebrake Rattlesnake	<i>Crotalus horridus</i>
Toothless Blindcat	<i>Trogloglanis pattersoni</i>
White-faced Ibis	<i>Plegadis chihi</i>
Widemouth Blindcat	<i>Satan eurytomus)</i>
Wood Stork	<i>Mycteria americana</i>
Zone-tailed Hawk	<i>Buteo albonotatus</i>

Rare

Big red sage	<i>Salvia penstemonoides</i>
Bracted twistflower	<i>Streptanthus bracteatus</i>
Cave Myotis Bat	<i>Myotis velifer</i>
Correll's false dragon-head	<i>Physostegia correllii</i>
Edwards Plateau Spring Salamanders	<i>Eurycea sp. 7</i>
Elmendorf's onion	<i>Allium elmendorfii</i>
Guadalupe Bass	<i>Micropterus treculi</i>
Henslow's Sparrow	<i>Ammodramus henslowii</i>
Keeled Earless Lizard	<i>Holbrookia propinqua</i>
Maculated Manfreda Skipper	<i>Stallingsia maculosus</i>
Mimic Cavesnail	<i>Phreatodrobia imitata</i>
Park's jointweed	<i>Polygonella parksii</i>
Plains Spotted Skunk	<i>Spilogale putorius interrupta</i>
Sandhill woolywhite	<i>Hymenopappus carrizoanus</i>
South Texas rushpea	<i>Caesalpinia phyllanthoides</i>
Spot-tailed Earless Lizard	<i>Holbrookia lacerata</i>
Texas Garter Snake	<i>Thamnophis sirtalis annectens</i>
Texas Salamander	<i>Eurycea neotenes</i>

References

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Hazardous Material Survey for Eagleland River Walk Link Project, San Antonio, Texas, Project No. ASF00-379-00, December 2000, Raba-Kistner Consultants, Inc.

San Antonio River Improvements Project Concept Design - Design Guidelines, July 2001, SWA Group et al.