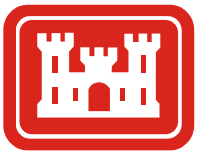
DRAFT ENVIRONMENTAL ASSESSMENT

CRANES MILL ROAD BOAT RAMP OUTGRANT

CANYON LAKE, COMAL COUNTY, TEXAS



Prepared for

Canyon Lake Project Office

by

U.S. Army Corps of Engineers
Fort Worth District

July 2005

DRAFT FINDING OF NO SIGNIFICANT IMPACT

PROPOSED IMPLEMENTATION OF THE CRANES MILL ROAD BOAT RAMP OUTGRANT AT CANYON LAKE, COMAL COUNTY, TEXAS

Description of Action. The United States Army Corps of Engineers (USACE) assessed the potential impacts to the environment that may result from the out-granting of USACE property at Canyon Lake, Comal County, Texas for construction of the proposed Cranes Mill Road Boat Ramp by Comal County. Because the proposed action involves Federal interests in property, it is considered a Federal action and as such requires compliance with the National Environmental Policy Act (NEPA) of 1969, as amended. The Environmental Assessment (EA) addressed potential impacts to the human and natural environment that would occur with implementation of the proposed alternatives. Four alternatives were considered in the EA and included: 1) No Action, 2) Implementation of the Cranes Mill Road Boat Ramp, 3) Alternative 2 With Closure of the Existing Comal County Boat Ramp at Canyon Lake Shores, and 4) Alternative 2 With Renovation of the Existing USACE Boat Ramp at Cranes Mill Park. Evaluation of project impacts indicated that Alternative 4 was the preferred alternative.

The project activities associated with the preferred alternative would include: the out-granting of approximately 0.5 acres of Federal land from USACE to Comal County for construction of a new boat ramp and floating dock facility on Government fee owned property, construction of a 4.0 acres parking lot area on private land on which the USACE owns a flowage easement, and removal of at least 30 vehicle-with-trailer overflow parking spaces around Canyon Lake. Installation of the new Cranes Mill Road Boat Ramp would result in the addition of 30 vehicle-with-trailer parking spaces. The new boat ramp would also remove 15 vehicle-with-trailer overflow parking spaces by eliminating unauthorized launching at the end of Cranes Mill Road. Renovation of the Cranes Mill Park Boat Ramp would include the addition of 15 designated vehicle-with-trailer parking spaces, 10 vehicle-without-trailer parking spaces, and the removal of 30 vehicle-with-trailer overflow parking spaces. Improvements to the Cranes Mill Park Boat Ramp and parking area are scheduled for fiscal year 2006 and would result in the net reduction of 15 vehicle-with-trailer overflow parking spaces. Through continued coordination between the USACE and Comal County, parking control measures such as vehicle barriers, enhanced surveillance, and gated access would also be considered to better manage water-oriented recreation at existing facilities and improve lake safety. Similar parking control measures, including striping of parking spaces and signage identifying "Parking Only In Designated Areas", would be implemented and enforced at the new Cranes Mill Road Boat Ramp.

Anticipated Environmental Effects. Canyon Lake is operated and maintained in accordance with authorized purposes as set forth in the 1970 Updated Master Plan, the 2005 Operational Management Plan, and the 1975 Environmental Impact Statement for the Operations and Maintenance Programs of Canyon Lake. This EA will serve as the decision document for revised classification of lands involved with the Cranes Mill Road Boat Ramp project. A revision to the 1970 Updated Master Plan will be prepared following the completion of the NEPA process. Under the preferred alternative, the portion of USACE fee property located within the Cranes Mill Road Boat Ramp study area would be reclassified from Aesthetics land use to Recreation land use; the Cranes Mill Park Boat Ramp study area would be updated from a Public Use area to Recreation land use.

Approximately 9,746 cubic yards of fill material was previously removed from the Suchi Creek Channel area as a result of the Mystic Shores-Park development project. Comal County would be granted credit for this excavated material to offset the placement of approximately 5,700 cubic yards of fill material in the Canyon Lake flood storage pool associated with the construction of the Cranes Mill Road Boat Ramp.

If implemented, the preferred alternative would utilize a Nationwide Permit (NWP) #42 (Recreational Facilities) for removal and placement of dredged or fill material associated with installation of the boat

ramp facility. Since the preferred alternative would disturb an area in excess of 1.0 acre, Comal County would be required to comply with the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activity. Contractors would be required to comply with the Texas Pollution Discharge Elimination System (TPDES) permit process, which requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) that describes the Best Management Practices (BMPs) that would be employed before, during, and after construction to minimize erosion and runoff from construction activities.

The Fort Worth District Water Related Development Policy (WRDP) was considered during assessment of potential recreation impacts of the preferred alternative. The current potential peak-use level of boating traffic at Canyon Lake was estimated at 9.66 surface acres of water per boat, which is below the WRDP policy standard of 22 surface acres of water per boat. The preferred alternative would increase the total number of boat ramps from 22 to 23, create 30 designated vehicle-with-trailer parking spaces, and remove at least 30 vehicle-with-trailer overflow parking spaces. The preferred alternative would maintain the potential peak-use level of boating traffic at 9.66 surface acres of water per boat. Since the current potential peak-use level of boating traffic at Canyon Lake is below the WRDP policy level of 22 surface acres of water per boat, approval of the preferred alternative would require a policy exception with signatures from the Chief, Operations Division and the Chief, Real Estate Division. With regards to future actions and new development at Canyon Lake, the EA and FONSI would stipulate that a Water Related Recreation Use Study (WRRUS) would be required for actions that impact the potential peak-use level of boating traffic, even if the action results in a positive, negative, or no-net-change in surface acres of water per boat.

Prairie and savannah habitat within the Cranes Mill Road Boat Ramp (4.0 acres) and Cranes Mill Park Boat Ramp (0.3 acres) would incur both short and long-term impacts. Species located within the construction footprints would incur long-term impacts due to the removal and replacement of existing habitat with concrete/asphalt surfaces. Short-term impacts from required clearing and construction-related activities would directly and/or indirectly affect most animals that reside or wander within the study areas. The USACE would recommend to Comal County that removed live oak trees located within privately-owned flowage easement property within the Cranes Mill Road Boat Ramp study area be replaced with seedlings at a 2 to 1 ratio along the 924 to 934 feet contours. Fringe wetland impacts within the Cranes Mill Road Boat Ramp study area would include the removal of approximately 6-8 buttonbush plants located along the shoreline of Canyon Lake. Mitigation for loss of wetland vegetation would require the replacement of buttonbush along adjacent shoreline areas of Canyon Lake.

The preferred alternative would not have any significant impacts to the social, economic, or human and natural environment. No significant habitat for threatened and endangered species was identified within the study area. No significant historical, architectural, archeological, or paleontological resources were identified within or adjacent to the study area. In the event that hazardous materials or archeological deposits are discovered during construction, all actions would cease and compliance with local, state, and Federal regulations would ensue.

Facts and Conclusions. Based on a review of the information contained in this EA, it is concluded that the implementation of the Cranes Mill Road Boat Ramp 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.

_____ _____

John R. Minahan Date
Colonel, Corps of Engineers
District Engineer

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1.0 INTRODUCTION

As required by the National Environmental Policy Act (NEPA) of 1969 and subsequent implementing regulations promulgated by the Council on Environmental Quality (CEQ), this Environmental Assessment (EA) was prepared to determine the potential impacts associated with the proposed out-granting of United States Army Corps of Engineer (USACE) fee property for an easement to implement the Cranes Mill Road Boat Ramp at Canyon Lake, Comal County, Texas. The lead agency for implementation of the boat ramp on USACE property is Comal County. Four project alternatives were considered and are included in this EA: 1) No Action, 2) Implementation of the Cranes Mill Road Boat Ramp, 3) Alternative 2 With Closure of the Existing Comal County Boat Ramp at Canyon Lake Shores, and 4) Alternative 2 With Renovation of the Existing USACE Boat Ramp at Cranes Mill Park. The potential impacts associated with these four alternatives will be the focus of this EA.

1.1 PURPOSE AND NEED

Comal County has indicated a need for additional access to Canyon Lake for residents located in the northwest area of the lake and has requested that the USACE grant an easement to the county allowing them to construct the Cranes Mill Road Boat Ramp facility. Implementation of Alternatives 2, 3, or 4 would provide the access needs identified by the county through construction of the Cranes Mill Road Boat Ramp. Alternatives 3 and 4 would also implement measures to help offset potential increases in boating traffic that would be generated by the proposed Cranes Mill Road Boat Ramp. Additional impacts to the natural environment, traffic safety, recreation management efforts, and other socioeconomic factors were also considered in preparation of the EA.

The purpose of this EA is to identify and evaluate the environmental aspects of implementing the proposed alternatives in accordance with the NEPA of 1969, the CEQ, and Engineering Regulation (ER) 200-2-2. The objective of NEPA is to ensure consideration of the environmental aspects of proposed actions in the Federal decision-making process and to make environmental information available to the public before decisions are made and actions taken.

1.2 STUDY AREA

Canyon Lake is located in south central Texas in Comal County, at mile 303.0 of the Guadalupe River, approximately 35 miles northeast of San Antonio, Texas (**Figure 1**). The proposed Cranes Mill Road Boat Ramp study site is located on the northwest shoreline of Canyon Lake at the end of Cranes Mill Road; the existing Cranes Mill Park Boat Ramp study site is located on the southwest shoreline of Canyon Lake; and the Canyon Lake Shores Boat Ramp study site is located on the northwest shoreline at the end of Lakeshore Road (**Figure 2**). See **Appendix A** for photographs of the study sites.

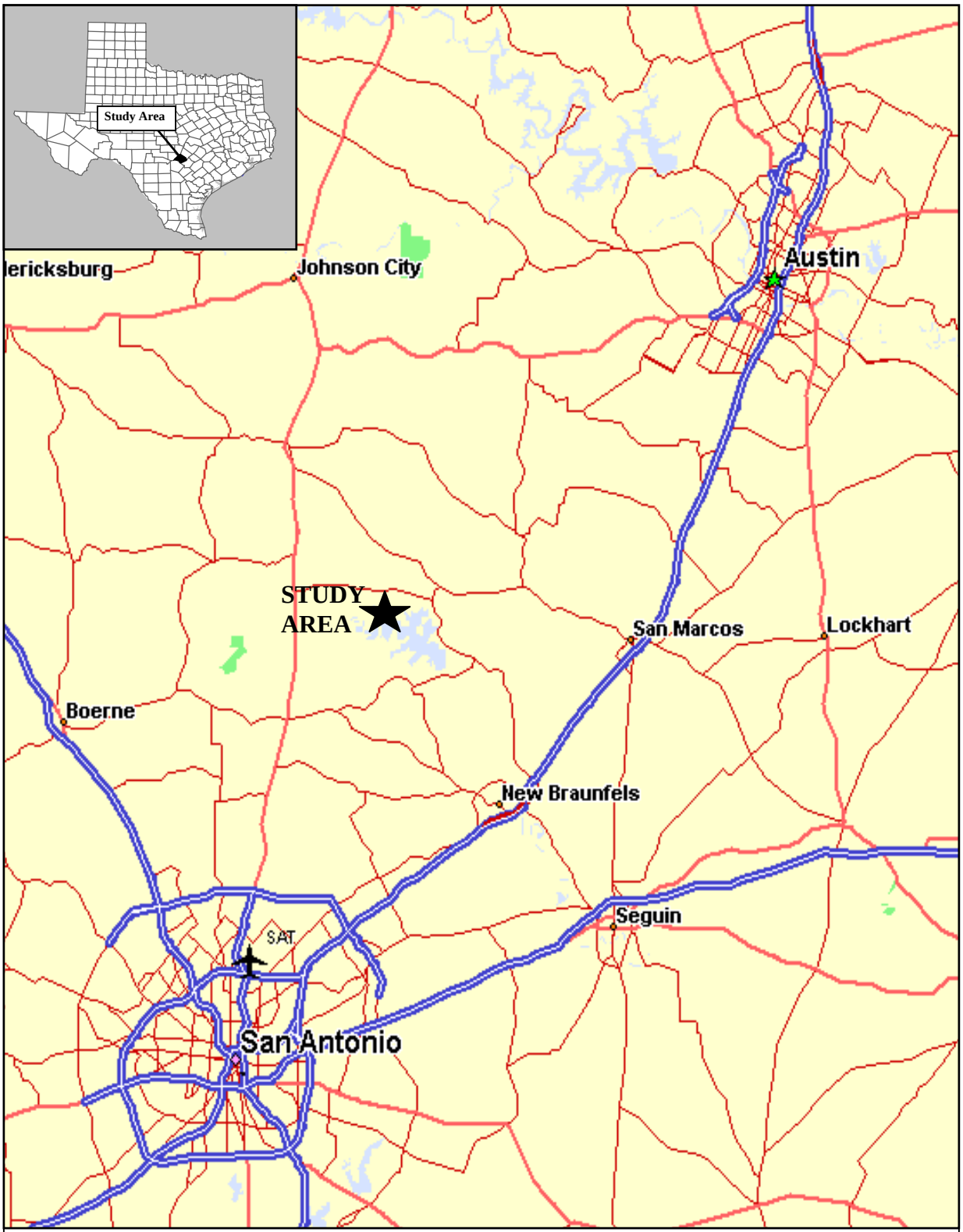

Figure 1
General Study Area Map
Comal County, Canyon Lake, Texas

U.S. Army Corps
of Engineers
Fort Worth District

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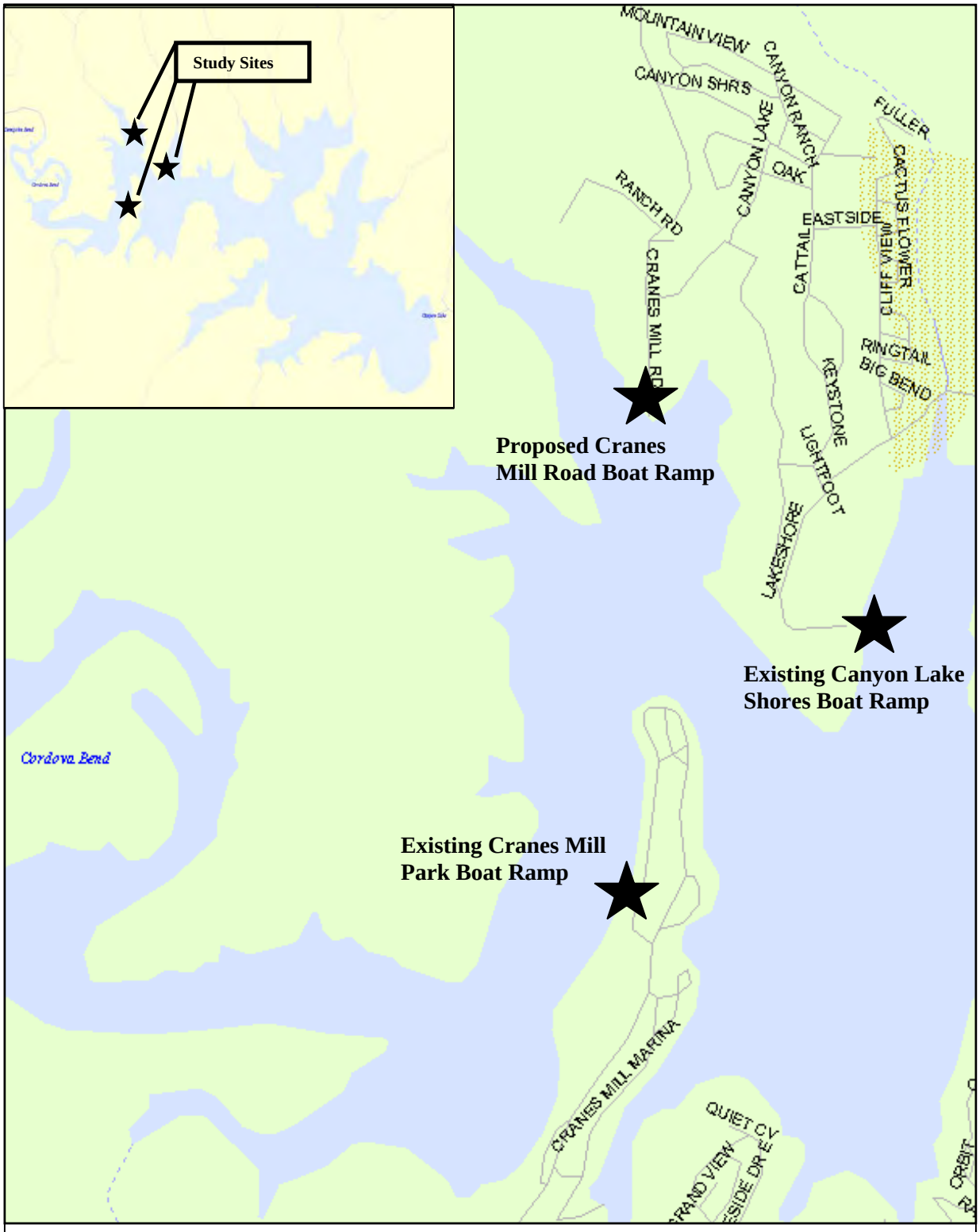

Figure 2
Study Site Map
Canyon Lake, Texas

U.S. Army Corps
of Engineers
Fort Worth District

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1.3 PROJECT AUTHORITIES AND REGULATORY COMPLIANCE

Construction of the Canyon Lake Dam was authorized by Congress under the River and Harbor Act, 2 March 1945 (PL 79-14) and modified by the Flood Control Act of September 1954 (PL 83-780). Authorized purposes are flood control and water conservation. The lake and portions of surrounding Federal lands have been developed by the USACE for recreational purposes and the conservation of fish and wildlife resources. Canyon Lake has developed recreational facilities under authority of the Flood Control Act of 22 December 1944 (PL 78-534) as amended by subsequent acts. Authority for the management and conservation of natural resources, including fish and wildlife, woodlands, grasslands, and wetlands is contained in the Fish and Wildlife Coordination Act of 1958, as amended (PL 85-624), the Forest Cover Act (PL 86-717), and the Migratory Bird Treaty Act, as amended (16 USC 703).

Construction of Canyon Lake Dam by the USACE began in April 1958 with deliberate impoundment of waters of the Guadalupe River in June 1964. Canyon Lake covers 8,240 surface acres with a shoreline length of 80 miles at the normal conservation pool level of 909 feet mean sea level (msl). Canyon Lake has a total area of 10,990 acres in fee title with flowage easements on an additional 3,597 acres. The Guadalupe-Blanco River Authority (GBRA) served as the local sponsor for construction of the Canyon Lake Dam and is responsible for operation and maintenance costs associated with water management and release within the conservation pool between elevations 800 feet above msl and the full conservation pool elevation of 909 feet msl. The USACE is responsible for management and release of waters to control downstream flooding within the flood control pool from an elevation of 909 feet msl to 943 feet msl. Daily operation of the Canyon Lake Dam is performed by the USACE, as is management of all Federal land surrounding the lake. Canyon Lake is operated and maintained in accordance with its authorized purposes as set forth in the 1970 Updated Master Plan and the 2005 Operational Management Plan (OMP). The Environmental Impact Statement (EIS) for the Operations and Maintenance Programs of Canyon Lake was completed in December 1975.

Per guidance contained in ER 1130-2-550 and EP 1130-2-550, existing project lands may be reclassified as existing lake Master Plans are revised and updated to fully consider public desires, legislative authority, regional and project specific resource requirements, and suitability. The allocated uses defined in the above guidance would take precedent over any existing land classifications and project lands would be classified into one of the following categories: 1) Project Operations, 2) Recreation, 3) Mitigation, 4) Environmental Sensitive Areas, 5) Multiple Resource Management, and 6) Easement Lands. This EA would serve as the decision document for revised classification of lands involved with the Cranes Mill Road Boat Ramp project. A revision to the 1970 Updated Master Plan would be prepared following the completion of the NEPA process.

The USACE owns a flowage easement on selected privately owned lands surrounding Canyon Lake, which grants to the USACE the perpetual right to occasionally overflow, flood, and submerge lands in connection with the operation and maintenance of Canyon Lake. Flowage easement lands around Canyon Lake are generally defined as those privately owned lands between the elevation contours of 918 feet msl and 948 msl. Landowners are prohibited from undertaking actions on flowage easement property, which would affect the capacity of the easement to store water in the event of a flood. Development within flowage easement property requires a no-net-loss of Canyon Lake flood storage capacity. The proposed Cranes Mill Road

Boat Ramp project would require Comal County to offset any excess fill material placed on the flowage easement during the construction process.

In response to emerging recreational boating issues at Fort Worth District lakes, including public safety, user enjoyment, and environmental protection, and using data resulting from a comprehensive Water Related Recreation Use Study (WRRUS) conducted at Lewisville Lake in the summer of 1999, the Fort Worth District USACE adopted a Water Related Development Policy (WRDP) in April, 2002 (**Appendix B**). The intent of the WRDP is to insure that the above issues are considered when proposals are under consideration for new marinas, wet slips, dry-stacked boat storage, boat ramps, or boat ramp parking spaces. The WRDP further stipulates the following:

a. Using criteria derived from the Lewisville Lake study, if existing wet slips and boat ramp parking spaces at any given lake have the potential to result in boating traffic levels more congested than one boat per 27 acres of water surface during peak use periods, then a comprehensive WRRUS may be required before new wet slips or boat ramp parking spaces could be allowed. Peak use periods generally include afternoon hours on weekends and holidays from May through September.

b. If a comprehensive WRRUS indicates that boating traffic levels exceed the Fort Worth District target level of one boat per 22 acres of water surface during peak use periods, then proposals for new development such as wet slips or boat ramp parking spaces would be denied or reduced. On large lakes with geographically distinct lake use zones, as determined through a WRRUS, the target of 22 acres per boat would be applied on a zone-by-zone basis.

c. Exemptions to the WRDP are possible on a case-by-case basis.

The 2004 Memorial Day weekend boat traffic count of 14.80 surface acres of water per boat provides an indication that during peak use conditions at Canyon Lake the potential level of boating traffic may exceed the WRDP target condition of 22 surface acres of water per boat. Actual levels of boating traffic on Canyon Lake could only be determined through a comprehensive WRRUS that also considers many other factors such as type of boats in use, when boats are in use, the length of time boats are actually underway, the history of boating safety violations, and public perceptions of crowding and safety. Conducting a WRRUS is an expensive undertaking and would almost certainly require cost sharing among numerous stakeholders in the management of Canyon Lake. Currently, the USACE is unable to fund a comprehensive study, but would continue to look for partners willing to share in the cost of a WRRUS. In reviewing the proposed Cranes Mill Road Boat Ramp, the USACE and Comal County agreed that the proposed action could be considered in the absence of a WRRUS if measures are taken to insure that the new boat ramp would not result in an increase of boating traffic over existing levels. Since the current level of boating traffic at Canyon Lake is estimated to be below the WRDP policy level of 22 surface acres of water per boat, approval of the preferred alternative would require a policy exception with signatures from the Chief, Operations Division and the Chief, Real Estate Division. Following the NEPA public review period, the Final Policy Exception Memorandum would be signed and executed. The Draft Policy Exception Memorandum is included in **Appendix B**. With regards to future actions and new development at Canyon Lake, this EA would stipulate that a WRRUS would be required for any

future actions that impact the level of boating traffic, even if the action results in a positive, negative, or no-net-change in surface acres of water per boat.

Canyon Lake is considered Waters of the United States and is protected under Section 404 of the Clean Water Act (CWA) as administered by the USACE. Implementation of the proposed project would likely be authorized by a Nationwide Permit (NWP) #42 (Recreational Facilities) for removal and placement of dredged or fill material associated with installation of the boat ramp facility.

United States Coast Guard permits are not considered necessary for this project since it does not cross any "navigable waters" of the United States. Since the proposed project would disturb an area in excess of 1.0 acre, Comal County would be required to comply with the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activity. Numerous other Federal and state laws that regulate activities, which may affect the environment, were also reviewed for the proposed project. **Table 1** lists pertinent environmental regulations that helped guide the preparation of this EA.

Table 1. Applicable Environmental Statues and Regulations.

Federal Statutes
Archeological and Historic Preservation Act
Clean Air Act, as amended
Clean Water Act, as amended
Endangered Species Act, as amended
National Historic Preservation Act, as amended
National Environmental Policy Act, as amended
Farmland Protection Policy Act
Noise Control Act
Land and Water Conservation Act
Executive Order 13112 on Invasive Species
Department of Transportation Act
State Statutes, Regulations, or Applicable Permits
Antiquities Code of Texas
Texas Parks and Wildlife Code
Texas Water Quality Standards/Texas Consolidated Permit Rules

2.0 DESCRIPTION OF ALTERNATIVES

Four alternatives were considered in this EA, including the no action alternative. The features associated with each alternative are listed below.

2.1 ALTERNATIVE 1: No Action

This alternative would include not out-granting USACE fee-owned property for an easement to Comal County for construction of the Cranes Mill Road Boat Ramp facility. As such, the proposed Cranes Mill Road Boat Ramp would not be implemented and existing boat ramps at Canyon Lake would continue to operate under their current conditions.

2.2 ALTERNATIVE 2: Implementation of the Cranes Mill Road Boat Ramp

This alternative would entail constructing a new boat ramp and floating dock facility at the end of Cranes Mill Road on USACE fee property (0.48 acres). The parking area and associated amenities would be located on privately owned flowage easement land (3.7 acres) adjacent to USACE fee property. The flowage easement property is owned in fee by Bluegreen Southwest One, Limited Partnership (BGSWO). **Table 2** below lists the project features with associated dimensions. **Figure 3** outlines the approximate location of proposed project features on flowage easement and fee property for the Cranes Mill Road Boat Ramp. Design templates for the boat ramp, floating dock structure, and parking area are located in **Appendix C**. The new boat ramp would result in the addition of 30 designated vehicle-with-trailer parking spaces. In addition, the new boat ramp would remove 15 vehicle-with-trailer overflow parking spaces by eliminating unauthorized launching at the end of Cranes Mill Road.

Table 2. Proposed Comal County Boat Ramp Facility.

Facility	Type	Length (YD)	Area (SY)	Volume (CY)
Fee Property				
Boat Ramp Area - B	3-lane concrete ramp, 14% grade	-	1,008.56	437.04
Shoulder Without Sidewalk	Concrete, 5:1 side slope	123.67	1.61	199.11
Floating Platform Dock	Requires 40 lb. psf live load	10.00	1.11	11.10
Floating Ramp	2 shore posts, ADA compliant	13.33	0.67	8.93
Ramp Abutment	Concrete, 1:12 max slope, ADA	11.67	4.44	51.81
Sidewalk, 8 foot wide	Concrete, 1:12 max slope	10.00	0.30	3.00
Sidewalk, 5 foot wide	Concrete	10.00	0.19	1.90
Total				**712.89**
Flowage Easement Property				
Parking Area - A	30-with and 52-without trailer spaces	-	8,728.44	3,782.33
Shoulder With Sidewalk	Concrete, 5:1 side slope	256.67	1.76	451.74
Shoulder Without Sidewalk	Concrete, 5:1 side slope	380.00	1.61	611.80
Sidewalk	Concrete, 5 ft wide, 4” deep	246.67	0.19	46.87
Pipe Rail Fence	2-3/8” ID, 48” high, 4” wire panels	820.00	-	18.15
Dumpster Pad	Concrete, 4” deep	10.00	0.44	4.40
Junction Box/Electrical Line	Line with 3 lights on 20’ poles	484.00	0.11	53.24
Total				**4,968.53**
Total Gross Fill				**5,681**

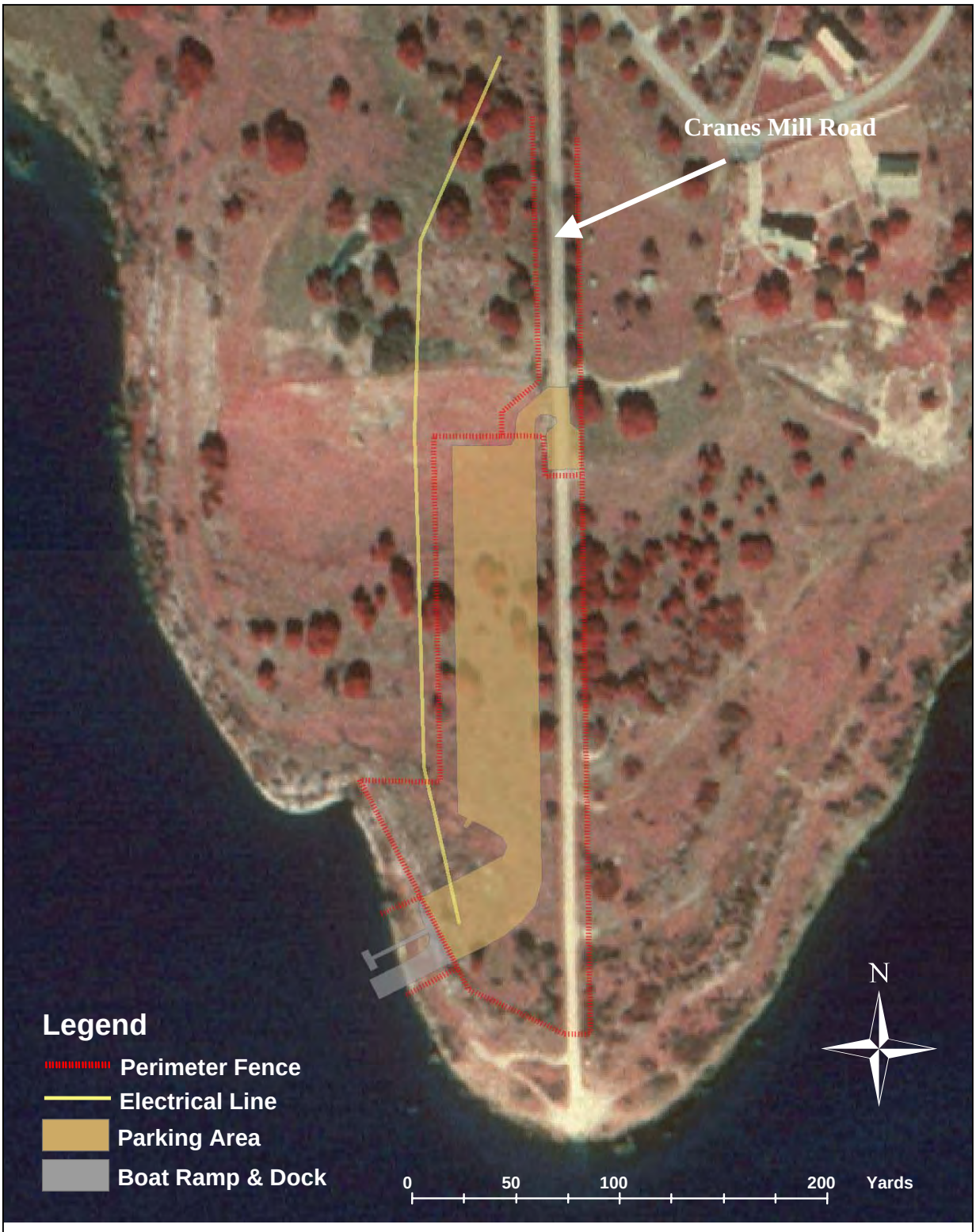

Figure 3
Location of Proposed Project Features
Cranes Mill Road Boat Ramp
Canyon Lake, Texas

U.S. Army Corps of Engineers
Fort Worth District

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2.3 ALTERNATIVE 3: Alternative 2 With Closure of the Existing Comal County Boat Ramp at Canyon Lake Shores

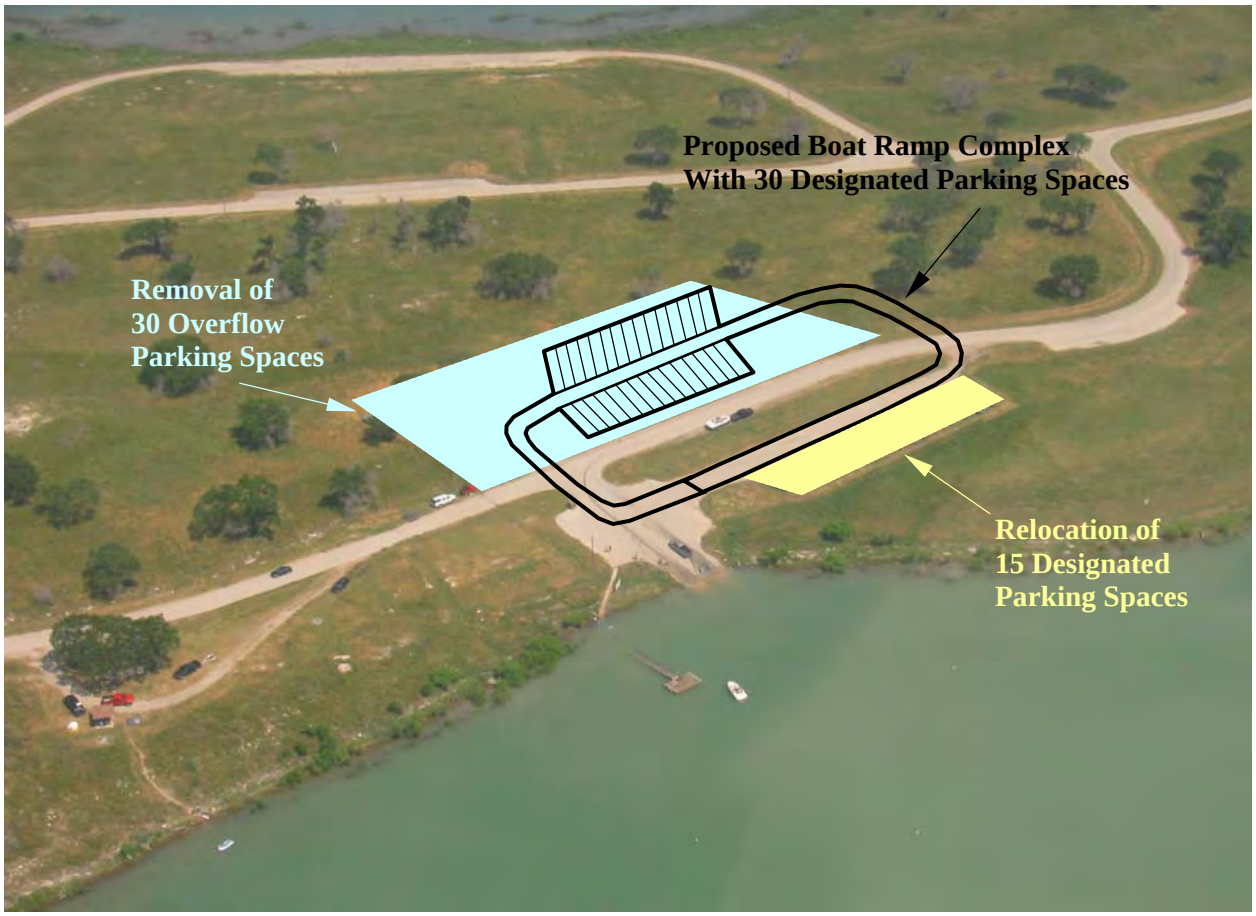
This alternative would consist of closing and abandoning the existing Comal County boat ramp located at Canyon Lake Shores and relocating the recreational amenities to the Cranes Mill Road Boat Ramp study area. The proposed Cranes Mill Road Boat Ramp would include an additional 10 vehicle-with-trailer and 52 vehicle-without-trailer parking spaces as compared to the Canyon Lake Shores Boat Ramp (including overflow parking). In addition, the new boat ramp would remove 15 vehicle-with-trailer overflow parking spaces by eliminating unauthorized launching at the end of Cranes Mill Road. The new boat ramp and floating dock would be located at the end of Cranes Mill Road on USACE fee property. The associated parking area would be located on privately owned flowage easement land adjacent to USACE fee property. The boat ramp, floating dock, and parking area design, as well as flood storage capacity mitigation procedures would be identical to those outlined in Section 2.2 above and located in **Appendix C**.

2.4 ALTERNATIVE 4: Alternative 2 With Renovation of the Existing USACE Boat Ramp at Cranes Mill Park (*Preferred Alternative*)

This alternative would consist of constructing a new boat ramp facility at the end of Cranes Mill Road on USACE fee property. The associated parking area would be located on privately owned flowage easement land adjacent to USACE fee property. The boat ramp, floating dock, and parking area design, as well as the flood storage capacity mitigation procedures would be identical to those outlined in Section 2.2 above and located in **Appendix C**.

This alternative would include the following measures to maintain the current potential peak-use level of boating traffic at Canyon Lake: 1) As described in sections 2.2 and 2.3, the installation of the Cranes Mill Road Boat Ramp would result in the addition of 30 designated vehicle-with-trailer parking spaces and the removal of 15 unauthorized vehicle-with-trailer overflow parking spaces at the end of Cranes Mill Road. This would result in the net addition of 15 vehicle-with-trailer parking spaces at Canyon Lake. 2) An approved fiscal year 2006 Park Renovation Plan for Cranes Mill Park would enlarge the existing boat ramp parking area from 15 to 30 designated vehicle-with-trailer parking spaces and vehicle barriers would be installed to eliminate the 30 vehicle-with-trailer overflow parking spaces that are currently being used. Scheduled improvements to the Cranes Mill Park boat ramp and parking area would result in the net reduction of 15 vehicle-with-trailer overflow parking spaces. **Photograph 1** identifies the approximate location of proposed project features within Cranes Mill Park. This measure, along with measure one above, would result in a no-net-change in vehicle-with-trailer parking spaces at Canyon Lake. 3) It is also anticipated that some of the existing overflow use at Canyon Lake may relocate to the proposed new boat ramp. This anticipated shift in recreational use patterns could help disperse boating traffic on Canyon Lake and improve boating safety. 4) Through continued coordination between the USACE and Comal County, parking control measures such as vehicle barriers, enhanced surveillance, and gated access would be considered to better manage water-oriented recreation at existing facilities. Similar parking control measures, including striping of parking spaces and signage identifying "Parking Only In Designated Areas", would be implemented and enforced at the Cranes Mill Road Boat Ramp.

Photograph 1. Aerial photograph of the USACE-Cranes Mill Park Boat Ramp identifying the conceptual layout for the removal of 30 vehicle-with-trailer overflow parking spaces and the addition of 15 designated vehicle-with-trailer parking spaces.



The Updated Potential Lake Surface Boat Load Analysis in **Appendix D** identifies 1) the number of designated vehicle-with-trailer parking spaces at existing Canyon Lake boat ramps, 2) the number of estimated vehicle-with-trailer overflow parking spaces at Canyon Lake, and 3) the number of designated wet slips at commercial and private marinas. These values were used to assess the potential level of boat traffic on Canyon Lake for each of the above alternatives based on the ratio of available surface acres of water to estimated vehicle-with-trailer parking spaces and single-boat wet slips.

3.0 AFFECTED ENVIRONMENT

The affected environment is the baseline against which potential impacts, caused by the proposed alternatives, are assessed. This chapter focuses on those resources specific to the proposed project area that have the potential to be affected by activities brought on by the Cranes Mill Road Boat Ramp project at Canyon Lake. Resources that would most likely be affected (e.g., recreational resources, water resources, biological resources) by the proposed alternatives are described in more detail than those not likely to be affected (e.g. air, noise).

3.1 PROJECT SETTING AND TOPOGRAPHY

Canyon Lake is located within the Balcones Canyonlands/Edwards Plateau physiographic province of south central Texas, commonly known as the "Texas Hill Country". Steep slopes and high-gradient streams with evergreen woodlands and deciduous forests dominate the landforms within the Balcones Canyonlands. Special features of this region include assorted karstic features such as sinkholes and grottoes, which harbor unique biota endemic only to this region of Texas. This region of Texas is also unique due to the intermixture of biotic elements characteristic of adjacent ecological regions, such as the Blackland Prairies, Llano Uplift, and South Texas Brush Country.

Canyon Lake controls run-off from the Guadalupe River Watershed, which has a drainage area of 1,425 square miles above the dam site. The watershed falls to the east-southeast from an elevation of 1,350 feet msl at the headwaters near Kerrville, Texas to 750 feet msl at the Canyon Lake dam site. The stream gradient within the project area is six feet per mile. The main divide of the watershed is 200 to 350 feet higher than the banks of the river, characterized by steep-walled canyons and generally rugged topography.

3.2 CLIMATE

The general climate of Canyon Lake is mild and moderately humid throughout the year. The average annual precipitation is approximately 30 inches within the lake area above the dam. Peak rainfalls typically occur in May, June, and September. The mean annual temperature of the Canyon Lake area is about 68 degrees Fahrenheit with the record high being 110 degrees and the record low being 2 degrees. The growing season extends from early March to late November, with about 265 frost-free growing days.

3.3 CURRENT LAND USE

According to the 1970 Updated Master Plan, the current land use classifications for USACE fee-owned property within the Cranes Mill Road Boat Ramp and Canyon Lake Shores Boat Ramp study areas are Aesthetics and Permanent Pool lands. The Aesthetics land area is defined as Government fee-owned property, which typically consists of the narrow strip of upland lakeshore around the entire lake from an elevation of 909 to 918 feet msl. The Permanent Pool land use area refers to the 8,240 acres of Government fee-owned property that is inundated at a normal conservation pool level of 909 feet msl. Management options for both of these land use areas include minor land modifications to enhance fish and wildlife habitat, facilitate low intensity recreation, and to lessen soil erosion. The parking area for the Cranes Mill Road Boat Ramp would be located on privately owned flowage easement property. Adjacent landowners

may request permission from the USACE to build structures on flowage easement lands that include, but are not limited to, swimming pools, golf courses, gazebos, water wells, parking lots, and storage buildings. Permanent human habitable structures of any kind are not permitted on easement lands. The current land use classification for the Cranes Mill Park Boat Ramp study area is as a Public Use area. The Public Use land classification refers to areas above elevation 909 msl that are reserved for use by the general public and are to be developed for park and recreation purposes.

3.4 GEOLOGY AND SOILS

Rock outcroppings in the study area are Lower Cretaceous in age and consist of the lower member of the Glen Rose Formation. The lower member consists of about 200 feet of alternating limestone, marls, and shale, which overlays about 100 feet of fossiliferous limestone. The upland habitat within the study area and the majority of Canyon Lake is thinly mantled with soil or has rocky outcroppings devoid of soil. Wave action has eroded some soils and exposed various geological layers up to the flood pool elevation of 948 feet msl.

Soils of the study areas are mapped as Brackett-Tarrant-Denton Association. This complex occurs in uplands and consists of very shallow to moderately deep, well-drained, slopping or hilly, clay and clay loam soils. These soils are moderately or severely limited for agricultural use by the shallow depth, rocky substrate, slow permeability, high shrink-swell potential, and slope. Water capacity of these soils is low and they promote rapid surface water runoff.

3.5 AQUATIC RESOURCES

3.5.1 Surface Water

Canyon Lake covers 8,240 surface acres with a shoreline length of 80 miles at normal conservation pool level (909 feet msl). The lake has a total storage capacity of 740,900 acre feet below the uncontrolled spillway, including 346,400 acre feet of flood control storage, 366,400 acre feet of conservation storage, and 28,100 acre feet of sediment reserve. The lake has a maximum length of about 15 miles, a maximum width of about four miles, and controls run-off from 1,425 square miles of drainage area. Canyon Lake is a deep storage, bottom drainage lake with a mean depth of 46 feet and a maximum depth of 125 feet. Due to the depth, thermal stratification develops annually in the lake. Much of the shoreline consists of steep sides, step-offs, or tall cliffs. Shoreline and bottom areas of the lake are often rocky. Small stands of timber were inundated during impoundment of Canyon Lake and are located at the river headwaters and creek areas of the lake.

Waters of Canyon Lake are primarily supplied from the Guadalupe River. This spring fed river flows over limestone geology, which decreases the turbidity of the water entering the lake. However, flash flooding in the watershed will often cause high inflows of turbid water into the lake. Low flow and intermittent creeks also supply some water to Canyon Lake. These include Jacob's Creek, Sorrell Creek, Potter's Creek, and Tom Creek. These creeks usually have little impact on lake levels or water quality within Canyon Lake.

3.5.2 Ground Water

The Edwards Aquifer is approximately 180 miles long and varies in width between five and 40 miles, covering 10 counties in central Texas. Canyon Lake is located within the Contributing

Zone and adjacent to the Recharge Zone of the Edwards Aquifer. Based on a review of Texas Water Development Board (TWDB) water well data for Comal County, groundwater in the area is generally present at depths of 250 to 400 feet depending on topography and at elevations ranging from about 600 to 700 feet above msl. The lower member of the Glen Rose Formation, which lies stratigraphically below the Edwards Group, underlies the proposed study area. Since the Edwards Group has been largely eroded from the area, the potential for significant groundwater recharge or impacts to sensitive karst features is unlikely. Likewise, waters of the Guadalupe River provide no significant recharge to the Edwards Aquifer because the streambed has been cut down below the level of the Edwards limestone.

The Edwards Aquifer was the first aquifer designated as a sole-source aquifer in 1975 and is the main source of water for the San Antonio and Austin areas. A sole-source aquifer is an aquifer designated by the EPA under the Sole Source Aquifer Program as the "sole or principal" source of drinking water for an area. The EPA further defines a sole-source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer (Safe Drinking Water Act, Section 1427).

3.5.3 Wetlands and Waters of the United States

Section 404 of the Clean Water Act (CWA) of 1977 (P.L. 95-217) authorizes the Secretary of the Army, acting through the USACE, to issue permits for the discharge of dredged or fill material into Waters of the United States, including wetlands. Waters of the United States (Section 328.3[2] of the CWA) are those waters used in interstate or foreign commerce, subject to ebb and flow of tide, and all interstate waters including interstate wetlands. Waters of the United States are further defined and may include waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, or impoundments of waters, tributaries of waters, and territorial seas. Jurisdictional boundaries for Waters of the United States are defined in the field as the ordinary high water marks (OHWM) which is that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural lines impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Canyon Lake is classified as Waters of the United States. As such, activities that result in a discharge of dredged or fill material into the lake would be regulated under Section 404 of the CWA. The USACE established NWPs to efficiently authorize common activities, which do not significantly impact Waters of the United States, including wetlands. The NWPs were modified and reissued by the USACE in the *Federal Register* on 15 January 2002, with an effective date of 18 March 2002. All NWPs have an expiration date of 18 March 2007. The USACE has the responsibility to authorize permitting under a NWP, or to require an Individual Permit.

Wetlands are those areas 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 for life in saturated soil conditions. Potential jurisdictional wetlands within the Canyon Lake area occur primarily along the edges, or in extremely shallow regions near the shoreline. Within the proposed study areas, the USFWS National Wetlands Inventory (NWI) maps show freshwater emergent wetland, other, and no data available classifications. Site investigations verified the presence of buttonbush (*Cephalanthus occidentalis*) along the shoreline of Canyon Lake, within the study areas (**Appendix A**).

3.5.4 Floodplains

The proposed study areas lie within the 948 feet msl contour, which is 3 feet above the 100-year floodplain as delineated by the Federal Emergency Management Association (FEMA) and 5 feet above the elevation of the crest of the Canyon Lake spillway, which is 943 feet above msl. In addition, the FEMA has established the 500-year floodplain at elevation 949.7 msl.

3.6 BIOLOGICAL RESOURCES

3.6.1 Vegetation

The bottomlands of the Guadalupe River Valley support small areas of hardwood forest of various species including pecan (*Carya illinoensis*), common hackberry (*Celtis occidentalis*), live oak (*Quercus virginiana*), Texas oak (*Quercus shumardii texana*), American elm (*Ulmas americana*), common baldcypress (*Taxodium distichum*), and Texas black walnut (*Juglans microcarpa*). Slopes and uplands support live oak, some post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), Texas ash (*Fraxinus texensis*), Texas persimmon (*Diospyros texana*), prairie flameleaf sumac (*Rhus lanceolata*), Texas sophora (*Sophora affinis*), and Ashe juniper (*Juniperus ashei*). Climax grasses consist of switchgrass (*Panicum virgatum*), big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), plains lovegrass (*Eragrostis intermedia*), buffalograss (*Buchloe dactyloides*), and Indiangrass (*Sorghastrum nutans*). Yuccas (*Yucca sp.*), prickley pear (*Opuntia lindheimeri*), and numerous species of forbs, vines, and shrubs are also common on upland and hillside areas. Common invaders within disturbed sites include giant ragweed (*Ambrosia trifida*), common cocklebur (*Xanthium strumarium*), prairie broomweed (*Amphiachyris dracunculoides*), and Johnson grass (*Sorghum halepense*). Due to existing substrate and soil conditions, aquatic vegetation and algae are not common in Canyon Lake. Vegetation within the study areas contained upland habitat consisting of scattered live oak with a switchgrass, bluestem, buffalograss, and Indian grass understory. A complete list of vegetation found within the Canyon Lake project area is listed in **Appendix E.**

3.6.2 Fish and Wildlife

Within the USACE project boundaries, Canyon Lake and the Guadalupe River support twelve families and 47 species of fish. The principal native game fishes are largemouth bass (*Micropterus salmoides*), Guadalupe bass (*Micropterus treculi*), white crappie (*Pomoxis annularis*), white bass (*Morone chrysops*), striped bass (*Morone saxatilis*), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), and flathead catfish (*Pylodictis olivaris*). Non-game fish include longnose gar (*Lepisosteus osseus*), common carp (*Cyprinus carpio*), smallmouth buffalo (*Ictiobus bubalus*), gray redhorse (*Moxostoma congestum*), and black bullhead (*Ictalurus melas*). Various species of sunfish, shad, perch, minnows, and shiners are also present within Canyon Lake. Introduced species of fish include walleye (*Stizostedion vitreum*), hybrid striped bass (*Morone saxatilis x Morone chrysops*), and white bass (*Morone chrysops*). The consistently low water temperatures within the Guadalupe River below Canyon Lake Dam have also allowed stocking of Rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*), which has created an artificial cold water fishery for the general public. Other aquatic biota includes mollusks, crayfish, and aquatic insects.

Wild game species in the Canyon Lake area include whitetail deer (*Odocoileus virginianus*), mourning dove (*Zenaida macroura*), northern bobwhite quail (*Colinus virginianus*), fox squirrel (*Sciurus niger*), and wild turkey (*Meleagris gallopavo*). Non-game species include the black-

tailed jackrabbit (*Lepus californicus*), eastern cottontail rabbit (*Sylvilagus fioridanus*), opossum (*Didelphis virginiana*), nine-banded armadillo (*Dasypus novemcinctus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), bobcat (Lynx rufus), striped skunk (*Mephitis mephitis*), and numerous species of bats, moles, and rodents. Migratory waterfowl and resident birds within the Canyon Lake area include numerous species of ducks, geese, songbirds, wading birds, and shore birds. Other wildlife present within the Canyon Lake project area includes various species of turtles, snakes, lizards, toads, frogs, and salamanders. A complete list of fish and wildlife species found within the Canyon Lake project area are listed in **Appendix E.**

3.6.3 Threatened and Endangered Species

The Endangered Species Act (ESA) [16 U.S.C. 1532 et. seq.] of 1973, as amended, was enacted to provide a program for the preservation of endangered and threatened species and to provide protection for the ecosystems upon which these species depend for their survival. All Federal agencies are required to implement protection programs for designated species and to use their authorities to further the purposes of the act. Responsibility for the identification of a threatened or endangered species and development of any potential recovery plans lies with the Secretary of the Interior and the Secretary of Commerce.

An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is a species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are those, which have been formally submitted to Congress for official listing as threatened or endangered. Species may be considered endangered or threatened when any of the five following criteria occurs: 1) the current/imminent destruction, modification, or curtailment of their habitat or range; 2) overuse of the species for commercial, recreational, scientific, or educational purposes; 3) disease or predation; 4) the inadequacy of existing regulatory mechanisms; and 5) other natural or human-induced factors affecting continued existence. In addition, the USFWS has identified species that are candidates for listing as a result of identified threats to their continued existence. The candidate designation includes those species for which the USFWS has sufficient information on hand to support proposals to list as endangered or threatened under the ESA.

Eleven Federally protected species have the potential to occur in Comal County. This list includes two amphibians, two birds, one reptile, two fish, two insects, one amphipod, and one plant. **Table 3** outlines the Federally protected species and their status. Of the eleven Federally listed species, only the black-capped vireo, golden-cheeked warbler, and Cagle's map turtle have the potential to occur within the proposed study area. The remaining Federally listed species (fountain darter, San Marcos salamander, San Marcos gambusia, Comal Springs riffle beetle, Comal Spring dryopid beetle, Texas blind salamander, Texas wild-rice, Peck's Cave amphipod) require either stenothermal habitats associated with adequate spring flow, subterranean habitat of the Edwards Aquifer, or habitat in close proximity to spring openings. None of these types of habitat are available within or adjacent to the proposed study areas, therefore, the presence of these species is considered extremely unlikely.

Table 3. Federally Protected Species in Comal County, Texas.

Common Name	Scientific Name	Federal Status
Golden-cheeked warbler	*Dendroica chrysoparia*	Endangered
Fountain darter	*Etheostoma fonticola*	Endangered
San Marcos salamander	*Eurycea nana*	Threatened
San Marcos gambusia	*Gambusia georgei*	Endangered
Comal Springs riffle beetle	*Heterelmis comalensis*	Endangered
Comal Springs dryopid beetle	*Stygoparnus comalensis*	Endangered
Texas blind salamander	*Typhlomolge rathbuni*	Endangered
Black-capped vireo	*Vireo atricapilla*	Endangered
Texas wild-rice	*Zizania texana*	Endangered
Cagle's map turtle	*Graptemys caglei*	Candidate
Peck's Cave amphipod	*Stygobromus pecki*	Endangered

The black-capped vireo is a migratory songbird present in Texas only during the breeding season. Vireos breed in the Trans-Pecos, Lampasas Cut-Plain, and Edwards Plateau regions of Texas. Typical vireo breeding habitat in central Texas consists of areas with thin soil and limestone bedrock that support scrubby vegetation dominated by broad-leafed shrubs. Foliage volume in vireo habitat is generally high from about eight feet in height down to ground level with a relatively open upper canopy layer. Vegetation within the study areas primarily consists of scattered live oak trees with very low densities of shrubs present in the understory. Because the volume of foliage within the shrub layer is very low, no suitable habitat for black-capped vireo is present in the study areas and occurrence of this species on or adjacent to the study areas is considered extremely unlikely.

The golden-cheeked warbler is also a migratory songbird present in Texas only during the breeding season. The known breeding range of the warbler is limited to central Texas. Typical warbler habitat consists of mature woodlands composed of a mixture of Ashe juniper, broad-leafed deciduous species, and live oak that possess a high percentage of canopy closure. The warbler requires large junipers as these trees provide strips of bark from which the birds make their nests. Occurrence of the golden-cheeked warbler within the study areas is considered unlikely because of lack of deciduous/coniferous trees and low percentage of canopy closure.

The Cagle's map turtle is restricted to portions of the Guadalupe and San Marcos rivers in central Texas. It is estimated that up to 70 percent of the entire population occupies the Guadalupe River between Seguin in Guadalupe County, and Cuero in Dewitt County. Populations in the Guadalupe River from Kerrville, Texas, to Canyon Lake are small and unevenly distributed. A small population is known from the San Marcos River in Gonzales County. Typical habitat for the species includes short stretches of shallow riffles with gravel or cobble substrate connected by pools approximately six to nine feet deep and with moderate flow. Fallen trees, logs, rocks, and cypress knees provide basking sites. Cagle's map turtles lay eggs in the late spring and early summer in nests excavated in sandy soils within approximately 30 feet of the river. This species is restricted to riverine habitats and as such is not expected to occur within the proposed study areas.

3.7 AIR QUALITY

Air quality is defined by ambient air concentrations of specific pollutants determined to be of concern with respect to the health and welfare of the general public. Under the Clean Air Act Amendments of 1990, the EPA established National Ambient Air Quality Standards (NAAQS), including six "criteria pollutants:" lead, ozone, sulfur dioxide, oxides of nitrogen, carbon monoxide, and particulate matter less than 10 microns in diameter (PM10). New standards for particulate matter smaller than 2.5 microns in diameter (PM2.5) have been proposed, and policies to implement the standards are in development. Areas that exceed a Federal air quality standard are designated as non-attainment areas. Canyon Lake lies within an area of attainment for all minimum air quality standards stipulated by the EPA.

3.8 NOISE

Noise-sensitive receptors are those locations where activities that could be affected by increased noise levels and include locations such as residences, motels, churches, schools, parks, and libraries. Existing noise levels are determined for the outdoor living area at sensitive receptors. The proposed study areas are not sensitive receptors and the dominant noise source is caused by use of motorized boats and personal watercraft.

3.9 CULTURAL RESOURCES

In 1949 archeological surveys were completed within the proposed Canyon Lake area. Before impoundment, twenty sites were examined for archeological resources, with three of the sites recommended for further study in the Texas Archeological Salvage Project. The Wunderlich, Footbridge, and Oblate sites are all multi-component Indian campsites that were excavated in 1959 and 1960. Artifacts that were recovered revealed intermittent occupations attributed principally to the Archaic Edwards Plateau Aspect and to a lesser extent the Central Texas Aspect. Unique cultural resources located on USACE project lands includes two original rock fences built by German settlers. The first agricultural settlements were made by German immigrants in the mid-1850's and included many small farms and a few large livestock ranches. None of these cultural resources are located within the proposed study areas.

No important paleontological assemblages or sites of National Register significance are known to occur in the Canyon Lake area, and additional surveys of known or unknown archeological sites are not planned for the immediate future. The Fort Worth District, Operation Division cultural resources specialist has reviewed the existing cultural resource information and study areas and has indicated there is no evidence that the proposed project would encounter any significant cultural resources. Coordination with the State Historic Preservation Office (SHPO) was also initiated by the USACE, Operations Division for a concurrence determination of "no impacts to historic resources".

3.10 SOCIOECONOMIC CONDITIONS

According to the United States Census Bureau, Comal County had a 2000 population of 78,021. Of this population, approximately 75 percent were of white (non-Hispanic) origin, 23 percent Hispanic, and the remainder black, Asian or American Indian. The average number of persons

per household in 2000 was 2.64, the median household income was $46,147, and the percentage of people in Comal County below the poverty level was 8.6%.

The area around Canyon Lake is unincorporated and is composed primarily of the communities of Sattler, Startzville, Cranes Mill, and Hancock. According to United States Census Bureau figures, the 2000 population of the Canyon Lake area was approximately 29,000. This represents an increase of roughly 100 percent from population estimates of 12,000 to 15,000 from the early 1980's. The Canyon Lake Chamber of Commerce expects population within the Canyon Lake area to double every 20 years. According to the Canyon Lake Chamber of Commerce, Canyon Lake supports a resort and tourist industry that attracts an estimated 1.1 million visitors per year. Canyon Lake provides a variety of recreational opportunities to the general public including fishing, boating, marinas, restaurants, and golf courses. The USACE operates eight public parks on Canyon Lake. Within the immediate area of Canyon Lake, the primary industrial and agricultural interests include cattle and goat ranching. Within a 50-mile radius, the major cities of San Antonio and Austin provide a wide range of activities including wholesale and retail business, industrial activity, mineral production, and educational institutions.

3.11 RECREATION AND OPENSPACE

Canyon Lake has eight operating parks: North Park, Jacobs Creek Park, Canyon Park, Potters Creek Park, Cranes Mill Park, Comal Park, Overlook Park and Guadalupe Park (**Figure 4**.) These parks contain a total of 1,626 acres and are classified for high intensity recreation activities. Canyon Lake also contains 718 acres of land that is classified for aesthetic purposes and is used for low intensity recreational needs and open space.

Canyon Lake has five commercial marina leases with a total of 961 boat slips. Canyon Lake Marina has 447 boat slips; Cranes Mill Marina has 250 boat slips; Fort Sam Recreational Area Marina has 81 boat slips; Randolph AFB Recreational Area Marina has 68 boat slips, and Lake Canyon Yacht Club Marina has 115 boat slips (**Appendix D**). The total number of wet slips was based on single-boat slips at commercial and private marinas.

There are currently 22 boat ramps located at Canyon Lake with 627 designated vehicle-with-trailer parking spaces and an estimated 130 vehicle-with-trailer overflow parking spaces (**Appendix D**). The total number of designated vehicle-with-trailer parking spaces was based on dimensions of existing paved boat ramp areas. The total number of vehicle-with-trailer overflow parking spaces was based on visual estimates of unpaved/unmarked areas where cars with trailers have been routinely parking. The December 1970 Updated Canyon Lake Master Plan estimated that the ultimate build out should occur around the year 2005 and at that time, 25 boat ramps would be needed to meet the public demand. The subsequent Fort Worth District WRDP, dated April 2002, superseded the Updated 1970 Canyon Lake Master Plan for use in estimating the ultimate build-out of boat ramps and the level of boating traffic at Canyon Lake.

The District WRDP sets a target of one boat per 22 surface acres of water during peak use periods. An analysis of all District lakes, based on findings from the Lewisville Lake WRRUS, was performed when the District policy came into effect and showed that the potential level of boating traffic at Canyon Lake was one boat per 7.90 surface acres of water (**Appendix D**).

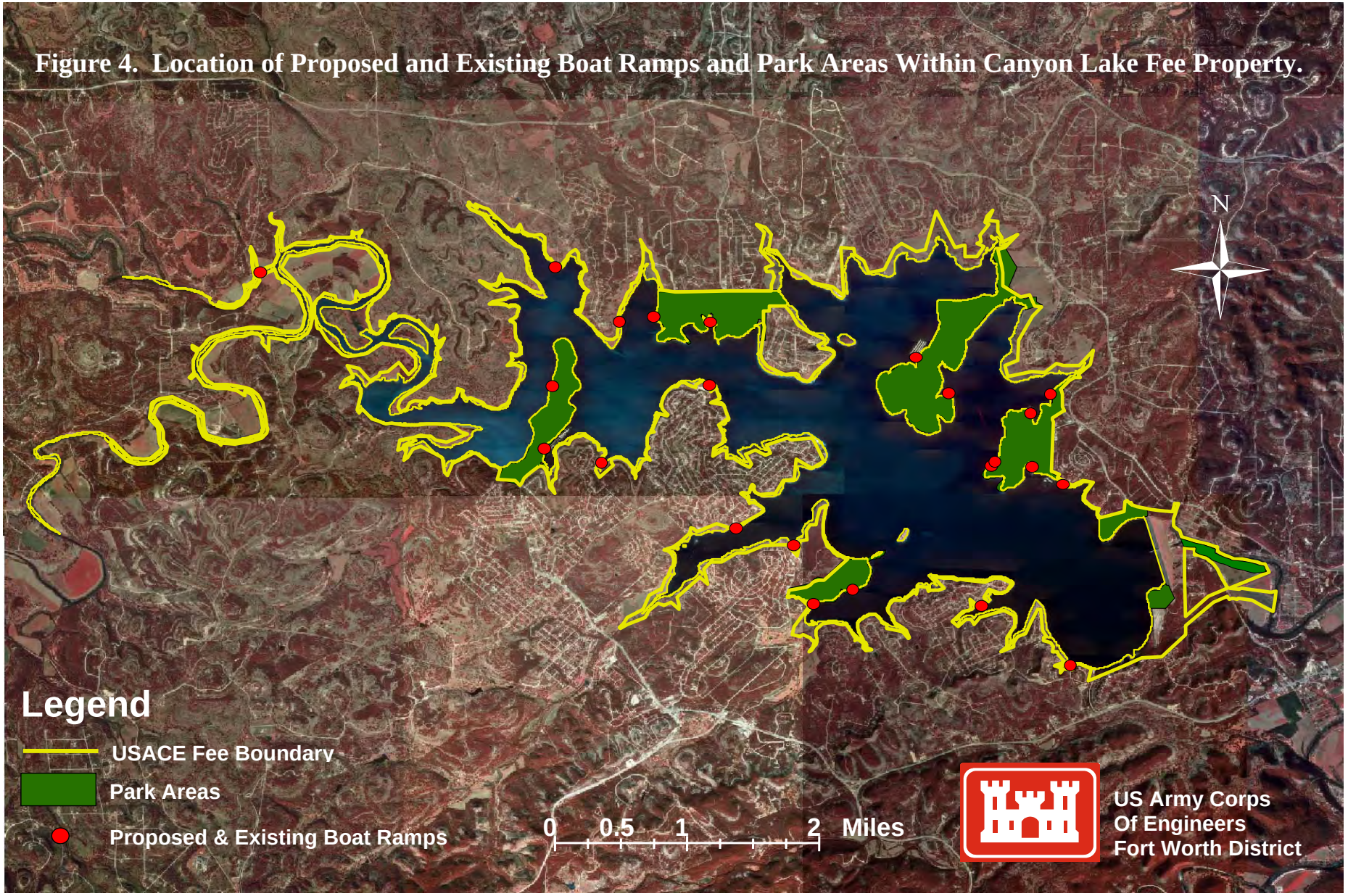


Figure 4. Location of Proposed and Existing Boat Ramps and Park Areas Within Canyon Lake Fee Property.

However, the data used in the analysis for Canyon Lake was based on an inaccurate count of designated and overflow vehicle-with-trailer boat ramp parking spaces and wet slips. Therefore, as part of this EA, a re-count was conducted, which revealed that there is a potential boating traffic level during peak use periods of one boat per 9.66 surface acres of water (**Appendix D**). In addition, a boat traffic count at Canyon Lake on Memorial Day Weekend (29 and 30 May 2004) indicated a ratio of one boat per 14.80 surface acres of water, which is a strong indication that boating traffic on the lake easily exceeds the District target for peak use periods.

The amount of vehicle-with-trailer overflow parking at existing Canyon Lake boat ramps was also assessed during the Memorial Day Weekend (29 and 30 May 2004) boat traffic count. The assessment indicated that the majority of existing boat ramps at Canyon Lake had significant vehicle-with-trailer overflow parking during this peak use period. Examples of vehicle-with-trailer overflow parking at the Comal County-Canyon Lake Forest Boat Ramp and the USACE-Potters Creek Boat Ramp are shown in the aerial photographs below. Unauthorized motor vehicle use, launching of personal watercraft, and other unauthorized uses have also occurred at the Cranes Mill Road Boat Ramp study area during peak use hours (see aerial photograph in **Appendix A**). Areas identified in the photographs provide examples of where parking control measures such as vehicle barriers, gated entry, and signage could be implemented to remove overflow parking in unauthorized areas.

Photograph 2. Aerial photograph of the Comal County-Canyon Lake Forest Boat Ramp on 29/30 May 2004 identifying vehicle-with-trailer overflow parking.

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Photograph 3. Aerial photograph of the USACE-Potters Creek Boat Ramp on 29/30 May 2004 identifying vehicle-with-trailer overflow parking.

3.12 HAZARDOUS MATERIALS

Canyon Lake has very little industrial or urban development upstream from the lake; therefore, inflows of highly polluted waters are not expected. Some polluted waters may enter the lake as runoff from agricultural and developed lands. The small sewage treatment plants at Fort Sam Houston Retreat Area and the GBRA's treatment plant at Hancock are potential sources of pollution. Both of the plants discharge treated wastes into the lake, but are unlikely to create hazardous conditions. In addition, recreational use of the lake contributes some human wastes, litter, and pollutants from motorboats and personal watercraft.

Large-scale applications of herbicides and pesticides on USACE property are regulated by the 1989 Canyon Lake Pest Control Program, and require application by a licensed pest control vendor. Approved herbicides and pesticides include AMDRO (for control of fire ants in high use park areas), AMMATE X-NI (for control of baccharis and Ashe juniper at riprap areas on the dam embankment and spillway), Isopropylamine salt of glyphosate (for control of Bermuda grass, sedges and other grasses in beach areas), and OUST (for control of Johnsongrass, foxtail,

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and other broadleaf weeds along road shoulders in park and maintenance areas). A review of existing Hazardous, Toxic and Radioactive Waste (HTRW) sources in the Canyon Lake area and site investigations did not identify any HTRW concerns within the proposed study areas.

3.13 FLOOD STORAGE CAPACITY

Construction of the Cranes Mill Road Boat Ramp would require the placement of approximately 5,700 cubic yards of fill material within the flowage easement, which would reduce the flood storage capacity of Canyon Lake. To insure a no net loss of flood storage capacity, Comal County would be required to offset the placement of this fill material. Comal County in cooperation with BGSWO proposes to compensate for the 5,700 cubic yards by receiving "credit" for fill material that BGSWO had previously removed from the flowage easement during development of the Mystic Shores Park residential area (see letter from BGSWO to USACE dated 23 September 2003, **Appendix F**).

Between March and May of 2002, as part of their plan to develop Mystic Shores Park, BGSWO removed an existing ranch road that crosses Suchie Creek within the Canyon Lake flowage easement (**Figure 5**). This work resulted in the excavation of approximately 15,634 cubic yards of material. Some of this excavation was done to offset the placement of 5,888 cubic yards of fill material within the flowage easement at BGSWO's Mystic Shores Park area, but the remaining 9,746 cubic yards of material was used in road construction above the flowage easement. BGSWO has agreed to allow Comal County to take credit for this material in the amount needed to offset the material that would be placed on the flowage easement as part of the Cranes Mill Road Boat Ramp project. The Fort Worth District, Operation Division has approved the proposed credit for the fill material that was previously removed from the flowage easement. Design templates for excavation and removal of fill material within the Suchie Creek Channel area are located in **Appendix B**.

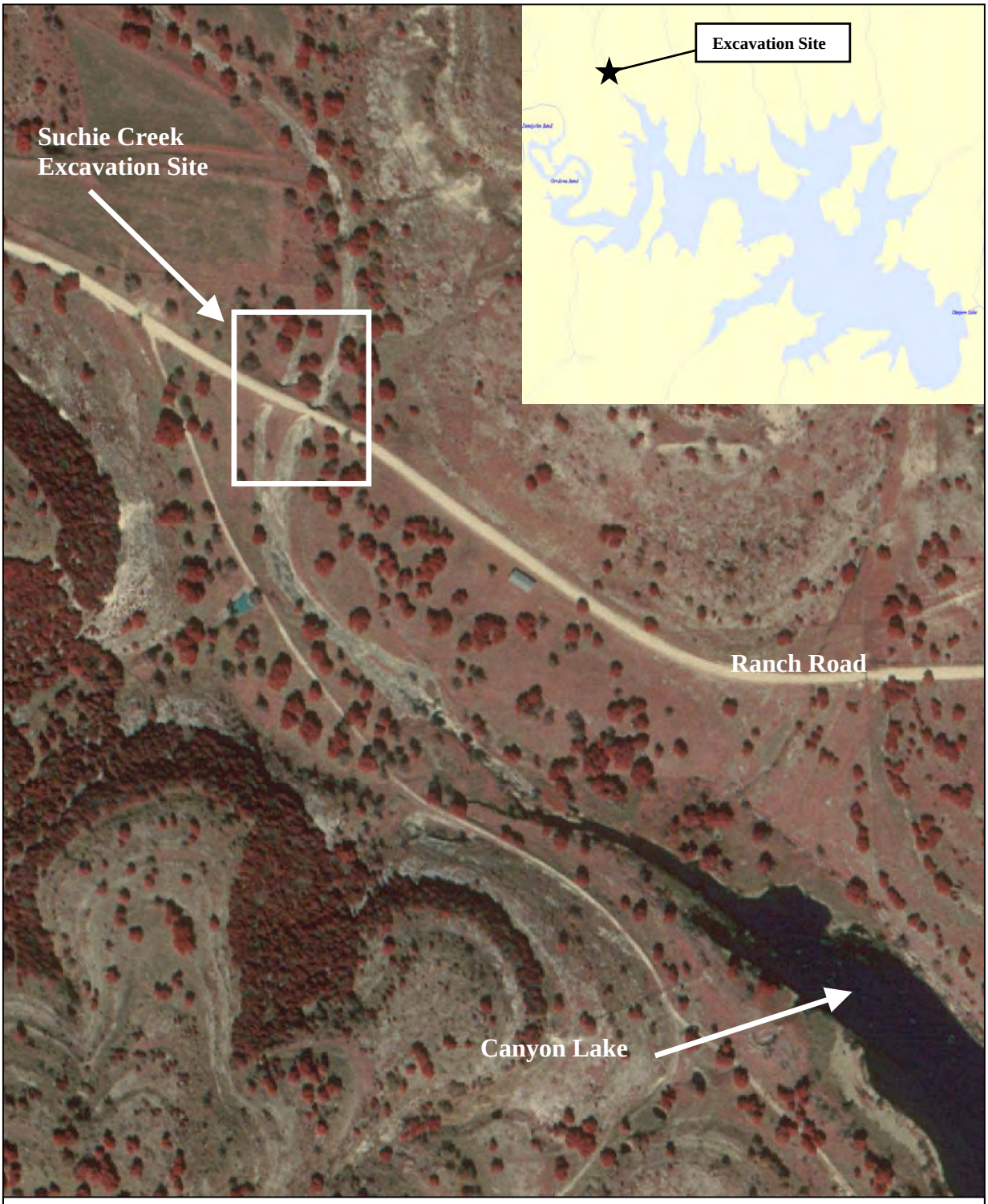

Figure 5
Location of Suchie Creek Excavation Site
Cranes Mill Road Boat Ramp
Canyon Lake, Texas

U.S. Army Corps
of Engineers
Fort Worth District

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4.0 ENVIRONMENTAL CONSEQUENCES

This section evaluates the potential environmental impacts of the proposed alternatives. The No Action plan is identified as Alternative 1. Implementation of the Cranes Mill Road Boat Ramp is identified as Alternative 2. Alternative 3 includes Alternative 2 along with the closure of the Canyon Lake Shores Boat Ramp. Alternative 4 has been identified by the USACE as the Preferred Alternative and includes implementation of the Cranes Mill Road Boat Ramp with renovation of the Cranes Mill Park Boat Ramp. This analysis includes likely beneficial and adverse effects on the human environment including short-term and long-term effects, direct and indirect effects, and cumulative effects. The analysis of impacts on resources focuses on environmental issues in proportion to their potential effects. Detailed consideration is given to those resources that have a potential for environmental effects. Interpretation of impacts in terms of their duration, intensity, and scale are provided where possible.

4.1 LANDUSE

4.1.1 Alternative 1 (No Action)

Under the No Action Alternative, there would not be any change in land use to USACE fee-owned property or privately owned flowage easement property. USACE fee owned property would continue to be classified as Aesthetics and Permanent Pool as outlined in the 1970 Updated Master Plan. Management options for both of these land use areas would continue to include minor land modifications to enhance fish and wildlife habitat, facilitate low intensity recreation, and to lessen soil erosion. Adjacent, privately owned property would continue to be classified as flowage easement lands with the same restrictions for development.

4.1.2 Alternative 2 (Cranes Mill Road Boat Ramp)

Under this alternative, the portion of USACE fee property located within the Cranes Mill Road Boat Ramp study area above 909 feet msl would be reclassified from Aesthetics land use to a Recreation area. As outlined in EP 1130-2-550, lands classified as Recreation are lands that are developed for intensive recreational activities by the visiting public, including developed recreation areas for concession, resort, and quasi-public development. The portion of the proposed project located below 909 feet msl would continue to be classified as Permanent Pool area. The 3.7 acres of privately owned flowage easement property located within the Cranes Mill Road Boat Ramp study area would continue to serve as a flowage easement and would be deeded to Comal County by the current owner, BGSWO. The USACE fee property located within the Cranes Mill Road Boat Ramp study area would be added to the existing USACE and Comal County lease agreement for maintenance and operation of the property as a boat ramp facility.

4.1.3 Alternative 3 (Alternative 2 With Closure of Canyon Lake Shores Boat Ramp)

Under this alternative, the lease agreements and deeds as well as land use changes and classifications at the Cranes Mill Road Boat Ramp study area would be the same as described in Section 4.1.2 above. In addition, the closure of the Canyon Lake Shores Boat Ramp would allow the land use classification to change from an Aesthetic area to a Multiple Resource Management area. As outlined in EP 1130-2-550, Multiple Resource Management areas are lands that are managed for one or more activities and may include minor land modifications to enhance fish and wildlife habitat, facilitate low intensity recreation, and protect/develop vegetative cover.

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4.1.4 Alternative 4 (Alternative 2 With Renovation of Cranes Mill Park)

Under this alternative, the lease agreements and deeds as well as land use changes and classifications at the Cranes Mill Road Boat Ramp study area would be the same as described in Section 4.1.2 above. In addition, the land use classification at the Cranes Mill Park Boat Ramp study area would be updated from Public Use area to a Recreation area. As outlined in EP 1130-2-550, lands classified as Recreation are lands that are developed for intensive recreational activities by the visiting public, including developed recreation areas for concession, resort, and quasi-public development.

4.2 GEOLOGY AND SOILS

4.2.1 Alternative 1 (No Action)

No direct, indirect, or cumulative impacts on geology and soils would occur under the No Action Alternative.

4.2.2 Alternative 2 (Cranes Mill Road Boat Ramp)

Minor, temporary, and localized impacts to water quality and clarity from construction related soil disturbances would likely occur at the Cranes Mill Road Boat Ramp study area, but would be minimized through the use of appropriate mitigation measures. Contractors would be required to have erosion control and hazardous spill prevention plans in place. Construction contractors would be required to comply with the Texas Pollution Discharge Elimination System (TPDES) for general construction activity. The TPDES permit process requires development and implementation of a SWPPP that describes the BMPs that would be employed before, during, and after construction to minimize erosion and runoff from construction activities.

4.2.3 Alternative 3 (Alternative 2 With Closure of Canyon Lake Shores Boat Ramp)

Potential impacts and mitigation requirements for Alternative 3 would be similar to those outlined in Section 4.2.2 above. In addition, minor soil disturbances would occur during the removal and relocation of existing recreational amenities at the Canyon Lake Shores Boat Ramp. Following removal of recreational amenities, bare soil would be planted with native vegetation to protect exposed soils and reduce the potential for erosion and subsequent lake sedimentation.

4.2.4 Alternative 4 (Alternative 2 With Renovation of Cranes Mill Park)

Under Alternative 4, potential impacts and mitigation requirements would be similar to those outlined in Section 4.2.2 above. Minor disturbances to soils would occur within the Cranes Mill Park Boat Ramp due to the installation of vehicle barriers and renovation of the existing boat ramp parking area. Additional benefits associated with this alternative would include reduced soil erosion and disturbance to existing boat ramp areas where unrestricted and overflow parking is no longer occurring.

4.3 AQUATIC RESOURCES

4.3.1 Alternative 1 (No Action)

No direct, indirect, or cumulative impacts on surface water, ground water, wetlands, or floodplains would occur under the No Action Alternative.

4.3.2 Alternative 2 (Cranes Mill Road Boat Ramp)

Site preparation, excavation, grading, and other construction related activities associated with Alternative 2 would result in minor soil disturbances to approximately five acres, which could result in temporary discharges of soil materials into Canyon Lake. Construction activities also have the potential to discharge hazardous substances into surface water, such as fuel, oil, grease, and other petroleum products that may be used during construction. Soil discharged into the lake can increase turbidity and increase sedimentation of habitat used by aquatic organisms. These impacts would be temporary and reduced to minor and less than significant with the mitigation measures described below.

Contractors would be required to have erosion control and hazardous spill prevention plans in place. Construction contractors would be required to prepare a TPDES stormwater plan for general construction activity. The TPDES permit process requires development and implementation of a SWPPP that describes the BMPs, such as use of silt fences, which would be employed before, during, and after construction to minimize erosion and runoff from construction activities.

No direct, indirect, or cumulative impacts to ground water would occur with implementation of Alternative 2. Proposed features of the Cranes Mill Road Boat Ramp would be located in Waters of the United States and would likely be authorized by a NWP #42 (Recreational Facilities) for discharges of dredged or fill material. Fringe wetland impacts would include the removal of approximately 6-8 buttonbush plants located along the shoreline of Canyon Lake. Minor negative impacts to water quality, due to increased emissions from boat engine exhaust, is also anticipated with implementation of Alternative 2.

4.3.3 Alternative 3 (Alternative 2 With Closure of Canyon Lake Shores Boat Ramp)

Potential impacts and mitigation requirements would be identical to those outlined in Section 4.3.2 above for construction activities at the Cranes Mill Road and Canyon Lake Shores Boat Ramps. No direct, indirect, or cumulative impacts to ground water or surface water would occur with implementation of Alternative 3. Impacts and mitigation requirements for Waters of the United States and wetland vegetation would be identical to those outlined in Section 4.3.2 above.

4.3.4 Alternative 4 (Alternative 2 With Renovation of Cranes Mill Park)

Under Alternative 4, potential impacts and mitigation requirements would be similar to those outlined in Section 4.3.2 above. Alternative 4 would also result in minor soil disturbances within Cranes Mill Park due to installation of vehicle barriers and renovation of the existing boat ramp parking area, which could result in temporary discharges of soil materials into Canyon Lake. Additional benefits associated with this alternative would include reduced disturbance to existing soil and vegetation at boat ramp areas where unrestricted and overflow parking is no longer occurring, thus reducing soil erosion and sedimentation of aquatic habitat. No direct, indirect, or cumulative impacts to ground water or surface water would occur with implementation of Alternative 4. Impacts and mitigation requirements for Waters of the United States and wetland vegetation would be identical to those outlined in Section 4.3.2 above.

4.4 BIOLOGICAL RESOURCES

4.4.1 Alternative 1 (No Action)

No direct, indirect, or cumulative impacts to vegetation, fish and wildlife species, and threatened and endangered species would occur under the No Action Alternative.

4.4.2 Alternative 2 (Cranes Mill Road Boat Ramp)

Site preparation and construction activities associated with Alternative 2 would result in the removal of approximately 10-15 mature live oak trees located on the privately owned flowage easement property within the Cranes Mill Road Boat Ramp study area (**Figure 3**). Approximately 4.0 acres of prairie habitat consisting of a mixture of switchgrass, bluestem, buffalograss, Indian grass, and several species of forbs would be replaced with concrete and asphalt surfaces.

The impacts of project construction activities on fish and wildlife species can be divided into short-term effects resulting from physical disturbance during construction and long-term effects resulting from habitat modification. Approximately 4 acres of prairie and savannah habitat would incur both short and long-term impacts. Species located within the footprints of the boat ramp and parking lot would incur long-term impacts due to the removal and replacement of existing habitat with concrete/asphalt surfaces. These species would likely relocate to another location adjacent to the study area where suitable habitat is available.

Short-term impacts from required clearing and construction-related activities would directly and/or indirectly affect most animals that reside or wander within the study area. The heavy machinery might kill some small, low-mobility animals such as mollusks, amphibians, reptiles, and mammals. Fossorial animals (i.e., those that live underground) such as mice and shrews may similarly be negatively impacted as a result of soil compaction caused by heavy machinery. Larger, more-mobile species such as fish, birds, deer, and raccoons may avoid the initial clearing and construction activities and move into adjacent areas outside the study area. Aquatic species may experience some additional impacts from decreased water quality due to increased turbidity associated with construction activities, but could temporarily relocate into undisturbed areas of the lake. To limit impacts to existing fish and wildlife resources, construction activities should occur at a time other than the spring spawning season when fish and wildlife are more vulnerable to disturbances in the environment. Overall, the net effect on local fish and wildlife species is expected to be minor. No impacts to threatened and endangered species are anticipated with implementation of Alternative 2.

4.4.3 Alternative 3 (Alternative 2 With Closure of Canyon Lake Shores Boat Ramp)

Under Alternative 3, potential impacts and mitigation requirements would be similar to those outlined in Section 4.4.2 above. Additional short-term impacts to vegetation and fish and wildlife would occur during relocation of recreational amenities at the Canyon Lake Shores Boat Ramp study area. Removal of existing recreational amenities and restoration of disturbed soil areas with native vegetation would create additional wildlife habitat for species adjacent to the study area. No impacts to threatened and endangered species are anticipated with implementation of Alternative 3.

4.4.4 Alternative 4 (Alternative 2 With Renovation of Cranes Mill Park)

Potential impacts and mitigation requirements associated with Alternative 4 would be similar those outlined in Section 4.4.2 above. Renovation of the existing parking lot within Cranes Mill Park would permanently convert approximately 0.3 acre of grassland habitat to a concrete surface. The control of overflow parking in non-designated areas would help reduce negative impacts from vehicle traffic such as vegetation disturbance and soil compaction. No impacts to threatened and endangered species are anticipated with implementation of Alternative 4.

4.5 AIR QUALITY

No direct, indirect, or cumulative impacts to air quality would occur under the No Action Alternative. Construction activities associated with Alternatives 2, 3, and 4 are expected to have only short-term and minor adverse impacts on local air quality. Such impacts would be primarily caused by increased emissions of carbon monoxide, hydrocarbons, and nitrous oxides from vehicles entering and exiting the site along with the operation of necessary equipment. Vehicle travel along unpaved road surfaces and excavation of bare ground surfaces would create fugitive dust emissions. In addition to fugitive dust, project construction activities would generate tailpipe emissions from mobile heavy equipment and increased vehicular traffic. In a regional context the daily equipment emissions associated with project construction, even during maximum-intensity work periods, would be relatively minor. Impacts on air quality would be less than significant. All construction-related activities on unpaved roadways and bare and dry soil would employ dust-suppression control measures, such as watering, to limit fugitive dust emissions.

4.6 NOISE

No direct, indirect, or cumulative noise impacts would occur under the No Action Alternative. Implementation of Alternative 2, 3, or 4 would result in temporary, minor to moderate, adverse noise impacts from heavy machinery during construction. These impacts would likely only affect boaters located especially near the shoreline. Residences to the north and east of the Cranes Mill Road Boat Ramp study area may be close enough to hear construction, but distance would likely be sufficient that these impacts would be negligible. Construction work would not be conducted on weekends when more visitors are present at the lake. Construction timing would be coordinated with the USACE to minimize impacts on special events. After construction is complete, an increase in noise associated with vehicle and boat traffic is anticipated in the immediate vicinity of the proposed Cranes Mill Road Boat Ramp, especially during peak use periods (i.e., weekends and holidays).

4.7 CULTURAL RESOURCES

The SHPO reviewed the results of the proposed project and issued a finding of "No Historic Properties Affected Project May Proceed" on June 1 2005. Because no cultural resources were identified within the study areas, no impacts on cultural resources are likely to occur under any of the proposed alternatives. In the event that archeological or paleontological deposits are encountered during the Cranes Mill Road Boat Ramp project, all construction activities in the immediate area would cease, accidental discovery procedures would be implemented in

accordance with the SHPO, and a thorough archeological investigation would be coordinated to determine the presence and type of resources that could be impacted by construction in the area.

4.8 SOCIOECONOMIC CONDITIONS

Implementing Alternatives 1, 2, 3 or 4 would have no effect on environmental justice because the project would be located entirely on Government fee and flowage easement land and construction of the proposed boat ramp would not disproportionately affect any low income or minority populations. Implementation of Alternatives 2, 3, or 4 would provide minor socioeconomic benefits to residents located in the northwest area of Canyon Lake by providing additional access to the lake and a shorter drive time to a boat ramp. Implementation of these alternatives could potentially have a negative economic impact to existing marina operators at Canyon Lake. Existing marina customers/tenants who live in close proximity to the proposed Cranes Mill Road Boat Ramp may choose to use the new ramp facility in lieu of renting a slip at a marina. Comal County could charge a use fee for any of the boat ramps they operate, including the proposed new boat ramp, but currently has given no indication that a use fee would be charged.

Implementation of Alternative 3 would require the closure of the Canyon Lake Shores Boat Ramp, which would likely have negative socioeconomic effects. Initial responses from residents within the Cypress Cove area indicated that they are strongly opposed to closure of the boat ramp. Closure of the boat ramp and relocation of recreational amenities to the Cranes Mill Road Boat Ramp would decrease access to Canyon Lake and increase drive time to a boat ramp for residents in the Cypress Cove area. Implementation of Alternative 4 would make the Cranes Mill Park Boat Ramp and parking area inaccessible to the general public during renovation activities.

4.9 RECREATION AND OPENSPACE

4.9.1 Alternative 1 (No Action)

Under the no action alternative, the members of Mystic Shores and the surrounding area would have to continue to use existing ramps at Canyon Lake Shores, Canyon Lake Yacht Club, or other facilities around Canyon Lake. No additional vehicle-with-trailer parking spaces would be created under this alternative. Unauthorized launching from the Cranes Mill Road shoreline area would likely continue, particularly during peak use periods.

Based on the total number of designated vehicle-with-trailer parking spaces (627), estimated vehicle-with-trailer overflow parking spaces (130), and boats from wet slips (96.1), the potential level of boating traffic on Canyon Lake was estimated at 9.66 surface acres of water per boat (**Appendix D**). This potential boat traffic value exceeds the District peak use period target of 22 acres per boat.

4.9.2 Alternative 2 (Cranes Mill Road Boat Ramp)

Under Alternative 2, Comal County would construct an additional boat ramp on Canyon Lake at the end of Cranes Mill Road raising the total boat ramp count from 22 to 23. Alternative 2 would create 30 designated vehicle-with-trailer parking spaces at the new boat ramp and eliminate 15 vehicle-with-trailer overflow parking spaces at the end of Cranes Mill Road for a

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total of 868 spaces (including overflow parking and wet slips). Alternative 2 would also create 52 additional vehicle-without-trailer parking spaces at the Cranes Mill Road Boat Ramp. The boat ramp would be a modern, state-of-the-art facility, complete with a courtesy dock, visitor parking, and one-way traffic flow.

Boating traffic on Canyon Lake would likely continue to exceed the District peak use target of 22 acres per boat and the problem would be exacerbated due to the net increase of 15 vehicle-with-trailer parking spaces, changing the potential boat traffic level to one boat per 9.49 surface acres of water (**Appendix D**). Unauthorized use of the shoreline around the Cranes Mill Road Boat Ramp study area would be controlled and limited to pedestrian access.

4.9.3 Alternative 3 (Alternative 2 With Closure of Canyon Lake Shores Boat Ramp)

Under Alternative 3, Comal County would close the existing boat ramp at Canyon Lake Shores and construct the Cranes Mill Road Boat Ramp, keeping the Canyon Lake boat ramp total at 22. Alternative 3 would include the removal of 20 designated vehicle-with-trailer parking spaces at the Canyon Lake Shores boat ramp, the creation of 30 designated vehicle-with-trailer parking spaces at the Cranes Mill Road Boat Ramp, and the elimination of 15 vehicle-with-trailer overflow parking spaces at the end of Cranes Mill Road. Alternative 2 would result in a net decrease of 5 vehicle-with-trailer parking spaces for a total of 848 parking spaces (including overflow parking and wet slips) at Canyon Lake. Alternative 3 would also create 52 additional vehicle-without-trailer parking spaces at the Cranes Mill Road Boat Ramp. The new boat ramp would be a modern, state-of-the-art facility, complete with a courtesy dock, visitor parking, and one-way traffic flow.

Boating traffic on Canyon Lake would likely continue to exceed the District peak use target of 22 acres per boat and the problem would be improved slightly by the net decrease of 5 vehicle-with-trailer parking spaces, changing the potential boat traffic level to one boat per 9.72 surface acres of water (**Appendix D**). Unauthorized use of the shoreline around the Cranes Mill Road Boat Ramp study area would be controlled and limited to pedestrian access.

4.9.4 Alternative 4 (Alternative 2 With Renovation of Cranes Mill Park)

Under Alternative 4, Comal County would construct an additional boat ramp on Canyon Lake at the end of Cranes Mill Road raising the total boat ramp count to 23. The boat ramp would have 30 designated vehicle-with-trailer and 52 designated vehicle-without-trailer parking spaces. Alternative 4 would also include the removal of 15 unauthorized overflow vehicle-with-trailer parking spaces at the end of Cranes Mill Road and 15 vehicle-with-trailer overflow parking spaces at the existing Cranes Mill Park Boat Ramp. Alternative 4 would result in a no net increase of vehicle-with-trailer parking spaces, maintaining a total of 853 parking spaces (including overflow parking and wet slips) at Canyon Lake. The new boat ramp would be a modern, state-of-the-art facility, complete with a courtesy dock, visitor parking, and one-way traffic flow.

Boating traffic on Canyon Lake would likely continue to exceed the District peak use target of 22 acres per boat, but the problem would improve as compared to alternative 2. By removing at least 30 vehicle-with-trailer overflow parking spaces, the potential boat traffic level of Canyon Lake would be maintained at one boat per 9.66 surface acres of water (**Appendix D**).

Unauthorized use of the shoreline around the Cranes Mill Boat Ramp study area would be controlled and limited to pedestrian access.

Through continued coordination between the USACE and Comal County, parking control measures such as vehicle barriers, enhanced surveillance, and gated access would also be considered to better manage water-oriented recreation at existing facilities. Similar management controls such as striping of existing parking spaces and signage identifying "Parking Only In Designated Areas" would be implemented and enforced at the new Cranes Mill Road Boat Ramp. Implementation of the parking control measures would likely result in a further reduction of boating traffic levels on Canyon Lake. The USACE also anticipates that some of the existing overflow use from other boat ramps may relocate to the proposed Cranes Mill Road Boat Ramp. This anticipated shift in recreational use patterns could result in a small net reduction in boating traffic on Canyon Lake.

4.10 HAZARDOUS MATERIALS

Implementation of Alternatives 1 through 4 would have no impact on hazardous waste conditions in or near the study areas. No hazardous sites were found within or adjacent to the proposed study areas. In the event that hazardous materials are encountered during the Cranes Mill Road Boat Ramp project, all construction activities in the immediate area would cease and accidental discovery procedures would be implemented in accordance with the USACE HTRW Center of Expertise guidelines and all applicable federal, state, and local environmental laws and regulations.

4.11 FLOOD STORAGE

With implementation of Alternatives 2, 3, or 4, Comal County would utilize the excess excavation from the Suchie Creek Channel area. The material would be used to mitigate for the placement of approximately 5,700 cubic yards of fill material within the Canyon Lake flood storage pool due to the Cranes Mill Road Boat Ramp project (**Appendix B**). Comal County has removed the concrete bridge structure, culverts, and embankments associated with the old ranch road crossing of the Suchie Creek Channel and has returned the land back to its original contours. The fill material was removed from the excavation area and disposed above the 948 feet msl contour.

5.0 CUMULATIVE IMPACTS

Cumulative effects are the direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action (40 CFR Part 1508.7). Guidance for implementing NEPA (CEQ, 1997) recommends that Federal agencies identify the temporal and geographic boundaries of the potential cumulative effects of a proposed action. For the purposes of this EA, the temporal boundary of analysis is from approximately 1999 to 2009. This boundary encompasses a range within which data are reasonably available and forecasts can be reasonably made. The geographic boundaries of analysis vary depending on the resource and potential effects. As such, they correspond to the analysis areas described under each resource.

Specific projects that are similar in size or scope or have the potential to cumulatively affect the resources evaluated for the project are identified in **Table 4** below. These projects are further described in the narrative following the table. Some resources would be affected by several or all of the described activities, while others could be affected very little or not at all.

Table 4. Past, Present, and Reasonably Foreseeable Activities, Canyon Lake, Texas.

Cumulative Action	Project Description	Past	Present	Future
GBRA Raw Water Intake	Pipeline and Intake Structure	✓	✓	
Future Residential Development	Residential Development		✓	✓
Canyon Lake Pool Raise	Seasonal 1-Foot Pool Raise			✓

GBRA Raw Water Intake. This project consisted of construction of an on-shore wet well and pump station located on Federal land in an undeveloped portion of Comal Park and a buried pipeline that would convey raw water off Federal land. Additional construction activities included fencing, site grading, access road, parking, electrical service entrance, electrical transformer, and telephone service. The EA and FONSI for this project were completed in April 2002 and the project is currently under construction. Based on the environmental resources and Alternatives outlined in this EA, no cumulative impacts are likely to occur through implementation of this project and any of the Cranes Mill Road Boat Ramp alternatives.

Future Residential Development. The proposed Cranes Mill Road Boat Ramp is located adjacent to the Mystic Shores residential development near the northwestern portion of Canyon Lake. Development will continue in the Mystic Shores area as well as numerous other residential developments in other areas surrounding Canyon Lake. Potential cumulative impacts associated with implementation of the Cranes Mill Road Boat Ramp project and increased residential development in the area include: a greater area of non-permeable surfaces, increased surface runoff into Canyon Lake, an increase in land values, and the potential for increased recreational use of Canyon Lake. Implementation of Alternatives 3 and 4 would help improve overflow parking conditions at Canyon Lake, and help maintain the existing level of recreational boating use on the lake.

Canyon Lake Seasonal 1-Foot Pool Raise. The GBRA is requesting USACE to hold and slowly release one foot of floodwater (between elevations 909 and 910) in Canyon Lake starting in mid April through September of each year if water is available. This delayed release of impounded floodwater is anticipated to have recreational and water supply benefits. An EA would be required to address the impacts if a memorandum of agreement is entered into between GBRA and USACE to seasonally raise Canyon Lake one foot. Implementation of the Cranes Mill Road Boat Ramp has the potential to increase boat and personal watercraft use within the immediate vicinity of the proposed boat ramp. Implementation of the 1-foot pool raise would inundate new shoreline areas of Canyon Lake. Together, the two projects could increase wave action and disturbance of new shoreline areas, which could result in a negative cumulative effect of increased shoreline erosion. However, the shoreline erosion and subsequent sedimentation within the study areas is not anticipated to be significantly greater than in other areas of the lake.

6.0 MITIGATION

6.1 SECTION 404

Adverse impacts to Waters of the United States would be avoided and minimized to the extent practicable. The need for compensatory mitigation for adverse impacts to Waters of the United States is not anticipated. Comal County would be required to abide by the conditions set forth in the NWP.

6.2 VEGETATION

All of the significant vegetation impacts occur on privately owned flowage easement property. The USACE would recommend to Comal County that removed live oak trees located within the flowage easement property of the study area be replaced with seedlings at a 2 to 1 ratio along the 924 to 934 feet msl contour. Wetland impacts would include the removal of approximately 6-8 buttonbush plants located along the shoreline of Canyon Lake. Mitigation for loss of wetland vegetation would include the replacement of buttonbush along adjacent shoreline areas of Canyon Lake.

6.3 FLOOD STORAGE

To mitigate for the placement of approximately 5,888 cubic yards of fill material from the Mystic Shores Park development project, Comal County has removed an existing private ranch road that crosses Suchie Creek. Comal County has removed the concrete bridge structure, culverts, and embankments associated with the Suchie Creek Channel crossing (15,634 cubic yards of fill material) and have disposed the material above the 948 feet msl contour. Comal County would use the excess excavation material (9,746 cubic yards) to mitigate for the 5,700 cubic yards of fill material from the Cranes Mill Road Boat Ramp project.

6.4 OTHER NEEDS

To reduce impacts to soil and water resources, contractors would be required to have erosion control and hazardous spill prevention plans in place. Construction contractors would be required to prepare a TPDES stormwater plan for general construction activity. The TPDES permit process requires development and implementation of a SWPPP that describes the BMPs that would be employed before, during, and after construction to minimize erosion and runoff from construction activities. Dust suppression control measures could be utilized to limit fugitive dust emissions during construction. Construction activities would be coordinated with the USACE to reduce potential noise impacts to Canyon Lake users and area residents.

7.0 PERMITS

7.1 CLEAN WATER ACT / STORM WATER REQUIREMENTS

The CWA makes it unlawful to discharge storm water from construction sites into Waters of the United States unless authorized by the EPA's NPDES General Permit. A Notice of Intent (NOI) is required for projects that disturb five acres or more of land. The proposed project design does not exceed the five acres of disturbance; therefore, an NOI would not be required. A SWPPP would be posted at the construction site describing the BMPs that would be employed before, during, and after construction to minimize erosion and runoff from construction activities.

7.2 CLEAN WATER ACT / POINT SOURCE DISCHARGES

Construction contractors would be required to have emergency spill and prevention plans in place during construction activities to reduce the potential for accidental discharge of hazardous substances into surface water, such as fuel, oil, grease, and other petroleum products that may be used during construction.

7.3 CLEAN WATER ACT / SECTION 404

Section 404 of the CWA regulates discharges of dredged or fill material into Waters of the United States including discharges associated with development. A permit must be obtained from the USACE, Regulatory Branch, prior to such activities. Canyon Lake is considered Waters of the United States and is protected under Section 404 of the CWA as administered by the USACE. In order to comply with the regulations of the CWA, a NWP #42 (Recreational Facilities) would be utilized for the proposed project. Nationwide Permits are a type of general permit designed to authorize certain activities that have minimal adverse effects on the aquatic environment and generally comply with the related regulations cited in 33 CFR 320.3.

7.4 EASEMENTS

The proposed project would require the out-granting of USACE fee-owned property and issuance of a boat ramp easement to Comal County. Issuance of the easement would be conducted by the USACE, Real Estate Division, prior to implementing construction activities associated with the Cranes Mill Road Boat Ramp project. Coordination with the USACE, Operations Division, is also required to ensure that activities and structures occurring on privately owned flowage easement property would not adversely affect the ability to operate Canyon Lake in accordance with authorized purposes. Prior to issuance of the Real Estate easement to Comal County, the USACE would require an approved SWPPP. The USACE, Operations Division would be responsible for overseeing proper execution of the SWPPP and associated BMP's on USACE property during implementation of construction activities.

7.5 RECREATION

A WRRUS, as required by the WRDP, was not completed as part of this EA process. Instead, in accordance with the exception clause in the WRDP, an exception would be granted based on implementation of the preferred alternative (Alternative 4).

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8.0 FINDINGS AND CONCLUSIONS

The proposed alternatives for the Cranes Mill Road Boat Ramp project have been evaluated in this EA. The preferred alternative would not have any significant impacts to the social, economic, or human and natural environment. No significant habitat for threatened or endangered species was identified within the study areas. No significant buildings or man-made structures of historical value were identified within the subject areas or on adjacent properties. No significant archeological properties or hazardous waste concerns were identified within the study areas.

Minor impacts to fish and wildlife habitat would occur on USACE fee-owned property and privately owned flowage easement property. Minor impacts to Canyon Lake water quality would be minimized and controlled using temporary erosion and sedimentation control structures. In the event that hazardous materials or archeological deposits are discovered during construction, all actions would cease and compliance with local, state, and Federal regulations would ensue. Comal County would utilize excess excavation from the Suchie Creek Channel area to mitigate loss of Canyon Lake flood storage capacity. The proposed project would assume a NWP #42 (Recreational Facilities) for removal and placement of dredged or fill material associated with installation of the boat ramp facility.

Taking into account the District's WRDP, the preferred alternative would maintain the status of potential boat traffic levels during peak use periods at Canyon Lake at one boat per 9.66 surface acres of water. This is based on the removal of 15 unauthorized overflow vehicle-with-trailer parking spaces at the end of Cranes Mill Road and 15 vehicle-with-trailer overflow parking spaces at the existing Cranes Mill Park Boat Ramp. However, since the current level of boating traffic at Canyon Lake is estimated to be below the WRDP policy level of 22 surface acres of water per boat, approval of the preferred alternative would require a policy exception with signatures from the Chief, Operations Division and the Chief, Real Estate Division. The Final Policy Exception Memorandum would be signed and executed following the NEPA 30-day public review period. With regards to future actions and new development at Canyon Lake, this EA would stipulate that a WRRUS would be required for any future actions that impact the level of boating traffic, even if the action results in a positive, negative, or no-net-change in surface acres of water per boat.

Based on the findings in this EA, an Environmental Impact Statement (EIS) would not be necessary. As such, a draft Finding of No Significant Impact (FONSI) was prepared for the preferred alternative.

9.0 PUBLIC INVOLVEMENT

9.1 AGENCY COORDINATION

This section outlines the consultation and coordination that occurred during preparation of this document. This includes contacts made during development of the proposed action, other alternatives considered, and writing of the EA. Copies of agency coordination letters are presented in **Appendix F**. Formal and informal coordination was conducted with the following agencies:

United States Army Corps of Engineers (USACE, Fort Worth District),
Comal County,
State Historic Preservation Office (SHPO),
United States Fish and Wildlife Service (USFWS),
Region 6 Office, Environmental Protection Agency (EPA),
Texas Parks and Wildlife Department (TPWD), and
Texas Commission on Environmental Quality (TCEQ)

9.2 PUBLIC INFORMATION AND REVIEW

In accordance with NEPA, a 30-day review period of the draft EA would be provided via a Notice of Availability (NOA) in the local newspaper, via the Regulatory Branch-county mailing list, on the Fort Worth District website, at the Canyon Lake Project Office, and at a local library. Upon completion of the public review process, all public comments and USACE responses to comments would be presented in **Appendix F** of this document.

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