

**DRAFT  
ENVIRONMENTAL ASSESSMENT**

**WHITE BLUFF MARINA  
WHITNEY LAKE, HILL COUNTY, TEXAS**



*Prepared for*

**Whitney Lake Project Office**

*by*

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

**January 2011**



DRAFT

FINDING OF NO SIGNIFICANT IMPACT  
ENVIRONMENTAL ASSESSMENT  
WHITE BLUFF MARINA  
WHITNEY LAKE, HILL COUNTY, TEXAS

**Description of the Action:** The proposed action involves federal interest in property and changes to the current lease agreement between USACE and Double Diamond, Inc, therefore requiring compliance with the National Environmental Policy Act (NEPA) of 1969. The United States Army Corps of Engineers (USACE) has assessed potential impacts to the environment that may result from the proposed expansion of the White Bluff Marina at Whitney Lake, Hill County, Texas. The existing marina consists of 67 wet slips, 18 courtesy slips, a boat ramp, and a boat fueling point within a protected cove of Whitney Lake. The current White Bluff Marina lease (held by Double Diamond, Inc.) allows the marina to expand up to 190 boat slips. The proposed action (Alternative 2) would add to this, resulting in up to 300 boat slips with an additional 30 courtesy slips within the cove. Alternative 2 would accommodate boat sizes up to 40 feet in length, create additional parking, and convert the currently private White Bluff Yacht Club to a public marina. The primary purpose of the proposed action is to expand the existing yacht club to create a public marine open to the general public.

**Alternatives Considered:** The Environmental Assessment (EA) evaluated the environmental impacts associated with three alternatives and a No-Action Alternative. In addition to the preferred Alternative 2, the EA examined impacts from converting the private marina to a public facility and expanding to 190 boat slips (Alternative 1). Alternative 3 would create a new marina with up to 511 boat slips on the main body of Whitney Lake just outside the existing marina cove. Also considered was a dry storage alternative, but this option was not carried forward in the environmental analysis because it was determined not to be viable because it fails to address the primary project need of creating additional wet boat slips in this part of Whitney Lake.

**Anticipated Environmental Effects:** Implementation of the proposed action would require 9.3 acres of lake surface within the existing cove for the floating marina. Impacts to waters of the U.S. under Section 404 of the Clean Water Act would be addressed by Nationwide Permit 25. Construction of the docks, parking lots, and access walks would not result in loss of any lake flood storage capacity. Construction of paved surfaces would replace 1.1 acres of USACE land, all of which is dominated by grass vegetation. Parking lots and walkways would be designed to avoid mature trees on USACE property. Areas of temporary disturbance would be revegetated with native vegetation. Minor adverse environmental impacts would occur to waters of the U.S., water quality, terrestrial vegetation, noise and general aesthetics, and air quality within USACE property. No impact or negligible impacts were assessed for climate, geology and soils, wetlands, flood storage, wildlife and fish, aquatic vegetation, threatened and endangered species, cultural resources, hazardous, toxic, and radioactive wastes, Native American concerns, environmental justice, and indirect and cumulative impacts. Substantial benefits to recreation and local area socioeconomics were assessed.

**Finding:** As Double Diamond owns all privately-owned land surrounding the marina, a waiver of competition under Section 8-105a of ER 405-1-12 is appropriate and hereby authorized, and the White Bluff Marina may be characterized in lease documents as a public facility and operated accordingly.

**Facts and Conclusions:** Based on a review of the information contained in the EA, it is determined that the implementation of the White Bluff Marina Alternative 2 expansion 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. Therefore, the preparation of an Environmental Impact Statement is not required.

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Richard J. Muraski, Jr.  
Colonel, Corps of Engineers  
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Date

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## **EXECUTIVE SUMMARY**

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act of 1969 (NEPA) to address the potential effects, beneficial and adverse, associated with changing the current lease agreement between the U.S. Army Corps of Engineers (USACE) with Double Diamond, Inc. (Double Diamond) to allow the proposed conversion to a public facility and expansion of the private marina at White Bluff Resort on Whitney Lake, Hill County, Texas. The expansion would be financed and constructed by Double Diamond, owner of the White Bluff Resort. The existing facility consists of 67 wet slips, 18 courtesy slips, a boat ramp, and a boat fueling point within a protected cove of Whitney Lake. The existing marina comprises an area of 21.2 acres, of which 11.9 acres is on land and 9.3 acres is water surface area within a lake cove. This location within the cove affords the marina protection from the currents on the main body of the lake. The current USACE lease with Double Diamond authorizes up to 190 boat slips in the existing marina.

### **Purpose and Need**

Double Diamond has proposed to increase the number of wet boat slips at White Bluff Marina and convert the marina into a public facility. The purpose of these actions is to create a modern, upscale marina facility to complement nearby luxury lodging, dining, and recreation amenities of the White Bluff Resort and attract new customers to these public facilities. A study of regional demographics related to the potential boat rental market concluded there is a significant demand for the storage of relatively large boats (i.e., 20 feet to 40 feet in length) within the 22 counties that surround Whitney Lake. This demand, the scenic qualities of the lake, and a review of the number of people with sufficient income to afford boats and the White Bluff Resort amenities collectively serve to support the major investment needed to create a larger and more modern marina. In addition, the existing marina runs at or near capacity throughout the year and there is a waiting list of at least 30 people for wet boat slips.

### **Alternatives Considered**

Three alternatives were evaluated in the EA, in addition to the No-Action Alternative. The No-Action Alternative assumes that the marina would remain a private facility, available only to property owners within the White Bluff Resort. In addition, this alternative includes the possibility of adding 105 more boat slips under the terms of the existing lease, and impacts related to this aspect of the No-Action Alternative have been evaluated. Alternative 1 is similar

to the No-Action Alternative, except that it assumes the marina would be converted to a public facility with a maximum of 105 additional boat slips. Alternative 2 involves the expansion of the existing marina within the cove with the potential maximum buildout of 300 wet boat slips and 30 courtesy slips. Construction of Alternative 2 would include two parking lots near the cove to provide ready access to the new facility. Alternative 3 would move the existing rental slips out onto the main body of the lake and expand the marina to a potential maximum buildout of 499 wet boat slips with 12 courtesy slips. Alternative 3 would also include the construction of parking lots, sidewalks, restrooms, and a new ship's store with fuel dock. Utilities would be re-routed to service these facilities, and a fuel line would be extended from the existing marina to the location of the new ship's store. Also considered was the option of adding boat storage capacity by building a dry storage facility. This alternative was determined not to be viable because it fails to address the primary project need of creating additional wet boat slips in this part of Whitney Lake.

### **No-Action Alternative**

Although the No-Action Alternative includes the option of expanding the existing marina to a maximum of 190 boat slips, it is not considered to be a viable alternative from a business standpoint. Simply adding more boat slips in response to property owner demand within White Bluff Resort would not provide sufficient return on the investment. Converting the marina to a public facility must be accompanied by construction of a modern marina of sufficient capacity with emphasis on larger boats, and marketing both the marina and resort amenities. The adverse environmental impacts of this alternative would be negligible to minor, but the required beneficial economic benefits needed to justify the investment would not be sufficiently strong to warrant selection of this alternative.

### **Alternative 1**

As with the No-Action Alternative, converting the private marina to a public facility would allow increasing the number of slips to 190 and result in similar impacts. However, this alternative is not preferred because it would not provide sufficient economy of scale to warrant the investment.

### **Alternative 2 (Preferred)**

Alternative 2 would be constructed entirely within the limits of the existing lease. This alternative would have either no impacts or negligible adverse impacts regarding the following:

climate; geology and soils; wetlands; flood storage capacity; wildlife and fish; aquatic vegetation; threatened and endangered species; cultural resources; hazardous, toxic, and radioactive wastes; Native American concerns; environmental justice; and indirect and cumulative impacts. Minor adverse impacts are expected for the following: waters of the U.S.; water quality; terrestrial vegetation; noise and general aesthetics; and air quality. Substantial benefits to lake recreation and local area economics would be anticipated.

### **Alternative 3**

Alternative 3 would encompass 18.0 total acres of water surface area on the main body of Whitney Lake and require the addition of 2.9 acres of USACE land to the land and water covered by the existing marina lease. Construction of parking areas and access roads and walkways would require the paving of 2.1 acres of maintained grass, and less than 0.1 acre of combined upland forest and rock from limestone outcroppings. An additional 0.9 acre of grass-dominated land on adjacent private property would be required for parking and access paths, restrooms, and walkways. Impacts to a grass-dominated flood storage mitigation area on private land could result in an additional acre of impacts to vegetation. Otherwise, the impacts of this alternative would be as stated above for Alternative 2. Concerns related to lake currents indicate further study of lake hydraulics would be necessary before pursuing the option of placing a marina on the main body of the lake near White Bluff.

### **Regulatory Requirements**

A change in the status of the marina from private to public would be authorized under the USACE policy for outgrants of federal land for recreational purposes (ER 1130-2-550). The existing lease would need to be modified to reflect this change in the status. For Alternatives 2 and 3, construction of up to 190 boat slips would be authorized under the limitations of the existing lease, but the regulation would require USACE approval of market and feasibility studies before additional slips could be approved. In addition, altering the existing lease to create a public marina requires the Fort Worth District Engineer to approve a waiver under ER 405-1-12 regarding competition in awarding concessions on USACE property. Under Section 8-105a of this regulation, waiver of competition is appropriate for White Bluff Marina because the only means of access to the marina is across land owned by Double Diamond.

Compliance with Section 404 of the Clean Water Act is required because all alternatives could result in the placement of concrete anchor blocks below the ordinary high water mark of

Whitney Lake. Regional General Permit 8 would address this potential fill from marina expansion that could occur under both the No-Action Alternative and Alternative 1. The deposition of anchorage for Alternatives 2 and 3 would be authorized by Nationwide Permit 25 because the volume of anchor blocks for these alternatives exceeds the fill volume limits of the regional permit.

Coordination regarding cultural resources (Texas Historic Preservation Officer) has been completed. Coordination regarding biological resources (Texas Parks and Wildlife Department, and U.S. Fish and Wildlife Service), and Indian tribes would be conducted by USACE as part of the public involvement commitment for this project. In addition, local residents would be contacted with information regarding the project.

### **Conclusion**

The preferred alternative proposed action, Alternative 2, would be constructed in phases based upon demand. Construction of the project would be funded entirely by Double Diamond and would not require the expenditure of federal funds. No significant adverse environmental impacts were determined for any of the resources or environmental issues evaluated. Based on the findings within this EA, the proposed project would not be a major federal action. A Finding of No Significant Impact is appropriate for this proposed action, and a Notice of Intent to prepare an Environmental Impact Statement is not warranted.

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## ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AOI	Area of Interest (for Indirect Impacts Analysis)
BCV	Black-capped vireo
BMP	Best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CRASR	Center for Reservoir and Aquatic Systems Research, Baylor University
CTMP	Clean Texas Marina Program
dB	Decibel
dBA	A-weighted decibel level
dbh	Diameter at breast height
EA	Environmental assessment
e.g.	<i>exempli gratia</i> (for example)
EPA	U.S. Environmental Protection Agency
EO	Executive Order
EOR	Element occurrence record
ER	Engineering Regulation
ESA	Endangered Species Act
et al.	<i>et alia</i> (and others)
FEIS	Final environmental impact statement
FESWMS	Finite Element Surface Water Modeling System
FM	Farm-to-market road
FONSI	Finding of no significant impact
GCW	Golden-cheeked warbler
HHS	U.S. Department of Health and Human Services
HTRW	Hazardous, Toxic, and Radioactive Waste
i.e.	<i>id est</i> (that is)
MSL	Mean sea level
NDD	Natural Diversity Database
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Permit
PST	Petroleum storage tank
RGP	Regional General Permit
SH	State Highway
SW3P	Storm water pollution prevention plan
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TPDES	Texas pollution discharge elimination system
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
U.S.	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

## **ACRONYMS AND ABBREVIATIONS**

UST                      Underground storage tank



## 1.0 INTRODUCTION

USACE has prepared this Environmental Assessment (EA) to comply with the requirements of the National Environmental Policy Act of 1969 (NEPA, 42 U.S. Code Sections 4321-4375), as implemented by Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) Parts 1500-1508) and USACE regulations (33 CFR Part 230). NEPA compliance is necessitated for this proposed project because the proposed expansion of the White Bluff Marina requires USACE to take the federal action of modifying an existing lease with Double Diamond, and NEPA requires an appropriate level of environmental evaluation before federal agencies may take actions such as this. The objective of this EA is to examine proposed alternative courses of action and determine whether any of the alternatives would result in an environmental impact that would significantly affect the quality of the human environment. If a finding of no significant impact (FONSI) may be made, then this EA will also select a preferred alternative for which a lease modification may be pursued.

### 1.1 PROJECT LOCATION AND BACKGROUND

Double Diamond Companies, Inc. (Double Diamond) has proposed to increase the number of boat slips authorized for the existing White Bluff Marina at Whitney Lake, Hill County, Texas. The White Bluff Marina encompasses approximately 21.2 acres of land and water owned by the U.S. Army Corps of Engineers (USACE), and is currently being operated under a 10-year lease (i.e., 2004 to 2014) held by the White Bluff Yacht Club, Inc. The White Bluff Yacht Club is a private club owned by Double Diamond, but it would be reorganized as a public marina prior to any expansion of the existing marina or construction of new facilities. This combination of converting to a public marina and expansion of the number of wet boat slips are the key components of Double Diamond's objective of creating a modern, upscale marina facility to complement nearby lodging and other amenities of the White Bluff Resort and attract new customers to these facilities.

The general location of the proposed project area is on the eastern shore of Whitney Lake near its northern end, shown in **Figure 1-1**. The existing facilities of the White Bluff Marina are located in a cove adjoining the main body of Whitney Lake by an inlet approximately 130 feet wide (see **Figure 1-2**). The marina consists of 67 wet slips, 18 courtesy slips, a boat ramp, 25 parking spaces for vehicles/boat trailers, and a boat fueling point within the protected cove (see **Figures 1-3** and **1-4**). These marina facilities have functioned in their present configuration since 1995, when the marina cove was dredged to an elevation of 518 feet above mean sea

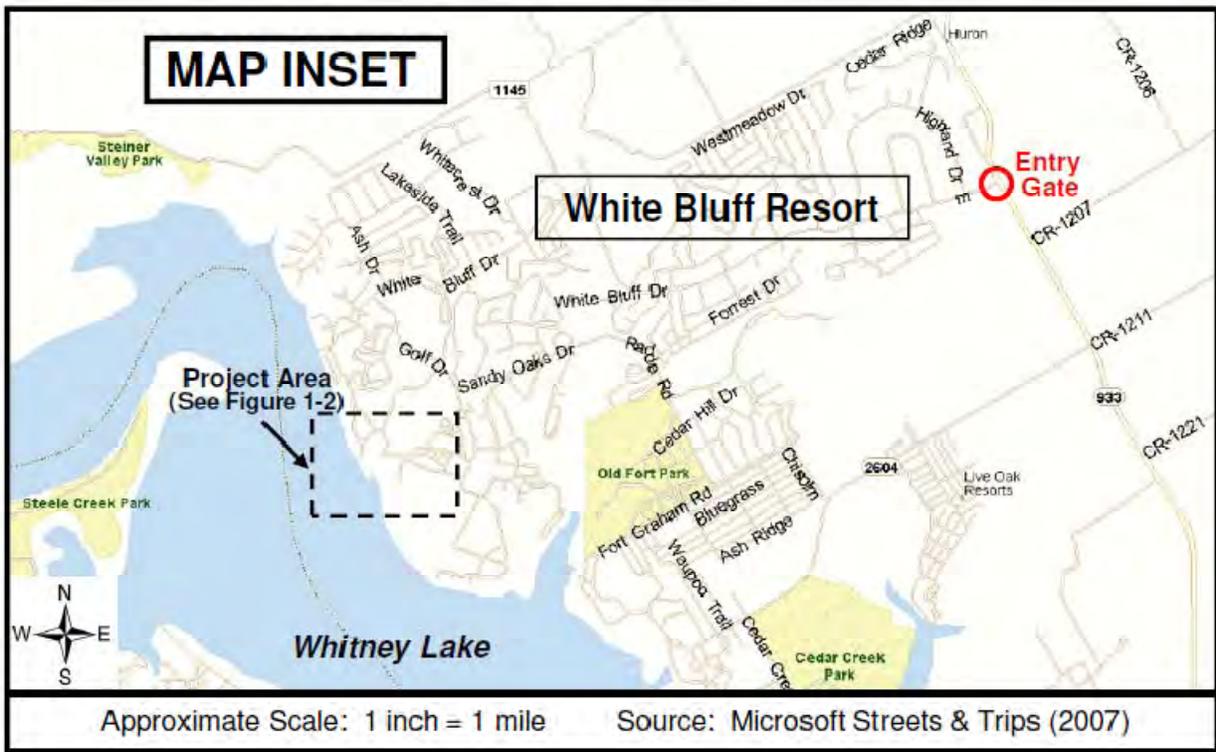
level (MSL). The USACE lease with Double Diamond allows for up to 190 wet slips inside the cove and provides for dredging the cove deeper to handle larger boats and to allow for better movement of vessels into and out of the cove during periods of lower water levels. Double Diamond again completed dredging of the cove to 518 feet above MSL in early 2009 (USACE, 2009).

The White Bluff Resort is a gated community comprised of a variety of facilities that are available to residents as well as the general public (Double Diamond, 2010). Luxury amenities that overlook Whitney Lake include a 28-room inn, an upscale restaurant, and spa and fitness centers. Other modern resort amenities available to the public include several dozen one- and two-bedroom condominiums, as well as log cabins, all near one of the two scenic 18-hole golf courses. Although rental of the marina boat slips is restricted to members of the White Bluff Resort community, the boat ramp is open to the public, as are the fueling station and nearby convenience store. Members of this community gain entry by displaying decals or passes issued to property owners, employees, or concessionaires. Nonmembers who wish to use resort amenities available to the public may receive a day-pass at the gate after providing identification information and upon specifying the purpose of their visit.

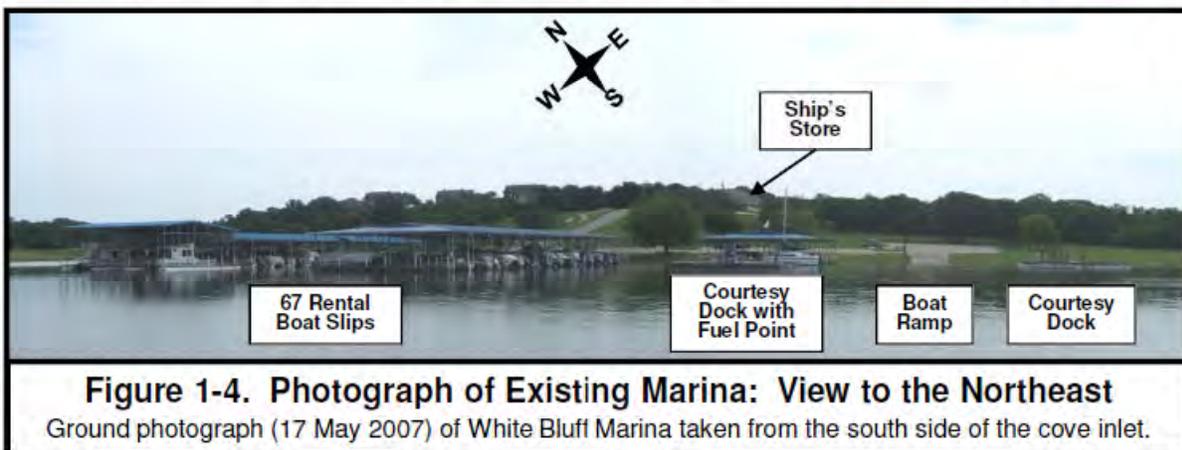
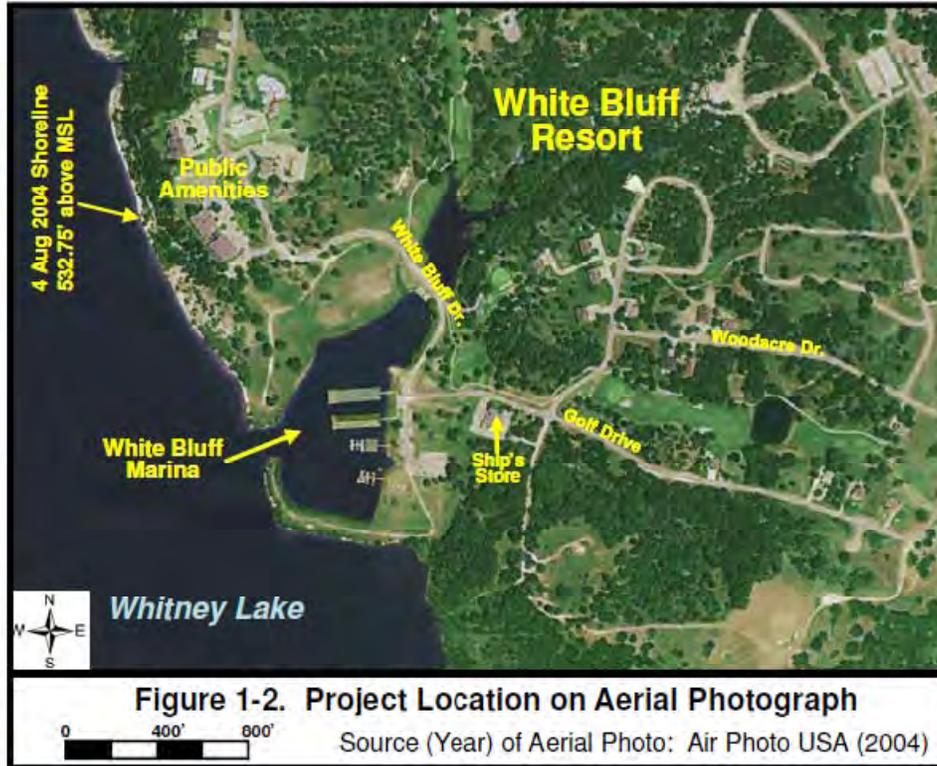
The publically-available resort amenities described above are part of the larger community which is a 3,450-acre master planned development with a residential community with over 5,500 residential building lots, most of which have been sold (Double Diamond, 2010). Nearly 560 residences have been constructed within the development, and much of the marina demand stems from the influx of nearby residents. Currently, most of the White Bluff Resort property owners who rent a boat slip in the marina live outside the area.

The White Bluff Marina operates year round and, as a private yacht club, is available only to owners of real property within the White Bluff residential community. There is a gasoline fueling point located at the lakeside end of one of the two docks with courtesy slips, which is proximate to the boat ramp in the cove. A ship's store (White Bluff Marina Market) is located on land approximately 500 feet northeast of the boat ramp, which sells fish bait and tackle, fuel, food, and beverages (including beer and wine), and provides clean restroom facilities for marina guests. The marina has 64 covered 24-foot slips, and three 40-foot slips. None of the 18 courtesy slips is covered.

The marina has been at maximum capacity in recent years, with a growing waiting list of over 30 people who have requested wet boat slips. It is expected that the demand is greater than that reflected on the waiting list, and that the interest in boat slips would increase if additional wet storage capacity were to be made available. Under the terms of the marina lease with USACE, Double Diamond may increase the number of boat slips in the White Bluff Marina cove to 190. However, as discussed in the next section, Double Diamond's proposed improvements to the marina focus on attracting boat owners who are not White Bluff area property owners, while also addressing the demand for additional slips by people eligible for membership in the existing private yacht club.



**Figure 1-1. Project Vicinity Map and Map Inset**



## 1.2 NEED FOR AND PURPOSE OF THE PROPOSED PROJECT

Rather than simply address the immediate need for wet boat slips of White Bluff Resort property owners as outlined above, Double Diamond's proposal is fundamentally based on business judgment that looks beyond the community's front gate. That is, converting the White Bluff Marina to a public facility, along with upgrading and expanding the number of boat slips, is directed toward creating demand within the major boating market of the 22 counties that surround Whitney Lake. The proposed changes to the existing marina would provide a new, high quality project that can attract more boaters and visitors to Whitney Lake and improve the economic impact of recreational boating in the Whitney Lake area. Moreover, the infusion of boat owners from outside the White Bluff Resort to use slips would be accompanied by economic benefits to the White Bluff Resort that would warrant the additional major investment required, and would provide the business economy of scale needed to support that investment. The economic feasibility of making the White Bluff Marina a public facility as well as increasing the number of slips were explored in a report that is in **Appendix A** (Hollin, 2007), and the discussion below largely summarizes key points made in that report. Although the report in **Appendix A** considered only the scenario involving a relocation and expansion of the existing marina outside the cove, the discussion of economic factors affecting the lake's boating industry are relevant to all alternatives addressed in this EA.

The Texas Parks and Wildlife Department (TPWD) anticipates an increasing demand for boat slips in the major boating market area represented by the 22-county area around Whitney Lake, and another 7,400 new boat registrations are projected by 2011 (Hollin, 2007). A review of area demographics strongly suggests that the combination of population growth in the region and household income would sustain a strong and increasing recreational boating industry. Not only is it likely that more people surrounding Whitney Lake will be buying boats in coming years, but these boats will be increasingly larger (i.e., longer than 20 feet). Improved facilities provided by a modern marina could attract more boaters to the lake and increase the overall economic impact of the marina industry by increasing both the level of service and the amount of money boaters are willing to spend on their boating experience. This attractiveness is enhanced by both the White Bluff Resort amenities nearby, the unique scenic qualities of the lake, and the relatively low boating density on the lake.

The expected economic synergy associated with improving the White Bluff Marina to attract boaters who would both enjoy Whitney Lake and the amenities of White Bluff Resort is further illustrated by considering existing marina facilities at Whitney Lake. There are four public

marinas and two major private marinas with approximately 525 wet slips at Whitney Lake, making it relatively low in terms of wet slip boat storage for Texas lakes (Hollin, 2007). While the public commercial marinas are older facilities with less than 100 boat slips and limited services, there has been some expansion of boat storage facilities. Since 2006 two Whitney Lake commercial marina owners have made changes in marina slip mix, size, and number of slips. The most dramatic changes have been at Lake Whitney Marina at Juniper Cove, which has grown from 85 wet slips to 130 wet slips by adding two new docks and larger covered slips (up to 60 feet) (Hollin, 2007).

Despite an overall vacancy rate of 14 percent, the demand for quality wet slips in the 24 feet to 40 feet sizes at public marinas on Whitney Lake is undersupplied. Since no known plans to build either new marinas or new wet slips at other commercial marinas on the lake exist, the proposed project is currently the only future major source of new wet slips on the lake, and particularly for larger boats. As the market absorbs those recently constructed wet slips at Lake Whitney Marina at Juniper Cove, there may be very few vacant slips available for long-term use. Few of the public or private marinas provide updated and improved marina slips, and most existing slips are 30 – 40 years old. There has been little change in available slips on the lake over the past 25 years.

Central to Double Diamond's proposed expansion of the White Bluff Marina is the favorable economic impact this new public marina would have on the Whitney Lake area. The study in **Appendix A** describes the application of an economic impact model to provide a basis for comparing different marina expansion scenarios in terms of projected sales, jobs, income, and boating trip expenditures. This model uses multipliers to estimate economic criteria derived from actual expenditures made by boaters in the course of pursuing recreational boating activities. The baseline condition, which represents the existing White Bluff Marina configuration, projects that a 67-slip marina would generate \$469,700 in marina-related and area sales. According to the economic impact models, expanding the marina fourfold would also generate a roughly fourfold increase in sales and other economic indicators. Although not specifically studied in the economic feasibility study, an increase in slip and other boating-related sales would likewise increase the amount of sales taxes paid to Hill County.

The feasibility study in **Appendix A** also examined the potential effects of expanding the White Bluff Marina on competing boat marinas at Whitney Lake. In essence, no new marinas are

planned for the lake and only modest increases in the numbers or sizes of boat slips are planned for some of the existing marinas (Hollin, 2007). An informal survey of Whitney Lake marinas conducted by USACE in 2010 similarly found that none of the marina operators have plans to expand their marinas with additional slips. As noted above, most of the marina slips at the lake are 30 to 40 years old and are at locations that are not adjacent to the types of recreation resort amenities that characterize the White Bluff Marina. Consequently, the proposed expansion of the White Bluff Marina would not directly compete with existing marinas because the proposed improvements seek to attract boaters to a new and modern project that is unique to Whitney Lake in terms of its proximity to quality amenities such as lodging, dining, and golfing. The target group of boaters would include, in addition to property owners within the White Bluff Resort, people from surrounding counties who are looking for a marina facility that is more modern and upscale than is currently available at the lake, and are willing to pay more to have those additional qualities and amenities that accompany it.

### **1.3 RELEVANT POLICIES AND REGULATIONS**

An important part of NEPA compliance includes the identification of statutory and regulatory authorities that are relevant to the proposed action. Such authorities for completing lease modifications and other actions affecting federal real estate are included in Engineering Regulation (ER) 1130-2-550 (USACE, 1996), which contains policies for making outgrants of federal land for recreational purposes. This regulation authorizes the development of recreation facilities that are dependent on the areas natural or other resources, and for which there is an unfulfilled demand. ER 1130-2-550 authorizes the USACE District Commander to create or modify an outgrant of USACE property for recreation development upon a demonstration of NEPA compliance as well as consideration of enumerated criteria which balance the need for the development with public interest and any natural resources that may be affected. Two of the evaluation requirements under this policy include the following: a market study that inventories existing recreational resources in the area and documents the demand for a new or expanded recreation facility; and a feasibility study to demonstrate that the proponent for a project will likely realize a reasonable return of profit on a yearly basis. The recreation outgrant policy also clearly expresses a preference that development of recreation amenities should be available for public use, and discourages the private exclusive use of a facility. Consequently, an additional purpose of this EA is to explore alternatives that would meet the USACE policy of encouraging the development of only public recreation facilities.

Another relevant USACE regulatory policy pertains to Double Diamond's proposal to alter its lease by converting the marina from a private facility to a public marina. The USACE Real Estate Handbook, ER 405-1-12, (USACE, 1985) requires competition when awarding public concessions on federal property, unless an exception applies. However, Section 8-105a of the regulation authorizes the District Engineer to waive this requirement "where an adjoining landowner has the only means of access to land that is to be leased." Such a waiver would apply to the White Bluff Marina because the USACE land under lease is landlocked by property owned by Double Diamond.

## 2.0 DESCRIPTION OF THE ALTERNATIVES

### 2.1 GENERAL

The development of alternatives considered varying levels of marina expansion as well as the effects of converting the private yacht club to a public marina. The alternatives addressed in this EA were developed jointly by Double Diamond and USACE as part of an iterative coordination process that occurred from 2007 through 2010. Among the principles guiding the potential expansion of the White Bluff Marina minimizing the amount of additional USACE land needed to support the new marina and facilities. Similarly, an additional objective is to restrict potential environmental impacts to areas within the existing USACE lease and already subject to occasional ground disturbance, to the extent practicable, thereby avoiding USACE lands and habitat that have been comparatively undisturbed in recent decades.

### 2.2 NO-ACTION ALTERNATIVE

The No-Action Alternative represents the conditions and consequences that would occur if there is no modification of the USACE lease with Double Diamond for the White Bluff Marina. Under this scenario, the marina would remain in its present location with the existing 85 wet slips (i.e., 67 rented slips, and 18 courtesy slips, as shown in **Figure 1-2**) and would continue to operate as a private marina. This alternative occupies 11.9 acres of land surrounding the marina cove plus 9.3 acres of water surface area within the cove. Of the total water surface area within the cove, the two existing docks with rented boat slips occupy 1.2 acres and the two courtesy docks occupy an additional 0.9 acre. Under the terms of the existing lease, Double Diamond would be authorized to construct dock facilities for a maximum of 105 new boat slips (190 total slips). These boat slips would likely be constructed to the north of the existing boat slips, and would occupy 3.0 acres of water surface area as shown in **Figure 2-1** (see also **Appendix B-1**). The marina would be secured by concrete anchors with winch-adjusted cables as shown in **Appendix B-2**, thereby allowing all floating facilities to rise when the lake level rises. Each each marina dock would also be secured to the shoreline by cables anchored by concrete columns embedded in shore rock (see **Appendix B-5**). Standard marina details are shown in **Appendices B-6** through **B-8**. In the event that these additional boat slips were to be added to the marina, this would not be accompanied by any reconstruction of the existing marina-related amenities (i.e., fueling dock, courtesy slips, parking, or ship's store), or the creation of any other new facilities within or near the marina area.

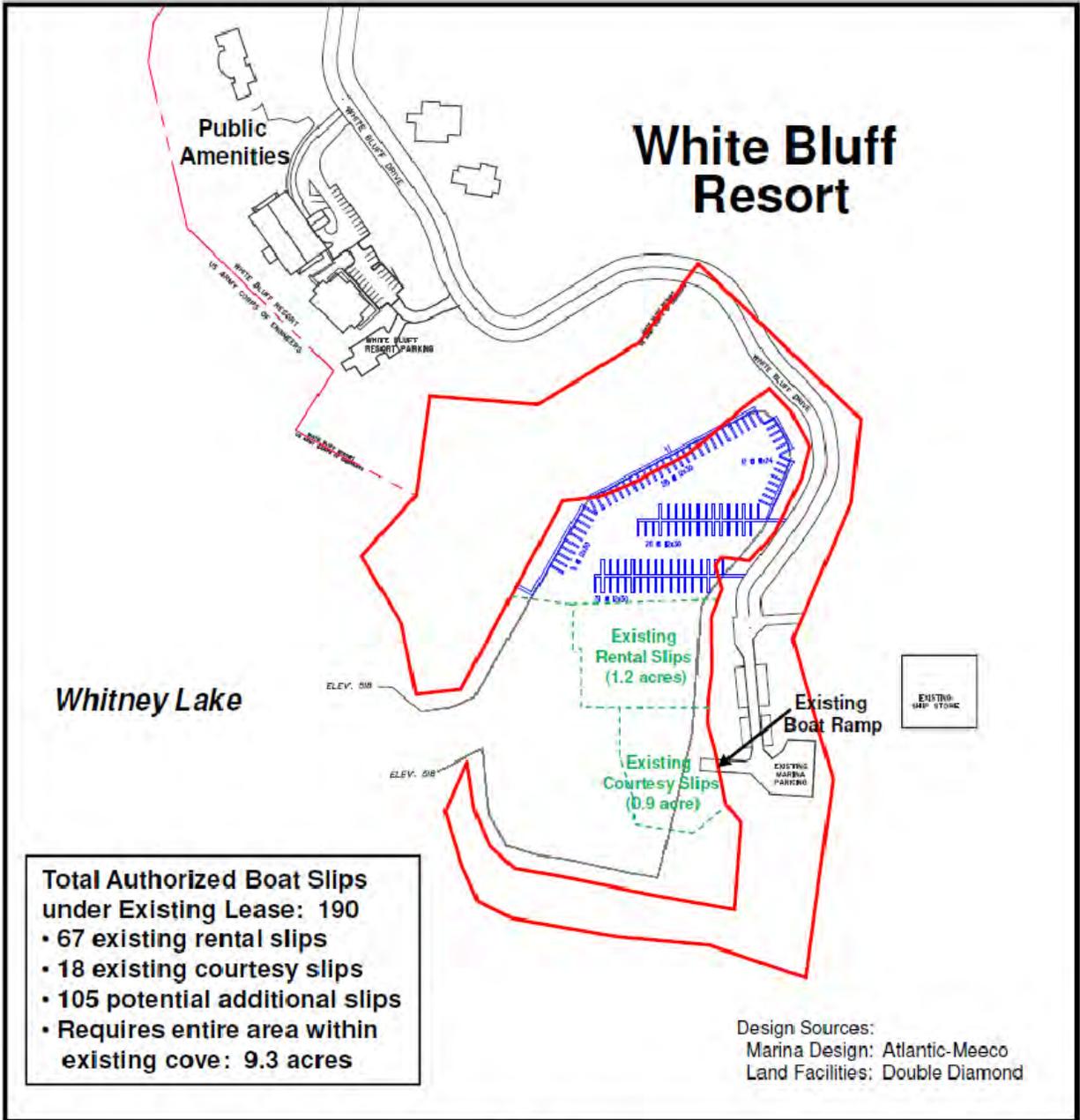
Although public use of the boat ramp, courtesy docks, and other marina amenities currently exist, the availability of these facilities has not been widely advertised to the community by way of signage, public notices, or Double Diamond's website. As a private yacht club, the marina is operated for the benefit of its property owner members who pay annual membership fees and rent boat slips. In contrast, the lodging, dining, golfing, and other amenities comprising the publically-available White Bluff Resort are widely publicized via a marketing program that includes an up-to-date Internet website, street billboards and other signage, mailings, and advertising in magazines. This manner of operation would continue under the No-Action Alternative because there is little business incentive for Double Diamond to publicize a public boat ramp when it is the availability of boat slips (particularly slips longer than 20 feet) that would result in an increase of visitors from surrounding counties who would likely utilize the resort facilities in connection with the use of their boats.

Under the No-Action Alternative, it is not likely that new boat storage capacity would be created, particularly for larger boats (25 feet to 40 feet in length) because the business objective of attracting boaters from outside the White Bluff Resort cannot be realized with a private yacht club. Without the public marina incentive and a sufficient number and mix of boat slips to attract outside boaters, the existing demand for boat slips by White Bluff Resort property owners would likely continue to be unmet. That is, the prospect of receiving boat slip fees alone is insufficient financial incentive to construct additional boat slips. Consequently, the boat owners who are otherwise eligible for yacht club membership would continue to find it necessary to seek boat slips at other parts of the lake.

### **2.3 ALTERNATIVE 1: CONVERSION TO A PUBLIC MARINA**

Alternative 1 represents the changes that would occur if the existing marina facilities operated by the private White Bluff Yacht Club were to be converted to a facility open to the general public. As noted above in **Section 1.3**, authorization to make this conversion of the marina concession without competition may be authorized by the Fort Worth District Engineer (i.e., Commander) under ER 405-1-12. This authorization would be the permissible as a waiver of the competition requirement because Double Diamond owns all privately-held property surrounding the marina, thereby precluding other entities from access to the marina area on USACE land. To implement this alternative, the existing lease instrument could be modified to reflect a change in name of the marina and its operation as a public marina.





**Figure 2-1. Design Layout for No-Action Alternative and Alternative 1**





As the existing marina has no excess boat slips to rent, implementing this alternative without increasing the number of slips would have little practical meaning. As with the No-Action Alternative, Double Diamond could construct dock facilities for a maximum of 105 new boat slips (190 total slips) and the result would be the same as described above (see **Figure 2-1**, and **Appendices B-1**, **B-2**, and **B-5** through **B-8**). Assuming this were to be done, then the approximately 30 White Bluff property owners already waiting for a boat slip would be able to rent a slip and the remaining 75 boat slips would be available for boaters unconnected with the White Bluff Resort. As with the No-Action Alternative, ultimate build out of 190 boat slips would not result in the construction of any other new marina-related amenities.

Certain operational and marketing steps would be necessary to implement the change in marina status under this alternative. First, Double Diamond would market the public availability of boat slips as it currently markets other publically-available White Bluff Resort amenities on its website (see, Double Diamond, 2010), and by signage, mailings, and magazine advertisements. In addition, the brochure available for persons with interest in the resort and other existing information outlets would be amended to inform the public of this change in marina operations. Second, to ensure that persons who rent a boat slip have unimpeded access to this gated community, boaters with a rented slip would be given a boat-renter permit that would be shown at the entry gate. Third, the lease fees for slips would be discounted for resident members, who pay an annual membership fee as part of the White Bluff Resort Property Owners Association.

Although Alternative 1 is being considered, it is not likely that Double Diamond would implement it. Financial returns on the additional capital investment necessary to design and construct 105 new boat slips would largely be limited to economic benefits associated with the 75 slips that could be marketed to outside boaters. Moreover, substantial expense was incurred in 2009 to dredge and deepen in 2009 as both a maintenance requirement for the existing marina and an investment toward preparing the cove to physically accommodate a substantially greater number of boat slips than the 190 maximum number of boat slips authorized under the lease. Consequently, there is little business incentive to pursue this alternative in light of the capacity of the cove for a much larger number of boat slips and the need for Double Diamond to realize greater returns on its past and future investments.

## 2.4 ALTERNATIVE 2 (PREFERRED): 330 BOAT SLIPS WITHIN COVE

Alternative 2 for the proposed project encompasses the phased construction of a marina inside the existing marina cove of Whitney Lake. If the ultimate buildout of the marina (as shown in **Figure 2-2**) is authorized by USACE and constructed, the marina would contain 330 boat slips with the following dimensions: 195 slips, 11 feet x 24 feet; 21 slips, 11 feet x 30 feet; 109 slips, 12 feet x 30 feet; and 5 slips, 14 feet x 40 feet. This alternative would initially include the construction of 20 slips that would be 11 feet x 24 feet, as well as the conversion of the marina from a private to a public facility. The operation and marketing of the public marina would be as described above for Alternative 1. As the existing lease with Double Diamond is subject to a maximum of 190 boat slips, implementation of Alternative 2 beyond that number could only occur after USACE approves a market and feasibility study demonstrating both the need for additional expansion and the economic viability of the enterprise, as required by the recreational outgrant policy (USACE, 1996).

Land-based amenities designed to support the marina facility include parking areas, and access sidewalks. As shown in **Figure 2-2**, the preliminary design for parking areas allows for up to 200 parking spaces for vehicles without boat trailers. Portions of the main parking area would be built to accommodate the phases of marina expansion. Parking areas would be constructed around mature trees (i.e., trees larger than six inches in diameter at breast height or "dbh") to ensure they are not harmed by construction. Similarly, sidewalks from parking areas to the main boat ramp would be routed around mature trees to avoid harm to them. The sidewalks and parking areas would be constructed of concrete. Final design plans for the construction of new sidewalks and parking areas will ensure that the volume of paving material, or site "fill", is balanced by the amount of earth removed. Any material removed from the site to achieve this volumetric balance would be relocated to Double Diamond property above the flowage easement elevation for the lake, which is 573 feet above MSL.

The proposed marina has been designed to match the physical conditions of the existing cove of Whitney Lake which was dredged in 2009 (see **Appendix B-3**). The marina would be held in place by numerous concrete anchors with winch-adjusted cables as shown in **Appendix B-4**. This design would allow all floating facilities to rise when the lake level rises. In addition, each marina dock would be secured to the shoreline by cables anchored by concrete columns embedded in shore rock (see **Appendix B-5**). Standard marina details, such as dock elevation, anchors, gangways, and roof structures, are shown in **Appendices B-6** through **B-8**. Existing

utilities, including electricity and fuel lines, would be utilized for Alternative 2. Two parking lots would be constructed as shown in **Figure 2-2**, which would require a total of 1.1 acres. As noted in **Figure 2-2**, the overall footprint of Alternative 2 would be comprised of the existing land lease (11.9 acres) and the existing cove area (9.3 acres), with a combined footprint of 21.2 acres. This alternative would neither require expanding the area covered by the existing lease nor would it require any construction on Double Diamond property adjacent to the area under USACE lease.

## **2.5 ALTERNATIVE 3: 511 BOAT SLIPS ON MAIN BODY OF LAKE**

Alternative 3 for the proposed project encompasses the phased construction of a marina on the main body of Whitney Lake. Although the design layout for Alternative 3 shows the ultimate construction of all five phases (see **Figure 2-3**, and design details in **Appendices B-9** through **B-12**), each phase beyond Phase 1 would be authorized only after a market and feasibility study demonstrates the need for it, as required by the recreation outgrant policy (USACE, 1996).

This alternative would initially include the construction of Phase 1 of the marina facility along the eastern shore of the lake just north of the inlet to the existing marina cove. Phase 1 would construct Docks A and B and Partial C, which would consist of the following 105 wet boat slips and boat amenities: 42 slips, 11 feet x 24 feet; 22 slips, 12 feet x 24 feet; 22 slips, 12 feet x 30 feet; 4 slips, 14 feet x 40 feet; 3 slips, 16 feet x 40 feet; 12 courtesy slips; a ship's store; and, a fueling facility. The ship's store, fueling facility, and courtesy slips would be located near the shore side of Dock A, and are shown generally in **Figure 2-3**, and in greater detail in **Appendix B-9**. Most of the boat slips for Phase 1 would be removed from the existing marina and relocated to the marina outside the cove area. A harbor to protect the proposed facilities would be constructed by placing three wave attenuators along the north, west, and south sides of the marina. The length of the wave attenuator on the western side of the marina would be increased as additional phases of the marina are added when warranted by user demand. Ingress and egress to the marina would be through an opening in the southwest corner of the harbor.

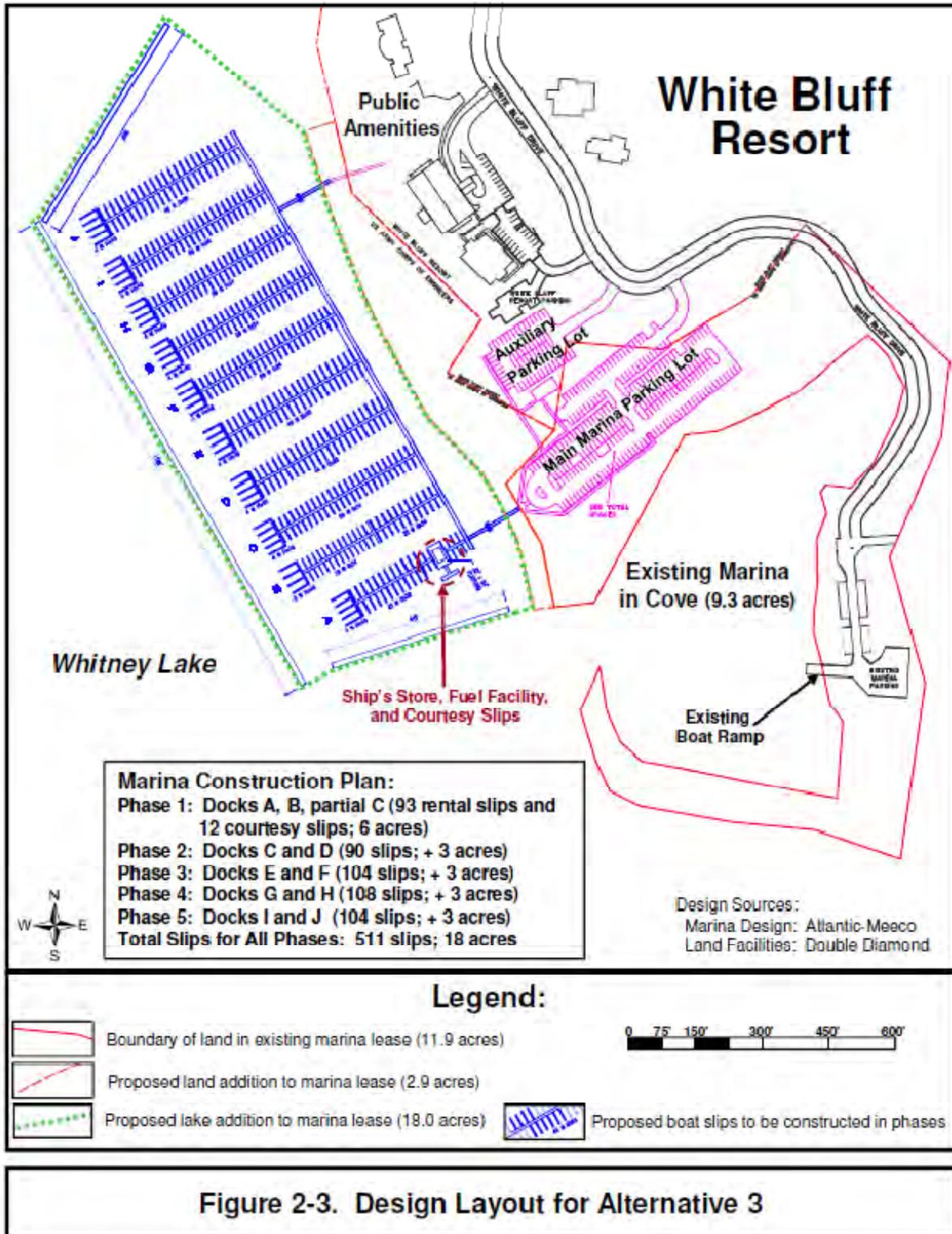
Successive phases of the facility would be added by constructing two additional docks for each phase as shown in **Appendix B-8**. If all phases are authorized by USACE and constructed, the marina would contain 511 boat slips with the following dimensions: 278 slips, 11 feet x 24 feet; 22 slips, 12 feet x 24 feet; 160 slips, 12 feet x 30 feet; 4 slips, 13 feet x 40 feet; 32 slips, 14 feet

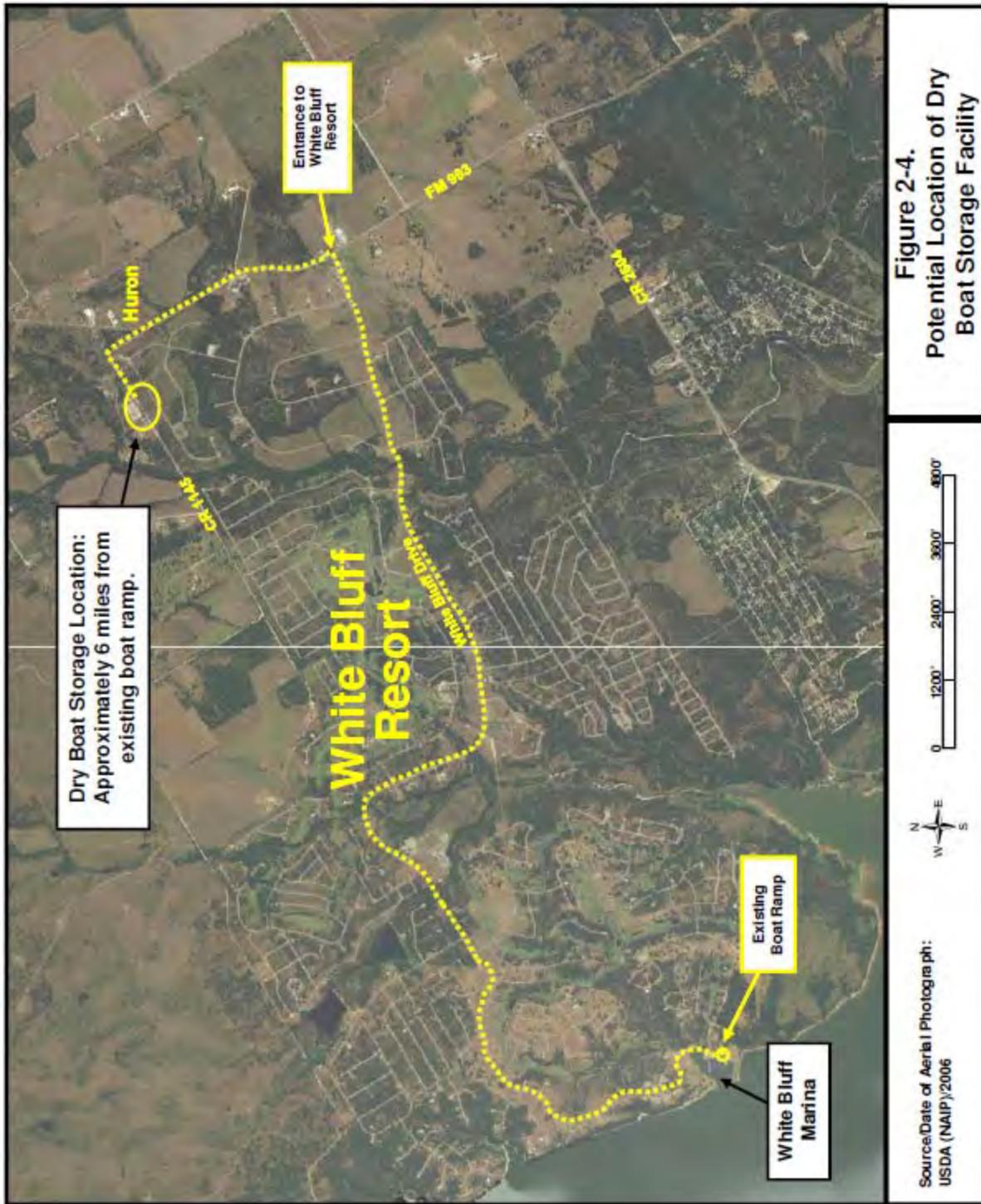
x 40 feet; 3 slips, 16 feet x 40 feet; and 12 courtesy slips. The existing boat ramp would remain in its existing configuration, and would continue to provide lake access for marina users as well as the general public.

Land based amenities designed to support the marina facility include parking areas, restroom facilities, and access sidewalks. The preliminary design for parking areas allows for up to 269 parking spaces (i.e., all for vehicles without boat trailers). Portions of the main parking area would be built to accommodate the phases of marina expansion, up to a maximum of 214 spaces. Auxiliary parking would be provided by a second lot to the northwest that would add 55 spaces. Parking areas would be constructed around mature trees to ensure they are not harmed by construction. Similarly, sidewalks from parking areas to the main boat ramp would be routed around mature trees to avoid harm to them. The sidewalks and parking areas would be constructed of concrete. Restroom facilities would be located between parking areas on Double Diamond property and would be constructed as part of the initial marina phase. Utilities to service the marina would include a fuel line, electricity, sewer, and water, and would be routed from the ship's store toward the northeast (see **Appendix B-11**). The fuel tank would be located above the lake flowage easement elevation (i.e., 573 feet above MSL) at approximately 581 feet MSL. As noted above for Alternative 2, design plans will ensure that any new construction fill material is balanced by the removal of like amount of earth material either from the construction site or a nearby flood storage mitigation area on Double Diamond property above the lake's conservation pool elevation of 533 feet above MSL.

Alternative 3 has also been designed to match the physical conditions expected for a marina located at this location of Whitney Lake. The design allows all floating facilities to rise when the lake level rises, and to be pulled toward open water during times of low lake elevation (see **Appendix B-12**). Each marina dock would be secured to the shoreline by two cables anchored by concrete columns embedded in shore rock (see **Appendix B-5**). Standard marina details, such as dock elevation, anchors, gangways, and roof structures, are shown in **Appendices B-6** through **B-8**.







**Figure 2-4.**  
**Potential Location of Dry Boat Storage Facility**

As noted in **Figure 2-3**, the overall footprint of Alternative 3 would be comprised of the existing land lease (11.9 acres), the existing cove area (9.3 acres), the proposed marina on the main body of the lake (18.0 acres), and the proposed extension of the land area covered by the lease to allow for pedestrian access to the shore and for shoreline cable anchors (2.9 acres). These components of the proposed action total 42.1 acres. An additional 0.9 acre of land on Double Diamond property adjacent to the lease footprint would be required to construct parking facilities and parking lot access roads and trails.

## **2.6 ADDITIONAL ALTERNATIVE CONSIDERED BUT NOT INCLUDED**

In addition to the three alternatives described above, consideration was given to constructing dry boat storage. As land covenants and space limitations preclude locating a dry boat storage facility within the Double Diamond Resort, the potential site shown in **Figure 2-4** has been identified. This scenario would involve making no change to the existing marina, except for the possibility of adding up to 105 additional wet boat slips, as described above for the No-Action Alternative. The marina would not be converted to a public facility under this scenario because the storage facility would not be located within the White Bluff Resort. Under this option, persons wishing to use the boat ramp at the White Bluff Marina would retrieve their boats from the remote facility, and tow the boat to the ramp. The distance from the boat ramp to the site identified as a potential dry storage facility is approximately six miles away (**Figure 2-4**).

The availability of dry storage for boats at Whitney Lake was discussed in the feasibility study in **Appendix A**. There are at least 350 existing spaces for storing boats on land and there is apparently no demand for more dry storage. Moreover, dry storage is not a practical option for the demand that has been identified for boats that exceed 20 feet in length. As the length of boats increases, so does the need for wet boat storage because of the difficulty attached to launching and retrieving large boats from the water every time they are used.

The option of dry boat storage was determined to be not viable primarily because it fails to address the fundamental purposes behind Double Diamond's interest in expanding the marina. That is, dry storage would not attract boaters from outside the immediate area who would be likely to use the various hospitality and recreation amenities during their visit to the White Bluff Resort. Double Diamond's marketing strategy depends on attracting customers with a level of income that would allow them to afford larger boats and the financial resources to enjoy the upscale amenities of the resort. In contrast, a dry boat storage approach would likely attract

boaters with smaller boats only, who would be most likely to leave the resort upon removing their boats from the water. Another major impediment to the economic feasibility of the dry storage option would be the necessity of purchasing residential land for the storage site, and the expected cost of constructing storage buildings.

### **3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS**

Whitney Lake is located on the Brazos River in central Texas on the border of Bosque and Hill Counties. **Figure 3-1** depicts an aerial photograph of the lake in reference to its surroundings. The dam to fill the lake was constructed in the early 1950s as part of the Flood Control Act of 1944 (USACE, 2007). The main purpose of the lake is flood control, with water conservation, hydroelectric power, and recreation being secondary uses (Gandara et al., 1999). The USACE manages Whitney Lake, which includes designating land and water uses on and around the lake.

#### **3.1 PROJECT SETTING AND LAND USE**

##### **3.1.1 Affected Environment**

At its conservation pool elevation, 533 feet above MSL, the lake comprises 23,560 acres. An additional 20,136 acres of fee land extend above this pool, of which approximately 13,600 acres are dedicated as natural areas, with only low impact public use permitted. In addition, 15 parks (including the existing White Bluff Resort) and three recreation areas are located adjacent to Whitney Lake.

In 1976, a Final Environmental Impact Statement (FEIS) for the Operations and Maintenance Programs of Whitney Lake, Waco Lake, Proctor Lake, Stillhouse Hollow Dam and Lake, and Somerville Lake, Brazos River Basin, Texas was prepared to address the impacts of operating Whitney Lake, as well as the other lakes noted (USACE, 2007). Associated with the FEIS was a Lakeshore Master Plan for Whitney Lake that addressed the operation and maintenance of the lake and surrounding land areas. This Master Plan includes a water use plan that designates the cove containing the existing White Bluff Marina as a “Low Speed Boating Area”, which allows boat fishing, canoeing, and other low-speed boat craft. This man-made cove facilitates the docking and storage of boats utilized by resort members and visitors. The water use plan designates the main body of the lake outside the marina cove as a “Skiing, Sailing, and Power Boating Area.” This classification applies throughout much of Whitney Lake, where greater water depth allows for a wide range of boating activity. The Master Plan also includes a land use plan that designates the land area adjacent to and including the existing marina as “Aesthetic and Multiple Use Recreation.” This classification allows for lower intensity land-based recreational activities which do not require supporting facilities.

The White Bluff Resort encompasses 3,450 acres just west of Farm-to-Market Road (FM) 933 on Whitney Lake. The gated, master-planned community includes approximately 5,500 individual residential home sites, a hotel, two restaurants, two 18-hole golf courses, and a spa and fitness center as well as other amenities (see map on Page 44 of **Appendix A**). These structures are adjacent to a rocky limestone escarpment to the west, and sit atop or on the sides of gently sloping hills (see topographic map, **Figure 3-2**). The existing White Bluff Marina is located within and adjacent to an unnamed ephemeral stream channel.

The hospitality and golf course amenities of the White Bluff Resort are available to members of the public. Although access to the resort is controlled by a manned entry gate, visitors who are not property owners may gain access to these amenities after receiving a day pass from the gate guard. Other than the marina and golf courses, recreation amenities such as swimming pools and tennis courts are available only to property owners. Residents and building lot owners of the resort pay annual fees to a property owners association, and receive access to all facilities within the resort either at no additional cost or at a reduced price.

All aspects of the White Bluff Resort are privately owned and operated. Real estate taxes based on appraised values are paid annually to the Hill County Tax Assessor and Collector. Double Diamond pays annual property taxes on all common areas within the development. All roads throughout the resort are privately owned and maintained. Sales taxes are collected from all retail sales, including all sales from the ship's store near the marina. No taxes are required for the rental of boat slips, but the proximity of Double Diamond property to the adjacent marina facility is a factor in the overall appraisal of the White Bluff Resort for property tax purposes.

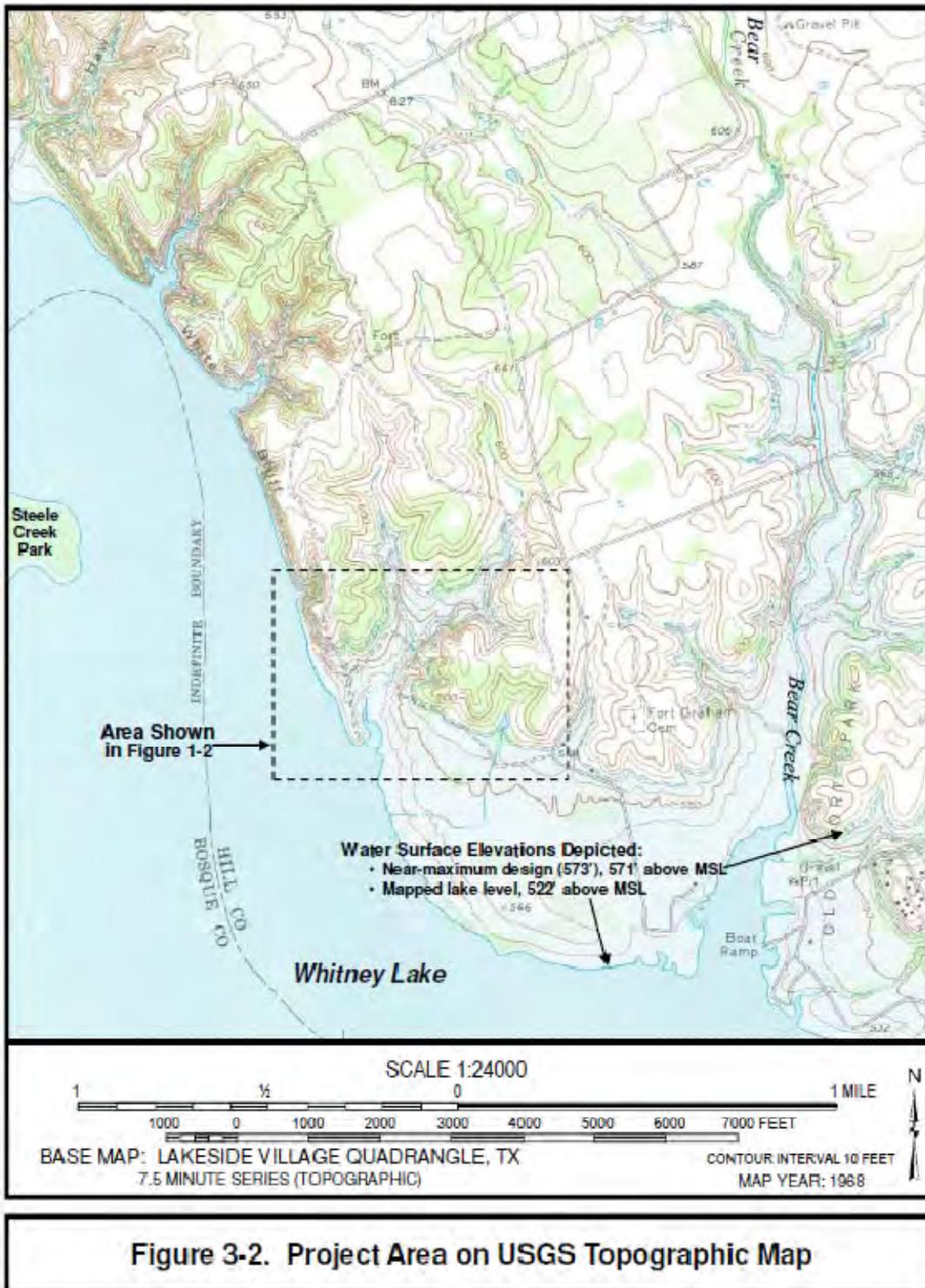
### **3.1.2 Environmental Consequences**

#### *No-Action Alternative*

Under the No-Action Alternative, there would not likely be any expansion of the existing White Bluff Marina to the lease limit, and it would remain a private entity with membership limited to property owners within the White Bluff Resort. There would be no change to the project setting and land use anywhere within the resort under this alternative, even in the event that the maximum number of additional boat slips (105) were to be added to the marina. That is, there would be no change in the existing parking, road, or retail facilities within the White Bluff Resort in support of this alternative regardless of whether additional slips are added to the marina.



**Figure 3-1. Aerial View of Whitney Lake and Surrounding Area**



## *Action Alternatives*

### Alternative 1

The conversion of the existing private marina to a public facility would change the nature of land use within the area covered by the marina lease with USACE (see **Figure 2-1**). Otherwise, this alternative would have essentially the same level of impact on project setting and land use that was described above for the No-Action Alternative.

### Alternative 2

The White Bluff Marina and facilities would be converted to public use under this proposed alternative (see **Figure 2-2**), thereby affecting a change in land use to the area covered by the existing marina lease. New boat slips would be added in phases according to demand, and this alternative would eventually affect the project setting from a cove that is relatively sparsely populated with boat docks to a cove that would have nearly four times the number of boat slips and docks. The expansion of existing parking facilities would similarly alter nearly one acre of land use within the USACE lease area from grass-dominated vegetation to parking lots and access roads and trails.

Other than the impacts discussed above, no other impacts would occur to the project setting or land use in the area. While retail revenues at the ship's store (i.e., the White Bluff Marina Market) would increase as a result of greater marina use, there would be no need to expand the size of the store to accommodate this increase. Similarly, the increase in boaters would not require any modifications to other aspects of land use within the White Bluff Resort such as expansion of the existing two-lane main thoroughfare of the resort (White Bluff Drive).

### Alternative 3

The White Bluff Marina and facilities would be converted to public use under this proposed alternative (see **Figure 2-3**), and the marina lease would be modified to reflect this change in land use. All rental boat slips within the cove (i.e., the existing marina) would be moved out into the main body of the lake during Phases 1 and 2 of this alternative. Consequently, the overall project setting would change from a cove-based marina to a marina on the main body of the lake. In contrast, the project setting of the cove would change with the removal of all docks, as the cove would only be used for the launching and removal of boats. Otherwise, this alternative would have the similar level of impacts on land use as described above for Alternative 2.

## **3.2 CLIMATE**

### **3.2.1 Affected Environment**

The local climate is characterized by long, hot summers and short, mild winters. Average monthly temperatures for the area range from a winter low of about 33° F to a summer high of 96° F. Average annual precipitation is approximately 34 inches. Heaviest rainfall generally occurs during spring and fall with a sharp drop off during the summer months (City-data.com, 2007; World Climate, 2007).

### **3.2.2 Environmental Consequences**

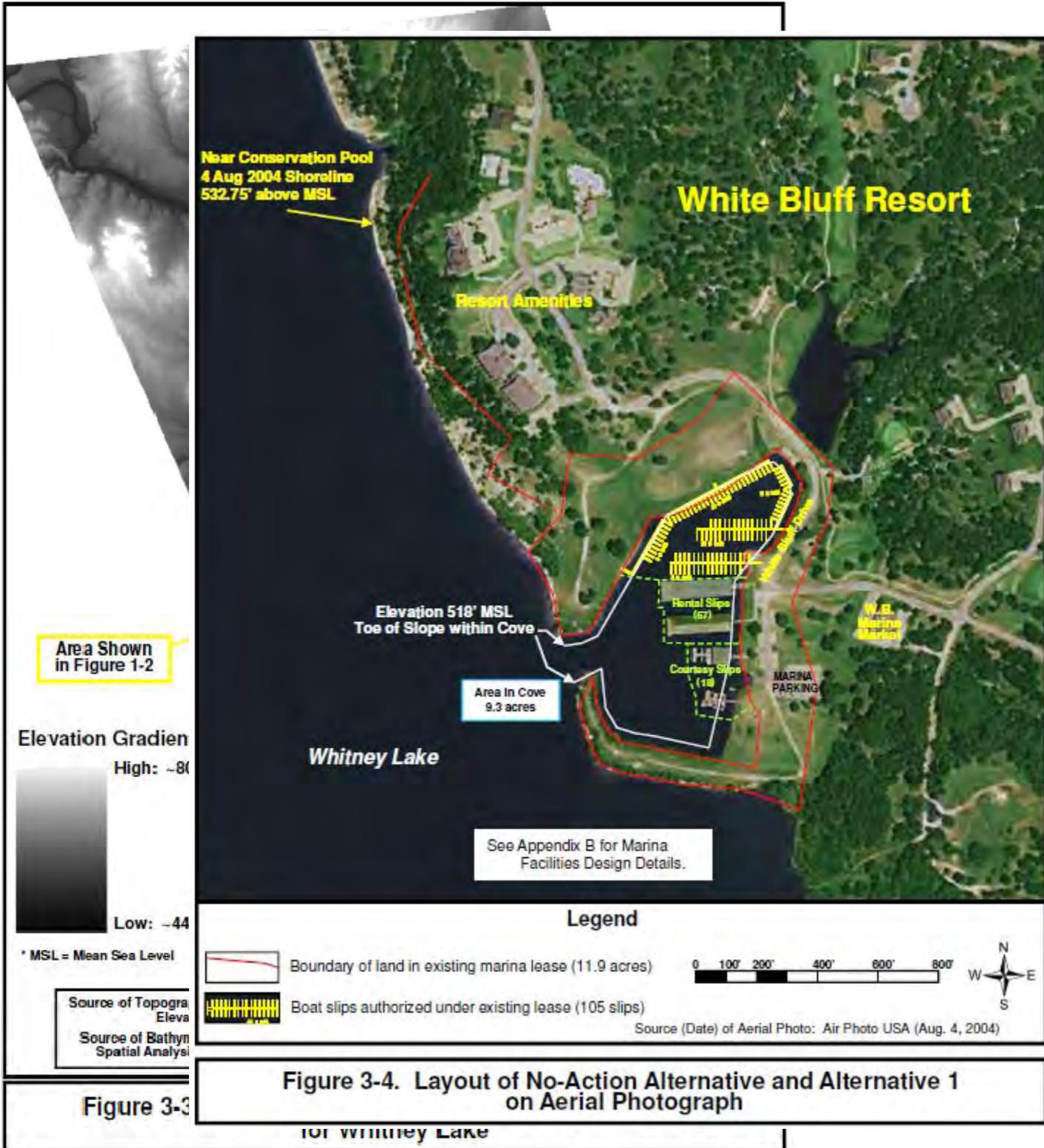
None of the alternatives would affect the climate at Whitney Lake.

## **3.3 GEOLOGY AND SOILS**

### **3.3.1 Affected Environment**

The project lies within the eastern edge of the Grand Prairie Physiographic Region (BEG, 1996). Much of this area is developed on terrace deposits above the Brazos River, and is characterized by limestones throughout the region where weathering and erosion have left thin rocky soils. A striking outcropping of Edwards Limestone immediately to the west of the project area forms the White Bluff namesake of the existing marina (BEG, 1987). The plateau-like surface is well exposed, and numerous streams dissect land that is mostly flat or that gently slopes to the south or west.

According to the Soil Survey of Hill County Texas, White Bluff Marina lies within the Bastsil-Travis-Aquilla soil series (SCS, 1978). This series is classified by slightly acidic, mildly alkaline sandy to loamy soils which are nearly level to gently sloping. Three specific soil types are found within this series in the project area: Bastrop fine sandy loam, 3 to 5 percent slopes; Bolar clay loam, 3 to 8 percent slopes; and Brackett-Rock outcrop complex, 5 to 30 percent slopes. The development of these soils has been heavily influenced by the erosion of parent rock in the region. **Figures 3-2** and **3-3** show the project area topography for reference.





### 3.3.2 Environmental Consequences

#### *No-Action Alternative*

No impact to geology and soils would occur under the No-Action Alternative, unless additional docks were to be added to create the 105 additional boat slips authorized under the existing lease (see **Figure 3-4**). In that event, disturbance of the top few inches of surface soils would be necessary to construct short access sidewalks from the existing marina parking lot and White Bluff Drive to adjacent dock facilities that would be located in the north end of the cove. The total land area that may be disturbed to construct these sidewalks would be less than 0.1 acre. Additionally, a total of seven shore columns would be needed to anchor these additional docks to the lakeshore within the cove (see **Appendix B-5** for shore column design). The approximate locations of these shore columns are shown in **Appendix B-2**. Removal of approximately one cubic yard of soil/rock from the shoreline would be necessary for the placement of each of these columns, which would be replaced with a concrete footing. If such construction occurs, there would be very minor impacts to area soils and site geology.

#### *Action Alternatives*

##### Alternative 1

No impact to geology and soils would occur under this alternative, as there would be an absence of any ground-disturbing activity associated with the conversion of the marina to a public facility. However, if the maximum of 105 additional boat slips are constructed as shown in **Figure 3-4**, potential impacts to soils and geology would be as described above for the No-Action Alternative.

##### Alternative 2

The areas where terrestrial impacts would be caused by construction of Alternative 2 can be seen in **Figure 3-5** and **Appendix B-3**. Soils would be affected only as needed to bring the area to grade prior to construction of the two parking lots, and a few short sidewalks to provide access to docks from parking areas or White Bluff Drive. These potential construction areas occur in areas that are relatively flat, thus necessitating very little disturbance of surface soils (see Photographs 4 and 11 in **Appendix C-9**). Additionally, the absence of any trees within any construction area would further lessen the need to excavate more than a few inches into surface soils. A total of 13 shore columns would be needed to anchor this marina to the lakeshore within the cove (see **Appendix B-5** for shore column design, and **Appendix B-4** for locations). Removal of approximately one cubic yard of soil/rock from the shoreline would be necessary for the placement of each of these columns, which would be replaced with a concrete footing. The

limited extent of construction grading of surface soil on 1.1 acres and installation of shore columns described above would have minor impacts to surface soils and to site geology.

### Alternative 3

This alternative would disturb surface soil material to construct parking lots, a restroom facility, and access roads and sidewalks, as shown in **Figure 3-6** and **Appendix B-11**. Site conditions are generally as described above for Alternative 2, except that trees are interspersed within the areas planned for parking lots (see Photographs 11-14 in **Appendix C-9**). However, as removal of mature trees would not occur, only the surface few inches of soil would be disturbed to bring a total area of 2.2 acres to grade during construction. Eleven shore columns would be needed to anchor this proposed marina to the lakeshore (see **Appendix B-5** for shore column design, and **Appendix B-12** for locations). Each column would be anchored by a concrete footing that would replace approximately one cubic yard of excavated soil/rock from the shoreline. The limited extent of construction grading and installation of shore columns described above would have minor impacts on surface soils and to site geology.

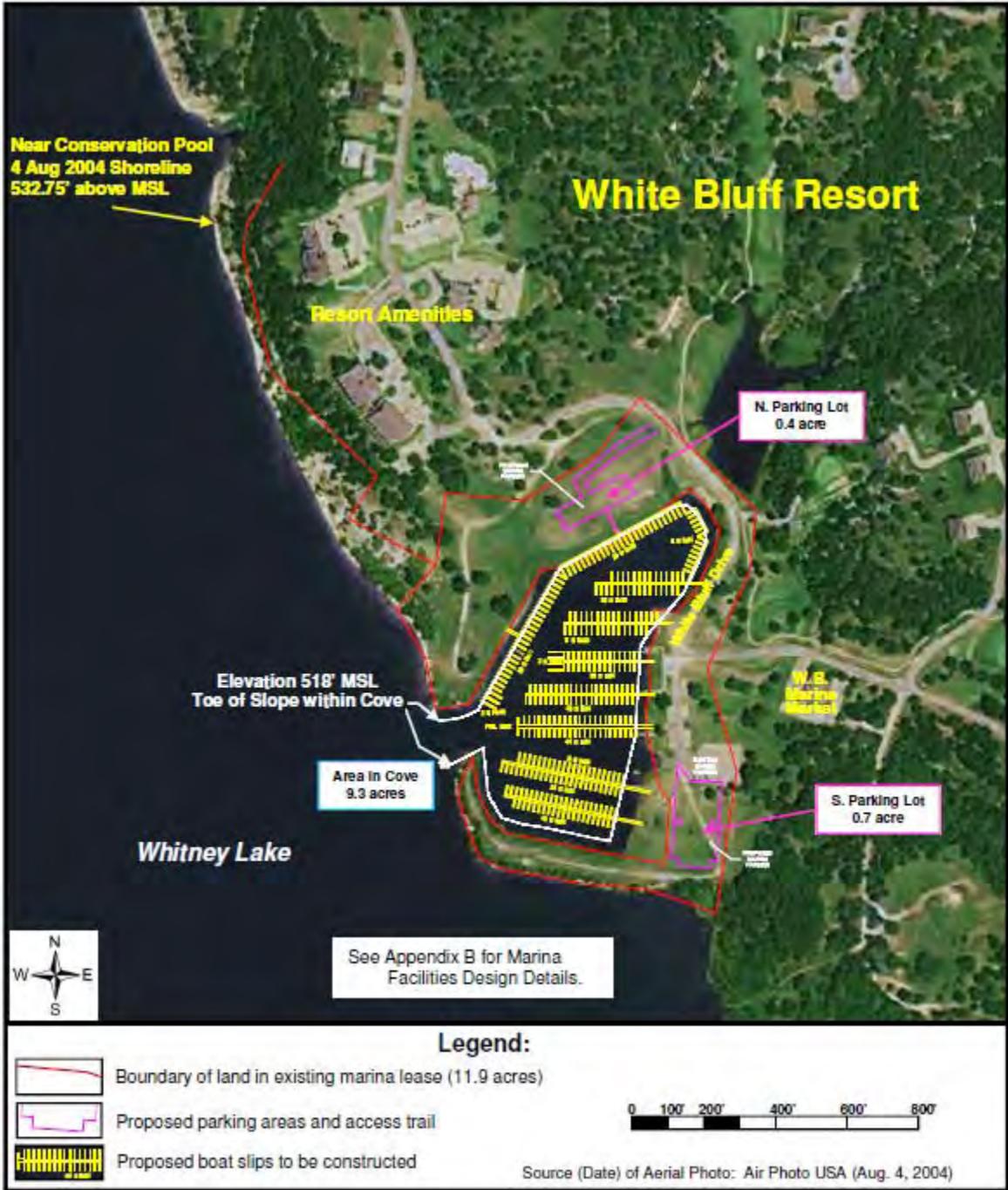
## **3.4 WATER RESOURCES**

### **3.4.1 Waters of the U.S., including Wetlands**

#### **3.4.1.1 Affected Environment**

##### Lake Physical Characteristics

Whitney Lake is located on the Brazos River, and the original river channel impounded to form the lake remains differentiated from the lake bottom. The continued presence of a defined river channel is illustrated in **Figure 3-3**, which graphically integrates topographic and bathymetric data to depict general hydrologic relationships in the area. As will be discussed in greater detail below, even after 60 years the historic river channel continues to influence lake characteristics such as sedimentation patterns, lake currents, and water quality.



**Figure 3-5. Layout of Alternative 2 on Aerial Photograph**



**Figure 3-6. Layout of Alternative 3 on Aerial Photograph**

With flood control as its main purpose, Whitney Lake is characterized by dramatic shifts in water surface elevations in response to major runoff events. Accordingly, management of the lake and surrounding land areas is affected by the flood control aspect, and all privately owned property surrounding the lake is subject to a flowage easement up to an elevation of 573 feet above MSL (USACE, 2010a). Within the area subject to the flowage easement, property owners are restricted from activities that would diminish the flood storage capacity of the reservoir, which is defined as the range of lake elevation from the conservation pool (533 feet above MSL) and the flowage easement limit (573 feet above MSL). Such activities include the construction of buildings or the introduction of any fill material between this 40-feet of flood storage capacity.

To ensure adequate reservoir capacity during flood events, the reservoir is managed during periods of normal Brazos River flows at the conservation pool elevation or below. The water within the reservoir at or below the conservation pool is used for recreation, hydroelectric power, and public water supply. Although the deposition of fill below the conservation pool elevation does not impact flood storage, it would diminish the amount of water available for these secondary uses. Similarly, floating docks are partially submerged and thereby reduce the amount of water in the reservoir for secondary uses at the conservation pool elevation or below. Floating structures, however, would have no impact on flood storage capacity of the lake as long as they are secured by anchor cables that may be extended in response to rising water surface elevations.

The ground photographs shown in this report (see **Figures 1-3** and **1-4**, and **Appendix C-9**) show Whitney Lake with a lake level at 534.8 feet above MSL, which is slightly above the conservation pool level. Other figures (**Figures 1-2**, and **3-4** through **3-6**) show the Whitney Lake shoreline when the lake is just below the conservation pool level. During the past ten years, the lake levels generally fluctuated within eleven feet above and below the conservation pool (i.e., 522 feet above MSL, which is the mapped lake elevation shown on the U.S. Geological Survey (USGS) quadrangle map in **Figure 3-2**, and 544 feet above MSL). The highest annual lake elevations generally occur during the spring and early summer months, and lowest annual lake levels occur in the fall and winter months. The lake surface elevation has exceeded 544 feet above MSL six times over the past 30 years (see historic lake level chart in **Appendix C-1**). In contrast, during the lifetime of the existing marina (i.e., since 1995) lake

elevation has dipped below 525 feet above MSL generally once out of every two years, thereby preventing boat access to the main body of the lake from the White Bluff Marina.

The dynamics of lake level fluctuations were demonstrated from April to October 2007, during which the lake experienced a range in elevation of 28.4 feet; the minimum elevation was 528.5 feet and the maximum was nearly 556.9 feet. The most rapid increase within this time frame took place over ten days during the summer of 2007 when lake levels were at 535.7 feet on June 25<sup>th</sup>, and increased 21 feet to 556.9 feet on July 5<sup>th</sup>. While rises in water surface elevation exceeding 20 feet within a ten-day time frame occurred seven times over a thirty-year period, or approximately once every five years, rises of ten to 15 feet in water surface elevation over the course of a few days occur almost annually.

The proximity of the historic river channel to the White Bluff Marina and formation of the lake are depicted in historic aerial photographs in **Appendix C-2**. These photographs illustrate the development of the existing marina cove from an area that was once densely forested to the creation of a protective levee and dredging of the cove by 1996. The photograph from 1996 highlights the hydrologic isolation of the cove from the main body of Whitney Lake during periods of low lake elevation. Examination of these photos shows that the river channel is located approximately 1,500 feet west of the inlet to the existing White Bluff Marina, and approximately 400 feet from the western most point of the location for Alternative 3. The photographs also indicate that most of the area that would be occupied by Alternative 3 would be above areas that originally were forested, so that tree snags would be expected on the lake bottom. Some tree snags are visible in **Appendix C-9**, Photographs 6 to 9.

A volumetric survey of Whitney Lake, commissioned by the Texas Water Development Board (TWDB), compared bathymetric data from 2005 with previous volumetric studies from 1951 and 1959 (TWDB, 2005). Lake-wide bathymetry established that the original river channel remains well defined (see **Appendices C-3** and **C-4**), and cross sections of the lake (e.g., **Appendix C-5**) show that the main channel is still the dominant feature throughout the lake and that sedimentation within the channel has been similar to surrounding areas. The survey concluded that the lake has a capacity of 554,203 acre-feet when at conservation pool elevation, which is a reduction in 72,897 acre-feet (11.6 percent) from its capacity in 1959.

Physical features in the vicinity of the project area were inferred from unpublished bathymetric data obtained in 2006 by the Center for Spatial Research at Baylor University. Based on the bathymetry depicted in **Appendix C-6**, the distance from the cove inlet westward to the Steele Creek Park peninsula is approximately 6,200 feet, and the deepest point along this cross section is approximately 476 feet above MSL, or 57 feet deep when the lake is at its conservation pool elevation. The bathymetry indicates that the lake cross section depicted in **Appendix C-5** would be generally representative of the cross section west of the marina cove, except that the main river channel would be shifted approximately 1,000 feet eastward toward the cove.

To better understand the direction of lake currents in the vicinity of the project area, a preliminary hydraulics study was performed by Halff Associates. The hydraulics study considered the area from the east bank of Whitney Lake opposite the Steele Creek Park peninsula to the area between Steele Creek and the Brazos River on the west bank of the lake (see **Appendix C-7**). The peninsula directs low flows from the west around its northern point causing the flows to concentrate on the east shoreline while the lake elevation is at or below conservation pool elevation. Lake elevations greater than 535 feet above MSL can flow across the peninsula altering the flow characteristics in the area. It was determined that a hydraulic surface model would assist in determining the flow patterns in the lake for both normal flow and high flow scenarios.

The hydraulics study applied the Finite Element Surface Water Modeling System (FESWMS) to simulate two-dimensional flow patterns in the lake. This modeling approach predicts the two-dimensional flow direction of water (or flow patterns) within the lake, and estimates flow velocity contours. Initially, a companion program was used to define the topographic constraints from the 2006 bathymetric depth data noted above from Baylor University, and point data obtained from USGS topographic quadrangle maps (i.e., Allen Bend and Lakeside Village Quadrangles). This program transformed topographic attributes into a network of cells, wherein areas with steeper slopes define a greater density of cells. The grid of hydraulic cells was then combined with representative flow and surface water elevation data in FESWMS to generate a flow direction vector for each grid cell. Three different water surface elevations on the lake were investigated for various discharges, as follows: eleven feet below the conservation pool elevation (522 feet above MSL); two feet above the conservation pool elevation (535 feet above MSL); and, a flood stage elevation (555 feet above MSL, or about two feet below the 2007 high

water level of nearly 557 feet). For the 535 feet and 555 feet elevations, the FEWSMS model simulated flows for the following water inflow rates taken from USACE hydrologic records: 14,000 cubic feet per second (cfs); 24,000 cfs; 33,000 cfs; and 43,000 cfs. The hydrograph discharge rate modeled for the 522 feet water surface elevation was 11,000 cfs. This model was not calibrated to any historical data on lake flows, as no such data were available. The model limits encompass the area upstream and downstream of the proposed marina expansion area on the eastern shore of Whitney Lake.

The results of the flow pattern modeling are summarized graphically in **Appendix C-7**, and show the directional arrows of flow assigned by FEWSMS to each grid cell created from topographic constraints. As the directional vectors were virtually identical regardless of the inflow rates modeled, the model results for only one inflow rate are shown for each lake elevation in the appendix. The simulations did, however, predict substantial differences in flow depending on the water surface elevation. The flow directional arrows for the 522 feet lake elevation indicate that the concentration of flows accumulate along the eastern shore north of proposed Alternative 3 but begin to spread out as flow approaches the area of the proposed marina expansion. This indicates a possibility of accumulation of debris on the upstream side of Alternative 3. The flow characteristics at 535 feet elevation just overtop the tip of the Steel Creek Park peninsula but otherwise show a pattern similar to the flow modeled for the lower elevation, with a slight shift to the west. As would be expected, flow direction may be strongly affected at higher (555 feet) lake elevations as some of the flow from upstream of the Steele Creek Park peninsula flows across the peninsula. Nevertheless, relatively high flows do little to alter much of the flow pattern around the end of the peninsula and flowing eastward toward the White Bluff area.

Although differences in the hydraulic model's output are apparent in **Appendix C-7**, the model confirms inferences about lake flow behavior based on physical characteristics and anecdotal observations from the Whitney Lake research team at Baylor University's Center for Reservoir and Aquatic Systems Research (CRASR). That is, the historic river channel remains a major influence on lake flow characteristics, thereby directing much of the flow through the lake system along the Steele Creek Park peninsula and then toward the steep slopes of White Bluff to the north of the project area. After the dominant lake flow curves around and along the bluff area, it then moves southward with the greatest volume of water located in and above the historic river channel.

According to observations of CRASR staff, during periods of upstream flooding Whitney Lake behaves much like a very slow moving river in a state of overbanking, with currents that are stronger in areas that are above the deepest portions of the historic river channel (Byars and Allen, 2007). Consequently, debris trains that tend to accompany major runoff events have been observed and would likely continue to move through this portion of the lake along the river channel and eastward toward the shore. These observations were confirmed by output from the FEWSMS model, and representative current velocity contours are shown in **Appendix C-8** for a lake water surface elevation of 535 feet above MSL and lake inflow rates of 33,500 cfs and 43,000 cfs; as normal inflow for Whitney Lake is generally less than 10,000 cfs, these conditions simulate two instances of upstream flooding. The model predicted flow velocities of 0.2 to 0.4 feet per second for the proposed marina site, which are approximately 0.1 feet per second less than flow velocities modeled for the historic river channel area. The strongest currents in the lake are associated with deep water above the historic river channel and currents weaken as they get closer to the shoreline. Virtually lake current effects occur within the White Bluff Marina cove, which has a narrow opening to the lake (i.e., approximately 130 feet wide).

#### Section 10

USACE is directed by Congress under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S. Code 403) to regulate all work or structures in or affecting the course, condition, or capacity of navigable waters of the U.S. The Brazos River is considered navigable within the Fort Worth District from the point of intersection of Grimes, Walker, and Washington Counties upstream to Whitney Dam in Hill and Bosque Counties, Texas. Therefore, the Brazos River is not regulated by Section 10 upstream from the dam at Whitney Lake .

#### Section 404

Congress directed USACE under Section 404 of the Clean Water Act (33 U.S. Code Section 1344) to regulate the discharge of dredged and fill material into all waters of the U.S., including wetlands. The Brazos River, including all impoundments such as Whitney Lake, is regulated by Section 404. Thus, any activities which discharge dredge or fill material into Whitney Lake would be regulated under Section 404 of the Clean Water Act. Furthermore, regulated activities under Section 404 of the Clean Water Act may be permitted by General Permit (such as Nationwide General Permits, Regional General Permits, or Programmatic General Permits) or Individual Permit (such as Standard Individual Permits or Letters of Permission). Based on the

nature of this project it appears that the project would meet the terms and conditions associated with the Regional General Permit (RGP) CESWF-09-RGP-8 for Boat Ramps and Minor Facilities (August 26, 2009). This RGP authorizes the construction of boat docks, boathouses, walkways, mooring devices, and similar structures that would be placed below the ordinary high water mark of the jurisdictional water body. However, RGP-8 does not authorize the placement of more than 50 cubic yards of dredged or fill material below the ordinary high water mark. Projects that place tightly sealed material such as concrete anchors or mooring cells as structural members of floating facilities may be covered by Nationwide Permit (NWP) 25 for Structural Discharges (72 Federal Register 11185, March 12, 2007). NWP 25 does not specify a maximum limit for structural discharges that otherwise meet its criteria. Floating structures on waters of the U.S. do not constitute the discharge of dredged or fill material and are not subject to Section 404 jurisdiction.

On-site visits, review of USGS topographic map and historical aerial photographs (see **Figure 3-2** and **Appendix C-2**), and consultation of National Wetland Inventory (NWI) maps found no evidence of wetlands adjacent to Whitney Lake within the area of the proposed project. Therefore, Whitney Lake below its ordinary high water mark is the only aquatic feature that should be considered a water of the U.S. within the area that could potentially be affected by any of the alternatives and the No-Action Alternative. In the project area, there are approximately 8 acres of waters of the U.S.

### **3.4.1.2 Environmental Consequences**

#### *Lake Physical Characteristics*

##### *No-Action Alternative*

The No-Action Alternative would have no potential effect on the physical characteristics of Whitney Lake, unless additional boat docks are added. If the maximum 105 additional boat slips authorized under the existing marina lease were constructed, potential impacts to the lake's flood storage capacity could occur unless mitigated. As described above in **Section 3.2.2**, construction of docks for the 105 additional slips would result in the installation of seven shore columns to help anchor the new docks (see **Appendix B-2**). Installing each shore column would remove approximately one cubic yard of soil/rock and replace it with a concrete footing for the anchor column. As the shore columns would be constructed above the conservation pool, the seven yards of material would be removed from the site to a location above the flowage easement elevation to prevent any net loss of lake flood storage capacity.

Additionally, floating docks could reduce flood storage capacity of the lake unless equipped with extendable tethering cables to allow the docks remain afloat during flooding events. As shown in **Appendices B-5** through **B-7**, all docks are designed with winch-and-cable anchorage to ensure that floating facilities do not diminish flood storage capacity of the lake. Assuming the mitigation of potential fill within the flood storage elevation zone is mitigated as described, there would be no impacts from this alternative to flood storage capacity.

The potential construction of docks for the 105 additional boat slips could also impact secondary lake water uses attributable to the conservation pool elevation and below (i.e., hydroelectric power, recreation, and public water supply), unless mitigated. In addition to securing these new dock facilities by shore columns, as described above, these docks would be tethered to 16 concrete block anchors (see **Appendices B-2** and **B-6**). Each block anchor measures three feet by three feet by seven feet in size, which would displace 2.33 cubic yards of water below the conservation pool elevation, with a combined fill of 37 cubic yards. Additionally, these docks would displace approximately 516 cubic yards of water resulting from the partial submersion of the docks. However, this combined 553 cubic yards of water displacement would be mitigated by approximately 60,000 cubic yards of material dredged from the cove by Double Diamond in 2009. Consequently, the potential construction of additional docks in the cove would not affect secondary uses of water in Whitney Lake.

The No-Action Alternative, including its possible expansion, is located within the same cove as the existing White Bluff Marina and is protected from the water currents and floating debris affecting the main body of the lake. The location of the No-Action Alternative within the cove obviates the concerns due to lake currents and debris discussed above in **Section 3.4.1.1**.

Shoreline erosion can have many negative impacts on an aquatic system, including increased turbidity and sedimentation, habitat destruction, and nutrient release which can potentially cause algal blooms. In addition, erosion can affect the integrity of shoreline structures and negatively affect property values. As a certified member of the Clean Texas Marina Program (CTMP), the White Bluff Marina has measures in place to reduce potential impacts to shoreline erosion which might be generated by other sources. These measures include locating waste storage facilities in upland areas away from the shoreline and encouraging vegetation growth around shorelines and parking lots. Thus, the marina would not have adverse effects on the lake's physical characteristics.

## *Action Alternatives*

### Alternative 1

This alternative would have the same potential impacts as described above for the No-Action Alternative.

### Alternative 2

The general floating dock design for this alternative would be as described above for the potential addition of boat docks under the No-Action Alternative. However, Alternative 2 would require the installation of 13 shore columns as shown in **Appendix B-4**. These 13 cubic yards of excavated material would be relocated above the elevation of the flowage easement to prevent any loss of flood storage capacity. Similarly, the design of planned parking lots and access trails would ensure that the fill from paving materials to construct these facilities would be offset by the removal of an equivalent volume of existing soil/rock to a location above the flowage easement elevation.

Potential impacts to secondary uses of lake water below the conservation pool elevation could occur from the 32 concrete block anchors (2.33 cubic yards each) needed to secure the docks and water displacement from the submerged portion of the docks (see **Appendices B-4** and **B-6**). Displacement of water for secondary uses would be approximately 1,675 cubic yards, which is comprised of 75 cubic yards for concrete blocks and 1,600 cubic yards for partial submersion of the floating docks. As the displacement affecting secondary uses of lake water would be mitigated by approximately 60,000 cubic yards of material dredged from the cove by Double Diamond in 2009, there would be no impacts to secondary uses of lake water.

The potential impacts regarding lake currents and debris and shoreline erosion would be as described above for the No-Action Alternative, and no adverse impacts to lake physical characteristics would occur.

### Alternative 3

The general floating dock design for this alternative would be as described above for the potential addition of boat docks under the No-Action Alternative. However, Alternative 3 would have 11 shore columns as shown in **Appendix B-12**. These 11 cubic yards of excavated material would be relocated above the elevation of the flowage easement to prevent any loss of

flood storage capacity. Also, the design of all planned facilities, including parking lots, access roads and trails, and restroom facilities, would ensure that the volume of fill from paving and building materials to construct these facilities would be offset by the removal of an equivalent volume of existing soil/rock to a location above the flowage easement elevation. In the event that there is insufficient graded material available from the construction sites for these facilities to offset construction fill, any remaining material needed to balance the volume of fill would be removed from a flood storage mitigation area located nearby within the flood storage lake elevations on Double Diamond property (shown in **Figure 3-6**). Additionally, all floating docks and wave attenuators would be equipped with extendable winch-and-cable mechanisms to prevent floating facilities from becoming fully submerged during flooding events. Accordingly, there would be no adverse impacts to the flood storage capacity of Whitney Lake from this alternative.

Potential impacts of this alternative to secondary uses of lake water below the conservation pool elevation could occur from the 78 concrete block anchors needed to secure the docks (182 cubic yards total), the 74 block anchors to secure wave attenuators (172 cubic yards total), and water displacement from the submerged portion of the docks (2,470 cubic yards total) and wave attenuators (1,102 cubic yards total) (see **Appendices B-6, B-12, and B-13**). The combined displacement of water for secondary uses from these structures would be 3,926 cubic yards. As the displacement affecting secondary uses of lake water would be mitigated by approximately 60,000 cubic yards of material dredged from the cove by Double Diamond in 2009, there would be no impacts to secondary uses of lake water from this alternative.

The location and design of Alternative 3 were chosen with respect to the Brazos River channel to minimize impacts to, and impacts from, currents and debris. **Appendix C-2** shows the location of Alternative 3 in reference to the historic Brazos River channel, while **Appendices C-3 through C-7** show the project area on depth, bathymetric, and hydraulic maps. The degree to which lake levels fluctuate was also considered, and led to the anchorage plan and winch-and-cable system which can be seen in **Appendix B-12**, with design details in **Appendices B-5 through B-7**. Based on a site analysis performed by marina designer Atlantic-Meeco, these features would allow the marina to move with the lake, and with proper management should enable the marina to withstand the currents and debris which will naturally flow down the channel.

The preliminary hydraulic analysis and anecdotal observations from CRASR scientists indicate the location of Alternative 3 is in an area where there may be accumulation of debris during/after upstream flooding events. This could be as minimal as floating trash, but could also include possible large vegetation such as tree logs which could damage the facility. Consequently, if the proposed marina facility is located as planned, the final design and operating procedures for the marina would include plans to divert or capture debris prior to impacting the facility.

As noted above, the hydraulic analysis modeled both the direction of flow for lake currents and an approximation of the velocity of lake currents. To address whether the construction of Alternative 3 would affect the direction and velocity of lake flow patterns, a cross section of the lake was developed from bathymetric data for the proposed marina site and the area of the cross section that would be obstructed by wave attenuators was graphed in **Appendix C-11**. Alternative 3 would effectively block flow for an area six feet deep and extending approximately 500 feet into the lake, or 3,000 square feet. As the total area for the upper six feet of the lake cross section is approximately 38,000 square feet (i.e., six feet by 6,300 feet), the area of potential blockage by the marina would be approximately eight percent of the area that would be available for water to flow through at this depth. Consequently, as  $Q = VA$  (where  $Q$  = discharge in cfs,  $V$  = velocity in feet per second, and  $A$  = area in square feet), this eight percent decrease in cross section would necessitate an equivalent increase in the velocity of water in the upper six feet of the lake as it moves past Alternative 3, or an eight percent rise in lake elevation at that point. The principal impact of the marina would be realized in an increase in lake current velocity as water in the upper six feet moves around the marina. With expected flood stage velocities near Alternative 3 of 0.2 to 0.4 feet per second, an eight percent increase in velocity is considered to be a minor impact under the circumstances. Note that at higher flood stages the lake level often rises from ten to 20 feet above conservation pool, which would increase the cross section area for the upper six feet of water, thus reducing the impact of the marina on lake currents.

Shoreline erosion can have many negative impacts on an aquatic system, including increased turbidity and sedimentation, habitat destruction, and nutrient release which can potentially cause algal blooms. In addition, erosion can affect the integrity of shoreline structures and negatively affect property values (Marinfo, 2007). In order to assess the potential for Alternative 3 to increase shoreline erosion, a Reflected Wave Analysis was performed by the marina designer (Atlantic-Meeco, 2007). The results of this analysis (see **Appendix D**) indicate that waves

reflected by the marina and its structures would have only negligible effects on shoreline erosion. In addition, as a certified member of the CTMP, White Bluff Marina has measures (discussed above) in place to reduce potential impacts to shoreline erosion which might be generated by other sources. Thus, it is not anticipated that the marina would have adverse effects on the lake's physical characteristics.

### Section 10

#### *No-Action Alternative and All alternatives*

Whitney Lake is not regulated under Section 10, and none of the potential alternatives under consideration would require any action under Section 10.

### Section 404

#### *No-Action Alternative*

In the absence of the construction of additional dock facilities, the No-Action Alternative would have no effect on waters of the U.S., including wetlands, and would not require any action under Section 404. However, construction of the additional 105 boat slips authorized under the existing lease would necessitate the creation of dock facilities north of the existing rental docks in the cove as described above in **Section 3.2.2**. These docks would be secured by shore columns, as described above, as well as by 16 concrete block anchors which are three feet by three feet by seven feet in size (see **Appendices B-2** and **B-6**). Each block anchor would result in 2.33 cubic yards of fill below the ordinary high water mark of the lake, with a combined fill of 37 cubic yards. Fill of this magnitude and for the purpose of securing floating docks would be authorized under RGP-8 for Section 404 impacts. No dredging would be necessary to construct this alternative.

#### *Action Alternatives*

##### Alternative 1

This alternative would have the same potential impacts as described above for the No-Action Alternative, and potential construction of docks would likewise be addressed by RGP-8.

##### Alternative 2

Construction of this alternative would require the placement of 32 concrete block anchors to secure floating docks (see **Appendices B-4** and **B-6**), which would result in 75 cubic yards of fill below the ordinary high water mark of the lake. Accordingly, this alternative would not be

covered by RGP-8, which has a limitation of 50 cubic yards of fill. Instead, impacts to waters of the U.S. would be authorized by NWP 25 as these anchors are tightly sealed forms that are a standard member of the floating structures. No dredging would be necessary to construct this alternative.

### Alternative 3

At ultimate buildout, this alternative would require 78 concrete block anchors to secure floating docks and 74 anchors to secure wave attenuators (see **Appendices B-6** and **B-12**), which would result in 354 cubic yards of fill below the ordinary high water mark of the lake. As this alternative exceeds the RGP-8 limitation of 50 cubic yards of fill, compliance with Section 404 would be achieved under NWP 25 as these anchors are tightly sealed forms that are a standard member of the floating structures. No dredging would be necessary to construct this alternative.

## **3.4.2 Water Quality**

### **3.4.2.1 Affected Environment**

Whitney Lake is identified as Segment 1203 within the Brazos River Basin. According to the Draft 2010 Texas Water Quality Inventory, recent water quality sampling at Whitney Lake indicates all evaluated water uses are either fully supported or present no concern (TCEQ, 2010). The water uses evaluated were aquatic life use, recreation use, general use, and public water supply use.

### **3.4.2.2 Environmental Consequences**

#### *No-Action Alternative*

The No-Action Alternative would have minor temporary impacts on water quality during construction of an additional 105 boat slips due to potential for release of debris and sediment disturbance when anchoring additional slips. Existing surface water runoff characteristics would not be affected by this alternative, and storm water runoff would continue to enter Whitney Lake via existing channels and swales. Although potential construction of an additional 105 boat slips would be authorized by the existing lease, which could include the construction of boat slips up to 30 feet in length, this construction would not include the addition of a sewage pump out station to empty boat holding tanks.

#### *Action Alternatives*

### Alternative 1

This alternative would have the same potential impacts as described above for the No-Action Alternative.

### Alternative 2

The proposed marina would require the replacement of approximately 1.1 acres of existing grass areas on USACE land within the existing marina lease area with impervious surfaces in the form of parking lots and sidewalks (see **Figure 3-5** and **Appendix B-3**). The storm runoff from these facilities would drain directly into Whitney Lake after passing through the water quality control measures necessary to meet control standards. These impervious surfaces would increase the amount of runoff, which may include oils and other road debris, entering Whitney Lake as compared to existing surfaces, but the precise amount of expected runoff increase has not been modeled. Assuming that nearly all of the runoff from the 1.1 acres of impervious facilities would reach Whitney Lake during each storm event, then the amount of additional runoff would be approximately 1.1 acre-inches (i.e., 0.09 acre foot) per inch of rainfall. Storm runoff from the marina land-based facilities would reach Whitney Lake within a few minutes, in contrast to much longer delays upstream as runoff works its way through the Brazos River tributary system. Also, according to a volumetric survey of the lake (TWDB, 2005), a tenth of an inch rise in water surface elevation represents nearly 2,300 acre feet of increased lake at the conservation pool level. Consequently, the amount of additional runoff in relation to the storage capacity of the lake and the timing of runoff entering the lake would not have a noticeable effect on reservoir flood management. Specific mitigation for this increase in storm runoff is not warranted.

As a Clean Texas Marina, White Bluff has measures in place to reduce pollution from a variety of sources, including stormwater runoff, and to adopt shoreline erosion control measures as applicable. Such measures include having a stormwater pollution prevention plan (SW3P), encouraging vegetative growth around parking lots and avoiding impacts to trees, and disposing of hazardous waste in accordance with federal and state regulations. BMPs, as outlined by the Texas Commission on Environmental Quality (TCEQ), would be incorporated to minimize sedimentation during construction and rainfall events. Additionally, the construction of this alternative would not include the addition of a sewage pump out station to empty boat holding tanks. This alternative does not include dredging, but would have minor temporary impacts on water quality during construction due to potential for some sediment disturbance when

anchoring additional slips. It is not anticipated that construction of the proposed project would have an appreciable effect on water quality.

### Alternative 3

The proposed marina would require the replacement of approximately 2.1 acres of existing grass areas on USACE land within the existing marina lease area with impervious surfaces in the form of parking lots, sidewalks, and other pedestrian facilities serving the proposed marina (see **Figure 3-6 and Appendix B-11**). In addition, approximately 0.1 acre of similar impacts would be necessary for the construction of sidewalks and stairs to support the proposed marina expansion. These impacts would result from access sidewalks to both the southern and northern marina access ramps, as well as impacts associated with constructing shore anchor columns. An additional 0.9 acre of impervious surface would be constructed on Double Diamond property adjacent to the existing lease. The storm runoff from these facilities would drain directly into Whitney Lake after passing through the water quality control measures necessary to meet control standards. These impervious surfaces would increase the amount of runoff, including potential for road debris, entering Whitney Lake as compared to existing surfaces, but the precise amount of runoff increase has not been modeled. Assuming that nearly all of the runoff from the 3.1 acres of impervious facilities would reach Whitney Lake during each storm event, then the amount of additional runoff would be approximately three acre-inches (i.e., 0.26 acre foot) per inch of rainfall. For the same reasons outlined in the discussion of impacts for Alternative 2, above, the amount of additional runoff in relation to the storage capacity of the lake and the timing of runoff entering the lake would not have a noticeable effect on reservoir flood management. Specific mitigation for this increase in storm runoff is not warranted. Similarly, the observations made above for Alternative 2 with regard to BMPs apply equally to Alternative 3.

Alternative 3 would differ from the other alternatives in that a sewage line would be constructed to allow the removal of sewage from the landside restrooms, the ship's store, and boat pump out station at a courtesy dock (see **Appendices B-9 and B-11**). Final design of the facilities would comply with Clean Texas Marina standards to prevent spillage and ensure no contamination of lake water would occur from these operations. This will include a requirement to ensure that no discharge of sewage may occur during periods of inundation during flooding events. This alternative does not include dredging, but would have minor temporary impacts on water quality during construction due to potential for some sediment disturbance when

anchoring additional slips. It is not anticipated that construction of the proposed project would have an appreciable effect on water quality.

### **3.5 BIOLOGICAL RESOURCES**

#### **3.5.1 Wildlife and Fish**

##### **3.5.1.1 Affected Environment**

Whitney Lake supports approximately 40 species of fish, and attracts fishermen from across the region. The principal native and introduced game fish species include largemouth bass (*Micropterus salmoides*), striped bass (*Morone saxatilis*), white bass (*Morone chrysops*), smallmouth bass (*Micropterus dolomieu*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), flathead catfish (*Pilodictus olivaris*), and sunfish such as Bluegill (*Lepomis macrochirus*). The lake is stocked nearly every year with fingerling-sized individuals of at least one of the above species. Various other species such as shad, shiners, and minnows are also present. Multiple microbial communities, including cyanobacteria, zooplankton, and various protists are present throughout the lake.

Common mammal species in the Whitney Lake vicinity include white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), swamp rabbit (*Sylvilagus aquaticus*), fox squirrel (*Sciurus niger*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), and bobcat (*Felis rufus*). Approximately 300 different bird species have been documented in the area, with both migratory and resident species occurring in abundance. Species include a variety of waterfowl, birds of prey, woodpeckers, songbirds, and many others. Various species of turtles, reptiles, toads, frogs, and salamanders are also present within and around Whitney Lake.

##### **3.5.1.2 Environmental Consequences**

###### *No-Action Alternative*

No fish or wildlife species would be adversely affected by this alternative. In the event additional boat slips are added to the north end of the cove, this would occur in an area which is already developed and populated. Those fish and wildlife living within the vicinity of the project are exposed to human activity on a daily basis. The potential expansion of the marina already authorized under the existing lease would accommodate more boats than the existing facility, so

there would be an increased human presence in the project area. However, ultimate buildout of White Bluff Resort residential parcels would increase human activity in the area as well. The increase due to the marina expansion would be similar to that felt due to the expansion of the White Bluff Resort community already taking place. Because development has occurred and continues, the increase in human presence and activity at the marina would not have a substantial additional effect on local wildlife, including waterfowl.

Any expansion of the existing marina under this alternative would be accompanied by a very minor terrestrial footprint which would be limited to several short walkways to connect new dock facilities with existing parking areas and White Bluff Drive. Construction of such short foot paths would occur exclusively within areas of maintained grass. This vegetative type is not considered a valuable resource for wildlife habitat. It is not anticipated that these short sidewalk structures would have an impact on wildlife in the project area. The marina and associated floating components would be located in a portion of the lake which is not recognized for having valuable fish and wildlife habitat. The total buildout of the proposed marina, which would include the placement of 16 concrete block anchors on the cove bottom, would not substantially affect local fish and wildlife species.

### *Action Alternatives*

#### Alternative 1

This alternative would have the same potential impacts as described above for the No-Action Alternative.

#### Alternative 2

This alternative would have the same general impacts as described above for the potential expansion of boat storage possible under the No-Action Alternative. The terrestrial footprint of this alternative differs from the No-Action Alternative because it would include the construction of two parking areas, an access road for the northern parking lot, and sidewalks to provide access from parking areas to docks covering a total of 1.1 acres (see **Appendix B-3**). These parking areas and access ways would be located almost exclusively within areas of maintained grass. This vegetative type is not considered a valuable resource for wildlife habitat. The few existing trees within the project area have been incorporated into the overall design, and would not be removed. The area which would be disturbed to construct the proposed ground facilities is negligible when compared to the amount of habitat (trees, riparian areas, and other types)

found within White Bluff Resort and surrounding Whitney Lake. It is not anticipated that these structures would have an impact on wildlife in the project area. The marina and associated floating components would be located in a portion of the lake which is not recognized for having valuable fish and wildlife habitat. The total buildout of the proposed marina, which would include placing 32 concrete block anchors on the cove bottom, would not substantially affect local fish and wildlife species.

### Alternative 3

Expected impacts to fish and wildlife for this alternative would be similar to those described for Alternative 2, above, except that new areas of paved surface would include 2.2 acres on USACE property and 0.9 acre on adjacent private property (see **Appendix B-11**). Also, this alternative would require the placement of 152 concrete block anchors to secure floating docks and wave attenuators. This larger footprint, however, would not constitute other than minor impacts to fish and wildlife in the area.

The marina and associated floating components would be located in a portion of Whitney Lake which is not recognized for having valuable fish and wildlife habitat. Any tree snags (potential habitat) which would be removed in order to accommodate the marina are numerous throughout Whitney Lake. In addition, consultation with Whitney Lake scientists from Baylor University's CRASR indicated that such snags are not considered to be favored or vital habitat for local aquatic species (White, 2007). The removal of tree snags would not likely have an adverse effect on any fish or wildlife species, nor would the total buildout of the proposed marina substantially affect local fish and wildlife species.

## **3.5.2 Aquatic Vegetation**

### **3.5.2.1 Affected Environment**

Aquatic vegetation within Whitney Lake includes bushy pondweed (*Najas* sp.), buttonbush (*Cephalanthus occidentalis*), bulrush (*Scirpus* sp.), coontail (*Ceratophyllum demersum*), pondweed (*Potamogeton* sp.), and water willow (*Justicia* sp.). Much of the submerged project area was once forested (see historic aerial photographs in **Appendix C-2**). Many of the hardwood trees still remain as dead branches and snags along the bluffs and lake bottom (see **Appendix C-9**, Photographs 6-9). A variety of algae (including diatoms and green algal groups) has also been documented within the body of the lake.

*Prymnesium parvum* is a toxic golden alga which causes fish kills in several Texas aquatic systems. Whitney Lake has been subject to such fish kills, caused by large blooms of the alga. TPWD, along with the TCEQ and CRASR, monitors levels of *Prymnesium parvum* and other microbial organisms in Whitney Lake. The last kill on Whitney Lake occurred in early 2007, and killed off hundreds of individual fish representing several species including threadfin (*Dorosoma petenense*) and gizzard shad (*Dorosoma cepedianum*), freshwater drum (*Aplodinotus grunniens*), crappie (*Pomoxis* sp.) and gar (*Lepisosteus* sp.). While it is not believed *Prymnesium parvum* is harmful to humans or other wildlife, the cost associated with managing such fish kills can be extensive. Monitoring of Whitney Lake, along with several other aquatic systems in Texas, is ongoing.

### **3.5.2.2 Environmental Consequences**

#### *No-Action Alternative*

In the event additional boat slips are constructed under the existing lease, no aquatic macro vegetation would be affected due to the basin having been dredged in the Spring of 2009. Expansion of the existing marina would affect surface water, and could disrupt microbial communities in the project area. Any effects on such organisms would be temporary and localized to the area of construction. Normal population dynamics would be unaffected throughout the rest of the lake, and become re-established within the new marina area shortly after construction. This alternative would also not increase the occurrence of *Prymnesium parvum* within Whitney Lake. Increased algal blooms would be caused by influxes of limiting nutrients, such as phosphorous and nitrogen, and the potential marina expansion would not constitute a source for such elements. Therefore, effects to the lake's aquatic vegetation would be negligible.

#### *Action Alternatives*

##### Alternatives 1 and 2

These alternatives would have the same potential impacts as described above for the No-Action Alternative.

##### Alternative 3

This alternative would have the similar impacts as described above for the No-Action Alternative, except that the area proposed for this alternative has not been dredged. This alternative would involve removal of the dead tree snags along the lake bottom within the

project area to avoid damage to boats. Any aquatic vegetation growing on the snags would also be removed in the process. As much of the lake bottom is lined with snags, removal of these trees would not have a substantial effect on overall aquatic vegetation associated with tree snags. Moreover, as noted in the previous section, tree snags are not considered an important source of habitat for fish and wildlife.

### **3.5.3 Terrestrial Vegetation**

#### **3.5.3.1 Affected Environment**

According to the TPWD map of the vegetation types of Texas, the project area lies within the “Oak-Mesquite-Juniper Parks/Woods” vegetation type (TPWD, 1984). This ecosystem is characterized primarily by post oak (*Quercus stellata*), mesquite (*Prosopis glandulosa*), and Ashe juniper (*Juniperus ashei*) savannas and forests, growing in association with a variety of other oak, cedar elm (*Ulmus crassifolia*), and hackberry (*Celtis laevigata*) trees with various short and mid-grasses dominating open areas. Similarly, the project area is included in the eastern most portion of the Lampasas Cut Plain in the Flora of North Central Texas (Diggs et al., 1999), and is characterized by vegetation elements from Cross Timbers areas to the east and west, and the Fort Worth Prairie to the north. According to this source, vegetation in the area is highly variable because of topographic diversity and variations in soil depth (shallow hilltop soils over limestone to deep soils in drainages).

Vegetation observed within the project area during a field survey in May 2007 is consistent with the general descriptions outlined above, and has retained a savanna-like aspect (see Photographs 11-15 in **Appendix C-9**) for several decades. An aerial photograph from 1943 (see **Appendix C-2**, Page 1) indicates that areas with existing mature forest trees have likely experienced little disturbance over the past 100 years. That is, originally, the entire project area was covered with forest vegetation, except for rocky areas that now make up the southern portion of the White Bluff escarpment that is also part of the Whitney Lake shoreline.

Substantial changes occurred between 1958 and 1964 on both land owned by USACE and adjacent privately owned land, causing much of the forested vegetation to be removed as evidenced by the contrasting aerial photographs in **Appendix C-2**, Page 2. These changes were apparently the result of mechanical tree/brush clearing operations, as the result was to clear woody vegetation from hillsides and bottoms with relatively deeper soil while leaving dense forests on the shallower soils located in hilltop areas. It is not likely that tree mortality

during this time was influenced by inundation from lake water because USACE lake records indicate that lake levels during the period 1958 through 1964 were generally near 520 feet above MSL, and most of the land clearing was above the conservation pool elevation; the lake level reached or exceeded the conservation pool on two occasions during this period (i.e., maximum of 533 feet in 1958, and nearly 537 feet in 1959). In addition, dead tree snags (or shadows cast by them) are not visible in the 1964 aerial photograph which is taken as an additional indication of mechanical clearing activity. A general absence of most grasses that would otherwise be expected in the area suggests that the disturbed areas were reseeded.

The data in **Table 3-1** characterizes the land cover within the four areas of existing and proposed land- and water-based areas associated with the existing White Bluff Marina, comprising all areas where impacts could occur for the No-Action Alternative and Alternatives 1 and 2, as well as the areas included within the proposed areas on land and water needed for Alternative 3. A description of each of the vegetation types is provided below.

**Table 3-1. Land Cover for Areas Potentially Affected by the Proposed Project**

AREA	Grass Area	Riparian Woodland	Upland Woodland	Water	Rock or Paved *
Existing Lease Land (11.9 acres)	9.8	0	0.8	0.1	1.2
Existing Lease in Cove (9.3 acres)	0	0	0	9.3	0
Proposed Lease Land Expansion (2.9 acres)	0.1	0	1.6	0.2	1.0
Proposed Marina Expansion on Lake (18.0 acres)	0	0	0	18.0	0
TOTAL (42.1 acres)	9.9	0	2.4	27.6	2.2
* Impervious areas within the existing lease are all road surfaces; the proposed lease land expansion includes approximately 1.0 acre of limestone rock surfaces.					

Grass Areas: These areas are dominated by grass species, but a great diversity of forb vegetation is also seen. Grass areas within the study area are periodically mowed, and afford little habitat for wildlife. Few of the native grasses that would be expected to dominate the area are present, except for Texas wintergrass (*Nassella leucotricha*), silver bluestem (*Bothriochola laguroides*), and tumble grass (*Schedonnardus paniculatus*). Other grasses in the area are indicative of past use of the area for crops and/or grazing, such as cultivated oats (*Avena sativa*), Johnson grass (*Sorghum halepense*), perennial ryegrass (*Lolium perenne*), and

Bermuda grass (*Cynodon dactylon*). Other grasses observed in the area include Japanese brome (*Bromus japonicus*), rescue grass (*Bromus catharticus*), and little barley (*Hordeum pusillum*). While numerous forbs were observed in the area, dominants include western ragweed (*Ambrosia psilostachya*), blanket flower (*Gaillardia pulchella*), Texas bluebonnet (*Lupinus texensis*), Indian paintbrush (*Castilleja* sp.), horse-nettle (*Solanum carolinense*), silver-leaf nightshade (*Solanum elaeagnifolium*), and giant ragweed (*Ambrosia trifida*). Other herbaceous plants in the area include milkweed (*Asclepias* sp.), bindweed (*Convolvulus* sp.), butterfly-weed (*Gaura* sp.), pepperweed (*Lepidium* sp.), sensitive briar (*Mimosa* sp.), wood sorrel (*Oxalis* sp.), plantain (*Plantago* sp.), dock (*Rumex* sp.), goat's beard (*Tragopogon* sp.), vervain (*Verbena* sp.), ironweed (*Vernonia* sp.), vetch (*Vicia* sp.), and prairie coneflower (*Ratibida columnifera*).

Riparian Woodlands: Upland woody and herbaceous vegetation extend up to the Whitney Lake shoreline, which is characterized by limestone rock outcrops throughout the project area (see **Appendix C-9**, Photograph 8). The abundance of rocky or thin soils along the shoreline combined with frequent fluctuations in the lake level may contribute to a general absence of vegetation that is distinctly riparian in nature. Although riparian plants as black willow (*Salix nigra*) and new-deal weed (*Baccharis* sp.) were observed in isolation or in small groups scattered along the shoreline, these were not found in sufficient abundance (i.e., less than 0.1 acre) to identify and map from aerial photographs and have been included with the upland woodlands category.

Upland Woodlands: Woody vegetation in the existing marina lease land area consists primarily of solitary mature trees that survived land clearing operations decades ago; these isolated trees are observable in the aerial photograph in **Figure 1-2** and **Appendix C-10**, and have a combined aerial cover of approximately 0.6 acre. For example, several of the trees in the savanna area north of the marina cove are plateau oaks (*Quercus fusiformis*) that range in diameter at breast height (dbh) from 20 to 29 inches; a 14-inch dbh pecan (*Carya illinoensis*) also stands close to the cove inlet. These trees are 30 to 50 feet in height with spreading canopies. The remaining 0.2 acre of upland woody vegetation within the existing lease is dominated by Ashe juniper and mesquite forest with trees generally under 30 feet tall with approximately 80 percent canopy cover. Upland forests that are within the 2.9 acres of land that would be part of the proposed marina lease expansion occur in patches along the limestone rock outcrops near the lake shoreline. These forests patches comprise approximately 1.6 acres dominated by Ashe juniper and mesquite trees with canopy closure of at least 80 percent and

trees generally less than 30 feet high. Cedar elm and hackberry trees also occur within these forest areas, which are further characterized by an understory dominated by bushes and vines such as prairie flameleaf sumac (*Rhus lanceolata*), greenbrier (*Smilax bona-nox*), gum bumelia (*Bumelia lanuginosa*), grape vine (*Vitis* sp.), and Eve's necklace (*Sophora affinis*).

### **3.5.3.2 Environmental Consequences**

#### *No-Action Alternative*

No terrestrial vegetation would be affected by the No-Action Alternative, unless the additional boat slips (maximum of 105) authorized by the existing lease are constructed. In that event, removal of mowed grass vegetation would be necessary to construct short access sidewalks to marina docks and shore columns for landside anchorage (see **Figure 3-4**). The total land area that may be disturbed to construct these sidewalks and shore columns would be less than 0.1 acre.

#### *Action Alternatives*

##### Alternative 1

This alternative would have the same potential impacts as described above for the No-Action Alternative.

##### Alternative 2

Construction of Alternative 2 would result in the removal of 1.1 acres of maintained grass on USACE land in the existing marina lease area. This area would be replaced by concrete parking lots in the two areas shown in **Figure 3-5**. The parking areas would be designed to ensure that no trees greater than six inches dbh within or near the areas would be removed or damaged during construction. Given the limited habitat quality of mowed grass areas, no mitigation for the loss of habitat in this area is anticipated.

##### Alternative 3

Construction of Alternative 3 would affect a total of 3.1 acres of land, 2.2 acres of which would be on USACE property and 0.9 acre on adjacent Double Diamond property. Approximately 2.1 acres of maintained grass on USACE land in the existing marina lease area would be replaced by parking areas (see **Figure 3-6**). An additional 0.1 acre of impacts would occur in the area of proposed marina expansion, which would affect grass, forest, and rock areas in roughly equal proportions. Besides the USACE land impacts, approximately 0.3 acre of grass-dominated area

and 0.6 acre of forest on Double Diamond property would be affected. Additional temporary impacts would affect grass-dominated areas on both USACE (0.2 acre) and Double Diamond (0.2 acre) land to install the utilities (i.e., fuel line, electricity, water, and sewage) to service the proposed marina (see **Appendix B-11**). In the event flood storage mitigation is necessary to ensure no net loss of lake flood storage capacity, up to one additional acre of grass-dominated privately-owned land may be disturbed.

In summary, Alternative 3 would have permanent impacts to 2.2 acres of vegetation or other land surface on USACE property, and would affect 18.0 acres of lake water surface. The data in **Table 3-2** show the extent of these impacts with respect to the four areas of existing and proposed land- and water-based areas associated with the existing White Bluff Marina lease and proposed expansion to it.

**Table 3-2. Expected Alternative 3 Impacts to Land Cover on USACE Land**

AREA	Grass Area	Riparian Woodland	Upland Woodland	Water	Rock or Paved
Existing Lease Land (11.9 acres)	2.10	0	0	0	0
Existing Lease in Cove (9.3 acres)	0	0	0	0	0
Proposed Lease Land Expansion (2.9 acres)	0.03	0	0.03	0	0.03
Proposed Marina Expansion on Lake (18.0 acres)	0	0	0	18.0	0
TOTAL (22.2 acres)	2.13	0	0.03	18.0	0.03

The proposed project is designed to minimize impacts to trees in the project area. Although several large (i.e., 20 inches dbh or greater) oak trees are within the proposed parking lot footprints, these trees would be incorporated into project design and preserved. Impacts to upland woodland areas would occur along the shoreline where cable columns would be constructed to provide shore anchorage for the proposed marina. With regard to tree impacts, no trees greater than six inches diameter at breast height (dbh) would be removed from this activity. As no trees greater than six inches dbh would be removed for the construction of the marina, and considering the extensive amount of upland forests in the project area, it is anticipated that the impacts of the proposed project would have little effect on upland woodland habitat. Mitigation for trees removed during construction of land-based facilities would be

accomplished on a 1:1 basis. Trees planted would be on USACE property at locations to be determined during final design of the project. No mitigation would be required for the 0.9 acre of vegetation impacts on private property.

### 3.5.4 Threatened and Endangered Species

#### 3.5.4.1 Affected Environment

Section 7 of the Endangered Species Act of 1973 (Public Law 93-205) (ESA) requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) in order to ensure projects do not jeopardize the continued existence of threatened and endangered species. **Table 3-3** contains a list of all threatened and endangered species known to occur within Hill County where suitable habitat exists. Coordination with TPWD indicated that of these species, two are known to occur along Whitney Lake near the project area: the golden-cheeked warbler (GCW) and the black-capped vireo (BCV).

**Table 3-3. Threatened/Endangered Species in Hill County and Expected Effects**

Species		USFWS*	TPWD**	Habitat Requirements	Habitat Present	Species Effects	Justification of Effects
Birds	American Peregrine Falcon ( <i>Falco peregrinus anatum</i> )	—	E	Potential migrant. Nests in tall cliff eyries; migrates through Texas; winters along gulf coast. Open areas, usually near water.	No	No	This species is migratory through the project area and would only potentially utilize the area for temporary stopover.
	Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	DM	T	Nests and winters near rivers and large lakes; nests in tall trees or on cliffs near large bodies of water.	Yes	No	The project area contains some preferred habitat for this species; however, no adverse effects are anticipated.
	Black-capped Vireo ( <i>Vireo atricapilla</i> )	E	—	Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces.	No	No	The project area does not contain the preferred habitat for this species.
	Golden-cheeked Warbler ( <i>Dendroica chrysoparia</i> )	E	E	Juniper-oak woodlands; dependent on mature Ashe juniper (cedar) for long fine bark strips from mature trees in nest construction; nests in various other trees; forage for insects in broad-leaved trees and shrubs.	Yes	No	The project area contains some preferred habitat for this species; however, no adverse effects are anticipated.
	Interior Least Tern ( <i>Sterna antillarum athalassos</i> )	—	E	Sand and gravel bars within braided streams and rivers; also known to nest on man-made structures near water.	No	No	The project area does not contain the preferred habitat for this species.

Species		USFWS*	TPWD**	Habitat Requirements	Habitat Present	Species Effects	Justification of Effects
	White-Faced Ibis ( <i>Plegadis chihi</i> )	—	T	Prefers freshwater marshes, sloughs, and irrigated rice fields; nests in marshes, in low trees, in bulrushes or reeds, or on floating mats.	No	No	The project area does not contain the preferred habitat for this species.
	Whooping Crane ( <i>Grus americana</i> )	E	E	Potential migrant via plains throughout most of the state to the coast.	No	No	This species is migratory through the project area and would only potentially utilize the area for temporary stopover.
	Wood Stork ( <i>Mycteria americana</i> )	—	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water; usually roosts in tall snags.	No	No	This species is migratory through the project area and would only potentially utilize the area for temporary stopover.
Fishes	Sharpnose Shiner ( <i>Notropis oxyrhynchus</i> )	C	—	Brazos River in shallow water in broad, open sandy channels with moderate current.	No	No	The project area does not contain the preferred habitat for this species.
	Smalleye Shiner ( <i>Notropis buccula</i> )	C	—	Brazos River in shallow water in broad, open sandy channels with moderate current.	No	No	The project area does not contain the preferred habitat for this species.
Mammals	Red wolf ( <i>Canis rufus</i> )	—	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas.	No	No	This species is extirpated from the county.
Mollusks	Smooth pimpleback ( <i>Quadrula houstonensis</i> )	—	T	Small to moderate rivers/streams an moderate-sized reservoirs; mixed mud, fine gravel, and sand; tolerates slow to moderate flow, but not dramatic fluctuations in water level. Lower Trinity, Brazos, and Colorado basins.	Yes	No	The project area contains some preferred habitat for this species; however, no adverse effects are anticipated.
	Texas fawnsfoot ( <i>Truncilla macrodon</i> )	—	T	Little known about species; possibly rivers and larger streams; impoundment intolerant; possibly gravel, sand, and sandy-mud bottoms in moderate flow; Brazos and Colorado basins.	Yes	No	The project area contains some preferred habitat for this species; however, no adverse effects are anticipated.
Reptiles	Brazos water snake ( <i>Nerodia harteri</i> )	—	T	Upper Brazos River drainage, in shallow water with rocky bottom and on rocky portions of banks.	No	No	The project area does not contain the preferred habitat for this species.
	Texas Horned Lizard ( <i>Phrynosoma cornutum</i> )	—	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees.	No	No	The project area does not contain the preferred habitat for this species.

Species		USFWS*	TPWD**	Habitat Requirements	Habitat Present	Species Effects	Justification of Effects
	Timber/Canebrake Rattlesnake ( <i>Crotalus horridus</i> )	—	T	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland, limestone bluffs; prefers dense ground cover.	No	No	The project area does not contain the preferred habitat for this species.
<p>* U.S. Fish and Wildlife Service listing (E = Endangered, T = Threatened, C = Candidate for Listing, PDL = Proposed Delisted)  ** Texas Parks and Wildlife Department listing (E = Endangered and T = Threatened)  Sources: TPWD Annotated County List of Rare Species as revised 1/15/2010 (TPWD, 2010b); USFWS—Southwest Region, Endangered Species List for Hill County as of 2/15/2010 (USFWS, 2010).</p>							

TPWD maintains the Natural Diversity Database (NDD) to track known occurrences of threatened, endangered, and otherwise rare plant and animal species throughout Texas. Maps and data received from the NDD in February 2010, indicated a three Element Occurrence Records (EOR) of GCW sightings (TPWD, 2010a). The EOR closest to the study area was made in 1996, and reported GCWs in an area approximately two miles to the southwest; the area is a mature juniper and mixed deciduous woodland with 70 percent canopy cover. The other two EORs were made in mature juniper/oak forested areas that are five to six miles to the west or northwest of the study area. The lack of other EORs in or near the project area is not an indication of absence of the rare species in **Table 3-3** that may be expected to be found in Hill County where suitable habitat exists.

### Bald Eagle

The bald eagle has been reported at various locations at Whitney Lake, but none within the project area have been reported. It is possible that the bald eagle could use some trees along the shoreline for perching; however, nesting would likely occur in areas farther removed from human development (Kaufman, 2000; NGS, 2002).

### Black-Capped Vireo

The BCV is a migratory bird which nests in the region during its breeding season, approximately March through August. Preferred habitat consists of scrubby oak within rocky hill country containing open spaces.

BCV habitat typically consists of oak-juniper woodlands with shrub vegetation that could provide coverage from the base of the plant to approximately six feet. Also, density of preferred vegetation is approximately 30 to 60 percent coverage, interspersed with open areas. These vegetative conditions are often found in rocky gullies, edges of ravines, and on eroded slopes (Grzybowski, 1995).

A habitat assessment of the entire government property surrounding Whitney Lake was conducted in 1996 and found marginal amounts of BCV habitat (USACE, 2006). BCV breeding surveys conducted over three years, 1996-1998, upon a combined total of 2,645 acres observed three BCVs. A site visit conducted by environmental scientists from Halff Associates on May 17, 2007 indicated there is no BCV habitat within the project area at White Bluff Resort.

#### Golden-Cheeked Warbler

The GCW is a migratory songbird which nests exclusively within central Texas during the spring months (Campbell, 2003). Its habitat is described as mature juniper-oak woodlands, with 50 percent or greater canopy cover. The warbler requires the shredded bark of older Ashe juniper (*Juniperus ashei*) trees for its nesting material, and prefers tall, densely packed forests, especially those located along slopes and ravines (Kaufman, 2000; NGS, 2002).

A survey conducted in 2002 by The Nature Conservancy revealed a colony of GCW located on private property near the lake. Although few GCWs have been recorded within the resort, there is the possibility of the existence of GCWs due to favorable habitat presence and the proximity to a known GCW colony on nearby private property.

#### Mollusks

The Brazos River channel within Whitney Lake could provide potential habitat for the two mollusk species listed in **Table 3-3**. Factors influencing mussel population decline include aquatic contaminants, population decline of needed host species (necessary for reproduction), and the damming/impoundment of rivers. Little is known about the individual species. No known populations exist within the project vicinity.

### **3.5.4.2 Environmental Consequences**

#### *No-Action Alternative*

No threatened or endangered species would be affected by the No-Action Alternative.

#### *Action Alternatives*

##### Alternative 1

No threatened or endangered species would be affected by Alternative 1.

## Alternatives 1 and 2

The construction of this project would not affect nor remove preferred habitat for any of the species listed in **Table 3-3**. Nearly all trees which could supply nesting material or potential nesting sites (i.e., junipers and oaks) would be preserved during construction and incorporated into the project design. Both locations selected for marina expansion are located away from the Brazos River channel, and would not affect mollusk species which may occur in the area. The project could result in increased activity at the resort both during construction and after the project is built; however, this effect would be negligible as the existing resort already serves the community with a boat ramp, marina, and other recreational amenities. If during construction any of the listed species are noted in the project area, construction would cease and coordination with TPWD and USACE would occur. The proposed project would not have an impact on threatened or endangered species within the project area.

## **3.6 NOISE AND GENERAL AESTHETICS**

### **3.6.1 Affected Environment**

Noise levels are generally measured in decibels (dB) – a relative scale of sound pressure levels (TxDOT, 1996). The human ear perceives only certain frequencies, so adjusted sound levels are used to quantify noise levels in many noise studies. Typical “A-weighted levels” (dBA) are used in the discussion below.

Noise levels within White Bluff Resort are low due to the open, residential nature of the development. Noise levels would typically fall within the range of 60 to 70 dBA. This level is considered average for outdoor commercial areas. Whitney Lake itself is quiet excepting passing boats which can become more numerous in warmer months and on weekends. Vehicular traffic on adjacent roads is restricted to low speeds, keeping traffic noise to a minimum.

The White Bluff Resort is generally characterized by attractive rolling hills covered by oak-juniper savannas cross cut by occasional creek channels. At its western edge, the generally natural setting of the resort culminates with a picturesque limestone cliff along the eastern shore of Whitney Lake. As shown in the photographs in **Appendix C-9**, panoramic views of the lake can be seen from various points within the resort, including one of its two landscaped 18-hole

golf courses. The White Bluff Resort has established aesthetic guidelines to ensure all future structures would help retain and enhance the natural beauty of the area.

### **3.6.2 Environmental Consequences**

#### *No-Action Alternative*

Noise levels and general aesthetics would remain the same under the No-Action Alternative. An increase in noise to areas around the marina cove could occur in the event that the 105 new boat slips authorized by the existing lease are added at the north end of the cove. Noise impacts associated with new boat docks would stem primarily from additional boat traffic on the water. However, as compared to operation of boats on the main body of the lake, boats within the marina cove would be operated at very low speed and would generate relatively little noise. Noise generated on the lake where boats operate at higher speeds would be partially blocked from the immediate vicinity by the limestone bluff. Similarly, noise from boats within the marina cove is largely blocked by the hillside and trees between the cove and its nearest sensitive noise areas (i.e., residences located approximately 500 feet or greater to the northeast of the cove, see **Figure 3-4**). Additional impacts may occur from land activities such as the operation of vehicles which would increase, with a minor increase to the ambient noise levels which already exist throughout the resort (i.e., approximately 60 to 70 dBA). Nearby existing non-residential structures are the resort's restaurant, hotel, and ship's store, which are not considered to be sensitive receptors for noise (particularly as boats would be operated during daylight hours). No noise barriers are proposed as part of the project.

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises (i.e., in excess of 100 dBA) are tolerable. Steps would be taken to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems. These impacts would be temporary in nature, and would not require mitigation.

After construction, no substantial increase in vehicular traffic along White Bluff Drive is likely as a result of this modest increase in the number of boat slips and because of low speed limits within the resort. In addition, increased vehicular traffic is already expected with ultimate buildout of White Bluff Resort residential parcels. As such, any noise impacts generated by land

vehicles attributable to the marina expansion would be minimal, and blend in with existing ambient noise levels (i.e., approximately 60 to 70 dBA).

Addition of new slips to the marina cove would include larger boat slips (i.e., up to 30 feet in length), which may result in onboard socializing. As the ship's store sells alcoholic beverages and consumption of intoxicating liquor is permitted within the resort, this could create a source of noise within the marina. During evening hours, noise from such socializing within the marina may be disturbing to guests in the hotel or home owners within sight of the marina. As part of any expansion of the existing marina and addition of longer boat slips, Double Diamond would impose a quiet hours restriction from 10:00 p.m. to 5:00 a.m. to mitigate possible disturbance of others.

Any new dock facilities to be added to the existing marina would be designed to be a state-of-the-art contemporary facility (see **Appendix B**). The marina has been designed to combine low maintenance with impressive looks. Impacts to general aesthetics would be minor with the addition of new, modern facilities.

#### *Action Alternatives*

##### Alternative 1

This alternative would have the same potential impacts as described above for the No-Action Alternative.

##### Alternative 2

This alternative would have essentially the same type of impacts on ambient noise and area aesthetics as outlined above for the No-Action Alternative. However, impacts related to boat motor noise would be greater because the number of boat slips would be 330 as opposed to the 85 existing boat slips or the 190 slips authorized under the existing lease. Although the number of boats would increase substantially, adverse effects of noise to surrounding areas would be minor for daytime hours because of the physical location of the cove in terms of distance and topography to the nearest residential structures or resort amenities. That is, the distance and natural obstructions between surrounding residential areas and the marina would remain as at present. Additionally, boats within the cove would be operated at low speeds and only a small fraction of the total number of boats would be operating with the cove at a given time.

Noise related to socializing on boats would potentially be greater because this design for marina expansion would include 146 boat slips in the 30-40 feet in length. Any disturbance to local residents would be mitigated through the enforcement of the quiet hours policy described above.

The planned dock system for this alternative would have terrestrial impacts limited to the two additional small parking areas and access sidewalks. The design of these parking areas would not damage existing trees. The cove area would continue to have the general appearance of a marina with uniform design and color for the boat coverings. This design would replace the older, potentially less appealing design which currently exists in the cove with state-of-the-art contemporary facilities. Any old, deteriorating materials would be removed, replaced, or refurbished as part of implementing this alternative. Impacts to general aesthetics would be minor due to the updating of existing facilities to a more modern, clean design. Overall impacts to area aesthetics will be minimized by confining marina expansion within the existing cove.

### Alternative 3

The observations above with respect to Alternative 2 noise impacts also generally apply to Alternative 3. However, this alternative would likely reduce noise impacts to nearby residences because the only boat traffic in the cove would be to launch and retrieve boats. In contrast, an increase in noise would be experienced by guests of the White Bluff Resort inn and restaurant, because there would be no physical barrier between these areas and much of the marina on the main body of the lake (see Photographs 6 and 7 in **Appendix C-9**).

The observations above with respect to Alternative 2 impacts to area aesthetics also generally apply to Alternative 3. However, relocating and expanding the existing marina to the main body of the lake would render the marina highly visible to guests of the White Bluff Resort lodging and restaurant facilities, whereas any modifications to the existing marina in the cove would not be visible from these locations. Relocating the marina to the main body of the lake would also be at least partially visible from nearby residences with a view of the marina cove.

## **3.7 CULTURAL RESOURCES**

### **3.7.1 Affected Environment**

#### Historic Properties

Projects that are federally permitted, licensed, funded, or partially funded must comply with Section 106 of the National Historic Preservation Act of 1966, as amended. Section 106 requires that every federal agency consider the effects of their actions on historic properties. Historic properties are those that are at least fifty years old and that are listed in, or eligible for inclusion in, the National Register of Historic Places (NRHP). The NRHP is a historic resources inventory maintained by the Secretary of the Interior that includes buildings, structures, objects, sites, and districts. Section 106 also requires federal agencies to seek comments from an independent reviewing agency, the Advisory Council on Historic Preservation (ACHP). The ACHP has developed a process for carrying out Section 106 responsibilities which is defined in their regulations entitled Protection of Historic Properties, 36 CFR Part 800.

The Texas Historical Commission's (THC) Historic Sites Atlas was reviewed for any National Register Properties, Recorded Texas Historical Landmarks, State Archeological Landmarks, and Official Texas Historical Markers within 1,300 feet of the project area, as this is the standard size established for study areas in order to facilitate the development of historic contexts. No previously designated historic properties within the study area appear to have been documented. Historic aerial photographs from 1943, 1958, and 1964, plus historic maps from the Texas Historic Overlay from 1933, were also reviewed. There are no extant historic structures within 2,000 feet of the project area.

#### Archeological Sites

As stipulated under Section 106, archaeological resources must be considered prior to implementation of an undertaking that uses federal funding. A search of the THC's Archeological Atlas revealed that only one previously recorded archeological site is located within a 1,000-meter radius of the project location. Site number 41HI31 was recorded in 1947 and is described as a prehistoric open campsite. It now lies beneath Whitney Lake, approximately 733 meters southwest of the project area. Three archeological sites were identified just outside the 1,000-meter radius: 41HI13, 41HI212, and 41HI213. Site number 41HI13 is located approximately 1500 meters southeast of the project location. It was documented in 1947 and again in 1971. It consists of multiple components of prehistoric and historic cultural materials. The prehistoric component is described as an open campsite of lithic material and broken mussel shell. The historic component contains cultural remains of a U.S. Military Fort occupied from 1849 to 1853. The remaining two sites are prehistoric sites consisting of lithic cultural remains. Site number 41HI212, recorded in 1971, lies 1320 meters

northwest of the project location. It is described as a possible quarry site with several lithic cores, lithic flakes and hammerstones collected during investigations. Located approximately 1058 meters northeast of the project area is site 41HI213. This prehistoric lithic scatter consists of chipped stone debris and was recorded in 1971.

A review of historic aerial photos (**Appendix C-2**) of Whitney Lake shows the area has been disturbed by previous ground moving activities. The project area was at one time heavily forested, but underwent a great deal of clear cutting between 1958 and 1964. The area was further disturbed in 1996 and 2009 when the cove was dredged to accommodate the existing marina. An archeological survey was conducted in January 2010 to assess the likelihood of archeological resources to occur within the project area (Cojeen, 2010). The study included shovel-testing and transects, and determined that the areas for terrestrial activities have been impacted in the past, and no cultural materials were observed.

### **3.7.2 Environmental Consequences**

#### *No-Action Alternative and All alternatives*

Based on the cultural resources survey conducted in January 2010 (Cojeen, 2010), USACE determined that no historic properties would be affected by the proposed project. This finding was coordinated with the State Historic Preservation Officer, who concurred with the finding (correspondence included in **Appendix E**). In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area would cease and qualified archeologists would be contacted to initiate post-review discovery procedures.

## **3.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES**

### **3.8.1 Affected Environment**

Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, and the Resource Conservation and Recovery Act, a preliminary investigation was conducted to identify sites within the project area that are "at risk" of environmental contamination by hazardous, toxic, and/or radioactive wastes (HTRW) or materials. The scope of the investigation consisted of the following tasks:

- Review of the proposed route maps, aerial photographs, and historical property information to establish current and former land use;

- Review regulatory agency listings of sites within the study area using a consultant database service; and
- Conduct field reconnaissance to confirm and/or supplement information pertaining to the types of land use in the study area.

Sites considered likely to be contaminated and within the proposed project area are categorized as "high risk." An example of a "high risk" site is a landfill. Sites are categorized as "low risk" if available information indicates that some potential for contamination exists, but the site is not likely to pose a contamination problem to roadway construction.

A federal and state environmental regulatory database review of the project area was conducted to identify potential environmental concerns that could adversely affect the project area. These databases were obtained directly from government sources and are updated on approximately quarterly intervals. The review did not identify any sites of concern within a quarter mile of the project area.

Field reconnaissance and information supplied by Double Diamond identified one facility within 500 feet of the project limits. This facility is identified in the Petroleum Storage Tank (PST) Registration database as White Bluff Marina Market (also known as White Bluff Ship's Store), addressed 1010 Golf Drive (shown in **Figure 3-4**). The facility is registered as a retail facility with two Underground Storage Tanks (UST) onsite (4,000 gallon and 8,000 gallon capacities). The tanks supply vehicular traffic within the resort, as well as boats which dock at the existing marina. The White Bluff Marina Market, including the associated USTs, would be considered a "low risk" facility.

### **3.8.1 Environmental Consequences**

#### *No-Action Alternative*

No impacts to HTRW would occur under the No-Action Alternative. This finding also applies to the possibility of adding boat slips to the marina as authorized in the existing lease, as there would be no modifications to existing facilities that could be sources of HTRW.

#### *Action Alternatives*

##### Alternative 1

This alternative would have the same potential impacts as described above for the No-Action Alternative.

### Alternative 2

The USTs located at the White Bluff Marina Market currently stock the fuel dock at the existing marina within the cove. White Bluff Marina is a certified member of the CTMP. As such, measures are in place to reduce pollution from a variety of sources, including petroleum storage and hazardous wastes. All efforts would be made to minimize effects on the current fuel line, and to prevent spills during and after construction. Construction activities would also comply with stormwater and hazardous spill prevention plans as required by the Texas Pollution Discharge Elimination System (TPDES). Such guidelines are in place to reduce potential impacts and ensure these impacts would be negligible.

The CTMP provides spill kits for boaters, signage and clean boating tips for all boaters which are, and would continue to be, displayed at White Bluff Resort. As a member of this program, the White Bluff Marina meets the standards outlined in the Clean Marina guidebook (CTMP, 2009). The marina is in compliance with fuel and oil storage requirements.

### Alternative 3

The discussion above with respect to Alternative 2 also applies to Alternative 3. In addition, this alternative would involve extending a new fuel line to provide fuel for the ship's store being built as part of Dock A. The safeguards that apply to existing fuel facilities would also be employed with respect to the proposed new fuel line and fueling facility.

## **3.9 AIR QUALITY**

### **3.9.1 Affected Environment**

Air quality is defined by ambient air concentration 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 U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards, including six "criteria pollutants:" lead, ozone, sulfur dioxide, oxides of nitrogen, carbon monoxide, and particulate matter less than 10 microns in diameter. Air quality is regulated nationally by the EPA which delegates authority to the TCEQ for monitoring and enforcing air quality regulations in Texas. Hill County is not designated for

nonattainment within the State of Texas. None of the six criteria pollutants occur in unacceptable levels within Hill County.

### **3.9.2 Environmental Consequences**

#### *No-Action Alternative*

No direct or indirect impacts to air quality are anticipated under the No-Action Alternative. In the event the maximum 105 additional boat slips are constructed as authorized by the existing lease, the operation of these boats would produce pollutants. In addition, some additional air pollution would be attributable to vehicular traffic associated with travel to and from these additional boat slips. Assuming that the increase in boat and automobile exhaust is proportional to the number of slips available for rental, an increase in the number of potential boats a doubling of the number of boat slips (i.e., from 85 to a maximum of 190) would double mobile source air pollution attributable to the marina. It is expected that use of vehicles to travel to the marina and operation of boats would vary substantially throughout the year, during the week, and during the day, such that even periods of high boat use would be of short duration and would allow for adequate mixing with ambient air. Also, very minor amounts of exhaust would be attributable to trucks and other equipment needed to deliver and construct the new boat docks. However, given the overall natural setting of White Bluff Resort and the modest increase in air pollutants from boats and cars as a result of potential expansion of the marina, this alternative would result in minor impacts to ambient air quality.

#### *Action Alternatives*

##### Alternative 1

This alternative would have the similar potential impacts as described above for the No-Action Alternative.

##### Alternatives 2 and 3

These alternatives would have the similar general impacts as described above for the No-Action Alternative. However, greater increases in boat and vehicle emissions would be anticipated in conjunction with these alternative in proportion to the number of boat slips that are constructed and rented to customers. The information that would be necessary to estimate the precise amount of air emission increases is unavailable and can only be qualitatively assessed at this point. Alternative 2 were constructed as planned (i.e., 330 boat slips), this would result in a predicted level of overall air pollution of nearly four times that of the current marina. If all

phases of Alternative 3 were to be constructed (i.e., 511 slips), up to a six-fold increase in air emissions (over existing levels) could result. As noted above, the overall increases in air emissions would be highly localized, would vary substantially over time, and would occur in an area with relatively good ambient air quality. Consequently, none of the alternatives would be likely to violate any state or federal regulatory requirements pertaining to air quality.

## **3.10 RECREATION**

### **3.10.1 Affected Environment**

Each year over two million people visit Whitney Lake to enjoy camping, fishing, boating, sight-seeing, and various other outdoor recreation activities. Visitation is highest over weekends during the summer months, over holidays, and over weekends during hunting season each Fall. At White Bluff Resort, visitors and residents enjoy golf as well as boating, swimming, tennis, and bird watching. The resort itself is currently semi-private, primarily serving residents, but also affords amenities to the public such as lodging, restaurant, and golf course facilities.

Recreation at Whitney Lake is managed by the USACE Fort Worth District. In 2002 the District issued the Water-Related Development Policy for Fort Worth District Lakes (included as Pages 38-42 in **Appendix A**), which established a minimum carrying capacity of 22 acres per boat. The estimated lake boat loading in 2002 based on the full conservation pool surface of 23,560 acres was calculated at 38.2 acres of water per boat. This calculation was based in part on an inventory of 392 wet boat slips at Whitney Lake. This policy indicates that potential lake boat loading may be estimated for future conditions by assuming that one boat will be on the lake for every ten additional wet boat slips, and one boat for every car-and-trailer parking space near a boat ramp. USACE Fort Worth District maintains an inventory of Whitney Lake boating facilities for the purpose of managing boat loading on Whitney Lake according to the foregoing policy. This inventory, updated in August 2010, indicated there are 926 authorized wet slips and a total of 658 car-and-trailer parking spaces near boat ramps at Whitney Lake (USACE, 2010b). Accordingly, the potential number of boats on the water is currently 750, calculated by adding 658 and 92 (i.e., ten percent of the number of wet slips), and the calculated potential lake boat loading is 31.4 acres of water per boat.

### **3.10.2 Environmental Consequences**

### *No-Action Alternative*

Under the No-Action Alternative boating use levels would remain the same (i.e., 31.4 acres of water per boat) because the already-authorized 190 boat slips are included in the USACE Fort Worth District's calculation of potential boat loading for the lake (USACE, 2010b). In addition, the current USACE boat loading calculation for Whitney Lake includes a total of 25 parking spaces for vehicles towing boat trailers in proximity to the White Bluff Marina boat ramp. This level of boat loading complies with the minimum standard of 22 acres of water per boat carrying capacity established for the lake.

### *Action Alternatives*

#### Alternative 1

This alternative would have the same potential impacts as described above for the No-Action Alternative.

#### Alternatives 2 and 3

Recreation levels in and around White Bluff Marina would increase after construction of either of these alternatives. This increase would be gradual, as the marina expansions would be built in phases, and overall use of recreation and lodging amenities at White Bluff Resort would also increase in proportion to an increase in the boats stored in the marina. Although these alternatives plan additional parking for people who rent boat slips, no additional parking spaces for vehicles with boat trailers would be needed or constructed near the boat ramp. Also, prior to the implementation of either alternative, a feasibility study would be completed to demonstrate that local recreational demand warrants the marina expansion above the existing lease limit of 190 boat slips (USACE, 1996). The proposed project would have a positive effect on recreation in the project area, and would be within the lake boat load carrying capacity. The change in lake boat loading for Alternative 2 would be based on an increase of 140 wet slips (i.e., in addition to the existing authorization of 190 slips) and no additional parking spaces for vehicles with trailers. This would result in an increase of 14 boats to the existing 750 potential boats on the water, and potential lake boat loading under this alternative would be 30.3 acres of water per boat. Alternative 3 would increase the number of authorized wet slips by 321 and would not add any new vehicle-with-trailer parking spaces, which would result in a calculated potential boat loading for the lake of 30.1 acres of water per boat.

## **3.11 SOCIOECONOMICS**

### **3.11.1 Affected Environment**

White Bluff Resort is an important economic component of the general area surrounding it and to Hill County. Annual property taxes are paid to Hill County for the 5,500 building lots, nearly 560 residences, and commercial properties including lodging facilities, restaurants, and golf courses. The presence of a boat marina within the resort is not only an attraction for the sale of the remaining building lots, but it also is a factor in the overall appraisal of property values within the White Bluff Resort. In addition, sales taxes are collected from all retail sales in restaurants, the White Bluff Marina Market, and two golf course pro shops. However, no taxes are required to be collected for the rental of boat slips. The resort also provides numerous jobs to the local community, including employment related to lodging and restaurant concessions, as well as maintenance of common areas and golf courses. The resort also benefits the local government by constructing and maintaining its own roads.

The economic feasibility study included at **Appendix A** (see Pages 14-16) discusses the strong direct influence commercial marinas can have on local communities in terms of sales, jobs, income, value added associated with boating use and services, and secondary effects to these categories related to trip spending by boat owners (Hollin, 2007). That study applied an economic impact model to the White Bluff Marina scenario which estimated that the existing marina generates \$353,200 in sales, supports 6.8 jobs with \$121,500 in labor income, and \$191,400 in value added (i.e., property values for the marina as well as nearby areas). The study also estimated that secondary economic effects related to trip spending by boat owners added an additional 20 to 25 percent to each of these direct impact categories. Although these estimates should be considered rough approximations of economic benefits attributable to marina facilities, this approach also provides a relative basis for comparing the future economic benefits of the alternatives.

### **3.11.2 Environmental Consequences**

#### *No-Action Alternative*

No change to the socioeconomics related to the existing marina would occur under the No-Action Alternative, assuming there is no expansion of the existing marina. In the event that the 105 additional boat slips authorized under the existing lease were constructed, there would be positive impacts on retail sales related to boating. This minor alteration in the overall

improvements affecting the White Bluff Resort would have limited appreciation in property values because the marina is located on federal property, therefore property values (and therefore property taxes) would be secondary and limited to the surrounding community. Also, because this alternative assumes continued operation of the marina as a private yacht club, all of the boat slip lessees would be either building lot owners or home owners which would make it unlikely that owning a boat slip would make a tremendous difference in spending habits within the resort or in the vicinity.

Based on the findings of Double Diamond's economic feasibility study (Hollin, 2007), existing marinas at Whitney Lake are unlikely to expand appreciably in the future and no new marinas are planned. Therefore, any expansion of the White Bluff Marina, particularly the increase of 105 slips, would not likely adversely affect existing marina operations. Similarly, the potential modest increase in slips under this scenario could result in the creation of new long-term employment opportunities.

### *Action Alternatives*

#### Alternative 1

This alternative would generally have the same potential impacts as described above for the No-Action Alternative. However, if the marina were to expand to a total of 190 slips and operate as a public facility, it is expected that greater revenues to White Bluff Resort concessions from persons not otherwise affiliated with the resort would likely be realized. Increased use of the marina by boaters who are not now associated with the resort would produce direct economic benefits for the resort concessions as well as trip-related spending in the local community outside the resort.

The economic feasibility study of White Bluff Marina examined the economic impacts of expanding the existing marina to a level near the maximum 190 slips under the existing lease (see Page 32 in **Appendix A**). The results of the study indicate that conversion of the marina to a public facility and the addition of 90 slips would result in a four fold increase in direct and secondary benefits to sales, the number of jobs and job-related incomes, and value added. While these estimated impacts to employment related to the marina expansion are long-term in nature, some short-term employment may be anticipated during the construction of the marina docks.

As noted above for the No-Action Alternative, the potential economic impact on other marinas at Whitney Lake of converting the marina to a public facility and adding boat slips was examined in the White Bluff Marina feasibility study (see Pages 33-34 in **Appendix A**). That study found that existing marinas at Whitney Lake are unlikely to expand appreciably in the future and no new marinas are planned. Moreover, any expansion of the White Bluff Marina would not likely adversely affect existing marina operations particularly because any expansion at White Bluff Resort would focus on creating an upscale, modern facility. The business model for any expansion of the marina would be to capitalize on the synergy of a well-maintained and attractive marina in proximity to the luxury lodging and dining amenities, as well as high-class golfing opportunities that are simply not available with other marinas. Consequently, marina improvements at White Bluff Resort would target a portion of the boating market in surrounding counties that would not otherwise be attracted to existing marinas at Whitney Lake.

The USACE Real Estate Handbook, ER 405-1-12, (USACE, 1985) contains a regulatory policy related to the economics of commercial concessions on USACE property. This policy normally requires USACE to award concessions only after receiving competitive bids. Under this policy, Double Diamond's proposal to alter its lease by converting the marina from a private facility to a public marina would normally require competition. However, Section 8-105a of the regulation authorizes the District Engineer to waive this requirement "where an adjoining landowner has the only means of access to land that is to be leased." In this instance, the entire marina cove is landlocked by White Bluff Resort, which is a private, gated community with not public access roads (i.e., all roads are owned and maintained by Double Diamond). Consequently, it would be appropriate and necessary to apply the waiver authorized under this USACE real estate policy to the conversion of White Bluff Marina to a public facility.

### Alternative 2

This alternative would generally have the same potential impacts as described above for the No-Action Alternative and Alternative 1. In addition, the planned buildout of the White Bluff Marina under this alternative would have substantial benefits the local economy. According to the economic feasibility study conducted for White Bluff Marina, expansion of the existing marina to a marina with 287 total slips would result in a six fold increase over existing levels in terms of direct and secondary impacts to sales, jobs and job-related income, and value added (see Page 32 in **Appendix A**). This economic estimate would approximate the relative level of beneficial economic impacts that would be realized with full buildout of this alternative (i.e., 330

slips). As discussed above, prior to the construction of boat slips in excess of the existing marina lease limit of 190, a feasibility study would be completed to demonstrate that the economic viability of additional marina expansion (USACE, 1996).

### Alternative 3

This alternative would generally have the same potential impacts as described above for the No-Action Alternative and the other alternatives. According to the economic feasibility study conducted for White Bluff Marina, the planned buildout of the White Bluff Marina under this alternative would result in a ten fold increase over existing levels in terms of direct and secondary impacts to sales, jobs and job-related income, and value added (see Page 33 in **Appendix A**).

## **3.12 NATIVE AMERICAN CONCERNS**

### **3.12.1 Affected Environment**

In accordance with Executive Order (EO) 13007, Indian Sacred Sites (1996), no Native American concerns have been identified in the study area and are not likely to arise.

### **3.12.2 Environmental Consequences**

#### *No-Action Alternative and All alternatives*

None of the alternatives would result in impacts to Native American concerns as none have been identified in the study area nor are they likely to arise.

## **3.13 ENVIRONMENTAL JUSTICE**

### **3.13.1 Affected Environment**

EO 12898 on Environmental Justice (1994) directs that federal programs, policies, and activities should not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations. The U.S. Environmental Protection Agency defines environmental justice as the fair treatment for people of all races, cultures, and incomes, regarding the development of environmental laws, regulations, and policies.

Because the White Bluff Marina is wholly contained on land owned in fee by USACE, there are no residential populations located within the marina and therefore there is no possibility for

environmental justice issues to arise as a direct consequence of any changes to the marina. The likelihood that project-related environmental justice concerns may arise within areas outside the marina is discussed as part of the indirect impacts assessment in **Section 3.14**.

### **3.13.2 Environmental Consequences**

#### *No-Action Alternative and All alternatives*

No persons reside within the area of the existing marina lease which is owned by USACE. In addition, areas of proposed expansion outside the lease under Alternative 3 would occur on commercial property owned by Double Diamond, which also has no residents that could be affected. Moreover, there are no Census blocks adjacent to the study area with minority or low-income populations greater than 50 percent and the median household incomes of all adjacent Census blocks is greater than the 2009 U.S. Department of Health and Human Services (HHS) poverty guideline for a family of four, there are no potentially disproportionate impacts to minority or low-income populations. Accordingly, all potential alternatives meet the requirements of EO 12898 on Environmental Justice.

## **3.14 INDIRECT IMPACTS**

### **3.12.1 Indirect Impacts Definition and Methodology**

The discussion of expected consequences of the proposed alternatives to this point has focused on direct impacts, which includes the area within the existing White Bluff Marina lease the area identified for potential expansion of Alternative 3 outside the existing lease on USACE land and on adjacent Double Diamond property. CEQ regulations also require the assessment of a project's indirect impacts, which are defined as the following:

“... effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.” (40 CFR Section 1508.8(b))

As the CEQ definition indicates, both direct and indirect impacts are caused by project activities, but indirect impacts extend beyond the construction/operation footprint and may occur at some future time. This requirement of causation is central to the definition of indirect impacts, and a

foreseeable future event or condition cannot be inventoried as an indirect impact unless it can be said that the event or condition was caused by the project. The discussion of indirect impacts below examines the extent to which the conversion of the White Bluff Marina to a public facility and different expansion scenarios would produce reasonably foreseeable impacts outside the marina area but within an expanded Area of Interest (AOI) or later in time. The AOI used for assessing indirect impacts in this EA comprises the land and resources within the vicinity of the White Bluff Marina area, which is the entire area shown in **Figure 1-2**.

Indirect impacts generally fall into one of two categories. First, construction of a project may result in project-influenced land use changes to nearby areas (i.e., the AOI). This category of impacts typically results from actions taken by other parties, such as private land developers not directly associated with the project. As applied to the proposed project, evaluation of this category of indirect impacts focuses on whether the proposed conversion to a public marina and addition of boat slips would cause new development or redevelopment of land near the marina. Where project-induced land use changes occur, any accompanying impacts to the human and natural environment caused by the changes in land use are also included as indirect impacts. Second, a project may result in encroachment-alteration impacts which include altering the behavior and functioning of the physical environment as a result of project design features. Examples of this category of impacts could include fragmentation of habitat by a roadway, dispersal of pollutants onto adjacent lands, or stream channel modifications that produce impacts downstream beyond the limits of the project footprint. This consideration acknowledges that some impacts of a project may extend beyond the immediate construction area or lease boundary before attenuating completely. Evaluation of indirect impacts therefore examines how much space is required for this attenuation of impacts to occur, and is based on an understanding of cause-effect relationships between the impact causing activities of the proposed improvements and these resources/issues.

Indirect impacts are inherently subject to some level of conjecture as to the extent of changes that may be expected in the project area, with and without the project in place. The CEQ definition above indicates the analysis of indirect impacts should identify impacts that are “reasonably foreseeable,” and CEQ has issued guidance that equates “reasonably foreseeable” with “probable” (CEQ, 1981). In its guidance, CEQ explains that whether a future estimate is speculative, as opposed to probable, should be evaluated in the same manner that an informed land developer would approach the purchase of a parcel of real estate (i.e., based on market

trends and other relevant economic information), based on a logical analysis of reasonably available and relevant information that a person of ordinary prudence and judgment would consider.

### **3.15.2 Expected Indirect Impacts**

The discussion below considers whether indirect impacts may be attributed to the alternatives for the topics which were discussed previously with respect to direct impacts. The likelihood that proposed changes to the existing White Bluff Marina lease would induce changes in land use is explored in the first topic below. The evaluation of the remaining topics focuses on encroachment-alteration effects, and whether substantial indirect impacts would extend beyond the limits of the proposed transmission line easements.

#### *Project Setting and Land Use*

Whether the modification of the existing White Bluff Marina lease is likely to induce land use changes in adjacent areas depends primarily how the presence of a public marina and/or the addition of boat slips (particularly for boats longer than 20 feet) affects land development decisions within the AOI shown in **Figure 1-2**. The likelihood of any induced land use changes is effectively non-existent because of existing ownership and physical characteristics of adjacent land. Much of the land immediately adjacent to the marina is subject to the lake's flowage easement, which precludes construction of habitable structures below 573 feet above MSL. This restriction on land development would prevent most changes in land use from occurring. In addition, existing land uses for the areas surrounding the marina have been pre-determined as part of the White Bluff Resort General Use Plan. The areas surrounding the marina have been developed already as commercial concessions (i.e., hotel, restaurants, ship's store, golf course) or low density residential lots. It is not reasonably foreseeable that operating a public marina or expanding the number of wet boat slips would induce any alteration in the surrounding land uses, nor would these changes to the marina be likely to accelerate the rate of any planned land use changes. Indeed, the primary purpose of expanding the marina and converting it to a public facility is to attract boaters who live in surrounding counties to engage in the existing recreation amenities of the White Bluff Resort.

#### *Climate*

The proposed alternatives are not expected to have indirect impacts on the climate in the AOI.

### Geology and Soils

The impacts of the proposed alternatives on geology and soils would be limited to the proposed construction necessary to implement the alternatives and are not expected to extend to areas farther away.

### Water Resources

The potential effects of the proposed alternatives on waters of the U.S., including wetlands, and lake flood storage are not expected to extend beyond the immediate areas where construction activity would occur. There is a potential for a small increase in sediment within the marina cove or main body of the lake from erosion of soil during parking lot or shore column construction, which could be transported beyond the AOI farther into the lake. In light of the erosion control measures that would be in effect during construction and the limited extent of ground disturbance, such impacts are expected to be minor and of short duration.

### Biological Resources

The proposed improvements to the marina would be limited to the AOI, and virtually no impacts beyond the AOI are likely to affect fish or wildlife populations, threatened or endangered species, or aquatic vegetation.

### Cultural Resources

The proposed alternatives are not expected to have indirect impacts on cultural resources in the AOI.

### Socioeconomics

Consideration of indirect socioeconomic impacts was integrated with the discussion in **Section 3.11** because socioeconomics plays a central role in the purpose for all proposed alternatives. That discussion included a summary of an analysis of indirect economic impacts in **Appendix A** (see Pages 14-16 and 31-34). Substantial economic benefits related to sales, jobs and job-related income, and value added would be realized as the number and size of available boat slips are added to the marina.

### Hazardous, Toxic, and Radioactive Wastes

Based on a review of potential sources of HTRW within White Bluff Resort, there is no reason to expect indirect impacts would generate additional HTRW or increase the likelihood of impacts from existing HTRW.

### Air Quality

The proposed alternatives are not expected to have indirect impacts on air quality.

### Noise and General Aesthetics

The potential indirect impacts of the proposed alternatives on noise that may extend beyond the marina area would largely be restricted to the AOI. Sloping landscape surrounding the marina cove and abundant forested vegetation would attenuate noise such that marina operations would not be heard beyond the general cove area. Similarly, because the general topography of the area slopes toward the marina cove, visibility of the marina would be limited to the AOI. Planned upgrades to modernize and maintain an upscale marina facility would help mitigate any adverse visual impacts of an expanded marina. However, indirect impacts of Alternative 3 would include visibility of the marina on the main body of the lake from thousands of feet lakeward, as there would be unobstructed views of the marina throughout the northern main body of Whitney Lake.

### Recreation

The proposed alternatives would benefit recreation by offering a boat storage option next to luxury resort amenities. This would create a market to attract boaters from surrounding counties, particularly owners of boats between 20 and 40 feet in length, to enjoy the recreation opportunities at Whitney Lake. All alternatives would result in Whitney Lake boat loading that would be well within the lake boat carrying capacity.

### Native American Concerns

The proposed alternatives are not expected to have indirect impacts on Native American concerns in the AOI.

### Environmental Justice

Hill County encompasses 985 square miles (962 on land, 23 on water). The population according to the 2000 Census was 32,321 persons. Potential indirect impacts to populations in

the vicinity of the study area were evaluated for compliance with EO 12898. To accomplish this, U.S. Census data were used in a demographic analysis of the Census block groups and blocks adjacent to the study area as to identify areas with high concentrations of minority and low-income populations (U.S. Census, 2000). As shown in **Table 3-4**, none of the Census blocks indicate a greater than 50 percent fraction of minority or low-income populations (i.e., percent below poverty level). The population of minorities living near the proposed project is lower than that of the county as a whole. In addition, none of the three Census block groups adjacent to the study area reported median household incomes below the 2009 HHS poverty guideline of \$22,050 for a four-person family. Based on the demographic data in **Table 3-4**, there do not appear to be any discernable minority or low income population groups in the AOI or in the areas immediately surrounding White Bluff Resort.

**Table 3-4. Minority and Low-Income Characteristics**

Census Geography <sup>1</sup>		Population							Income		
Census Tract	Block Group	Total Pop.	Race <sup>2</sup>					Ethnicity <sup>3</sup>		% Below Poverty Level <sup>4</sup>	Median Household Income <sup>5</sup> (1999)
			% White	% African-American	% American Indian/Alaskan Native	% Asian American or Pacific Islander	% Other Race	% Hispanic or Latino			
9602	--	3,769	95.2	0.4	0.4	0.05	4.0	4.9	11.1	\$38,082	
	1	1,153	93.8	0.8	0.3	0.09	5.1	5.6	6.2	\$40,395	
	2	1,027	95.1	0.5	0.4	0	4.0	9.7	15.0	\$35,284	
	3	1,589	96.2	0.1	0.4	0.06	3.1	1.2	12.1	\$38,542	
Hill County		32,321	84.2	7.4	0.4	0.3	7.8	13.4	15.7	\$31,600	

**Source:** U.S. Census Bureau, 2000 (accessed 2007).  
**Notes:** Minority populations are identified as either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the total population or other appropriate unit of geographical analysis. For this project, meaningfully greater would be double the percentage of the reference areas (i.e., Hill County).  
1. The census tract/block groups within the project area were used to represent the population potentially affected by the proposed project. Within Census Tracts, only the Block Groups adjacent to the study area were analyzed.  
2. Percent of persons reporting as White, African-American, American Indian and Alaskan Native, and Asian American, some other race, and two or more races.  
3. Percent of persons reporting as Hispanic or Latino ethnic origin. The U.S. Census Bureau considers race to be separate from ethnicity. These persons may be of any race.  
4. 1999 poverty level as reported in the 2000 Census (most recent available). The U.S. Department of Health and Human Services 2009 Poverty Guidelines for a family of four is \$22,050.  
5. 1999 median household income as reported in the 2000 Census (most recent available).

No adverse impacts to any disadvantaged persons or populations in the vicinity of White Bluff Resort would occur under this alternative, but any increase in economic activity at the resort would likely benefit the local community in terms of jobs at the resort. Economic impacts would be focused primarily within the resort, and would affect resort property values and commercial establishments. Also, this expected influx of economic activity would benefit socially and economically disadvantaged persons and populations in the vicinity by supporting existing jobs and creating new employment opportunities.

## 4.0 CUMULATIVE IMPACTS

CEQ regulations (40 CFR Section 1508.7) define cumulative impacts (i.e., effects) as “the impact on the environment which results from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions.” As this regulation suggests, the purpose of cumulative impacts analysis is to view the impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future. These same resources are then evaluated from the standpoint of their relative abundance among similar resources within a larger geographic area. Broadening the view of resource impacts in this way allows the decision maker to evaluate the incremental impacts of the proposed alternative in light of the overall health and abundance of selected resources. In essence, a cumulative impacts evaluation creates a model of the predicted condition of each resource that is independent of the proposed project, and then analyzes the expected impacts of the project within that context to determine if there is a cumulative impact. The discussion below highlights the past, present and reasonably foreseeable actions which have affected or have the potential to affect resources in the project area. Then each resource is examined individually to assess cumulative impacts.

### 4.1 PAST ACTIONS

The project area has been substantially altered from its historic condition. Past actions in this region include construction of Whitney Lake, with numerous recreation facilities such as parks and marinas, as well as residential and commercial development adjacent to and near the lake. Historical uses of many areas surrounding the lake for agricultural practices continues to be evident from aerial photograph of the area (see **Figure 3-1**). Within the immediate project area, **Appendix C-2** shows aerial imagery from 1943 through 2004 indicating tree clearing activities have occurred twice before in the project area.

### 4.2 PRESENT ACTIONS

Kimball Bend Park, located on the northwestern edge of Whitney Lake, near the mouth of the Brazos River, is currently being renovated. The park, managed by the USACE, is undergoing construction to add 35 campsites which would support recreational vehicles. The construction includes shelters, water and electric utilities, and some impervious surfaces. In addition, improvements have been continuing at Ham Creek Park, another USACE park located farther

north on the Brazos River. When finished, this park would have new campsites, parking lots, hiking trails, and other amenities to become a class A campground.

As described in **Section 1.1**, the White Bluff Resort is a 3,450-acre master planned community that is a prominent aspect of the northeast portion of the main body of Whitney Lake. Substantial development within this community has occurred in terms of the construction of roads and utilities infrastructure, subdivision of over 5,500 residential building lots, and the construction of nearly 560 residences. Numerous common area amenities exist within this gated community for its members, including tennis courts, swimming pools, and the existing facilities of the White Bluff Yacht Club. The resort also caters to visitors who are not members of the community, by offering to the public luxury lodging and dining facilities, a conference center, spa and recreation facilities, two 18-hole golf courses.

#### **4.3 REASONABLY FORESEEABLE USACE ACTIONS**

There are no reasonably foreseeable USACE actions at this time. Improvements to Kimball Bend and Ham Creek parks are ongoing.

#### **4.4 REASONABLY FORESEEABLE ACTIONS OF OTHERS**

Reasonably foreseeable projects are those which are planned to take place within the next three years. On-going or future projects in the area would include:

- Expansion of the State Highway (SH) 174 bridge near Kimball Bend Park;
- Construction of Alco store in Whitney, TX;
- Construction of new dentist's office in Whitney, TX; and
- Reconstruction of the "King Building" at the White Bluff Inn.

Expansion of the SH 174 bridge, which spans the Brazos River for a distance of approximately 1,000 feet, would include widening the traffic lanes and raising the height of the bridge. Approximately 60 to 80 feet of land would be needed for USACE easements for this project.

The City of Whitney has plans to construct an Alco store on FM 933 behind the existing Brookshire's grocery store. Just north of this, a new dentist's office is expected to be built along FM 933 on the north side of the Whitney High School.

On August 7, 2007, a fire destroyed one of two buildings that make up the White Bluff Inn. Double Diamond plans to rebuild the facility in the near future. This building would be larger than the original, but would be built on currently paved surfaces in the general location of the former “King Building.” Accordingly, very minor impacts would occur from this project.

Correspondence with the Hill County Clerk indicated that, other than those listed above, there are no other projects planned in the project vicinity in the foreseeable future.

A major ongoing foreseeable activity are the continuing changes occurring within White Bluff Resort. Although only ten percent of the building lots have had homes constructed, building of homes will continue. In general, many property owners purchased building lots to construct retirement homes and this will be a principal reason for continued residential construction as property owners reach retirement age. As a master planned community (see resort map on Page 44 of **Appendix A**), the common area recreation amenities were constructed during the initial phases of developing the property and the natural beauty of the area and the availability of these amenities are likely to continue to attract people to the resort to live and /or engage in recreation activities. These facilities, including the road network throughout the resort, were designed and constructed for the ultimate buildout population of the resort. Therefore, future addition or modification of common areas and facilities are not expected to change. Foreseeable changes in the resort are limited to the sale of the few remaining building lots and eventual buildout of residences on all building lots.

## **4.5 ANALYSIS OF CUMULATIVE IMPACTS**

### **4.5.1 Project Setting and Land Use**

The reasonably foreseeable a noted above would collectively have little impact on the setting and land use within the area surrounding the White Bluff Marina. The potential changes in land use under the alternatives would not likely contribute to a cumulative impact to project setting and land use.

### **4.5.2 Climate**

No potential cumulative impacts on local climate are foreseeable.

### **4.5.3 Geology and Soils**

Most of the above projects would require bringing current ground levels to grade. Impacts would disturb only those areas in the immediate project area. All activities would meet municipal ordinances, and conform to local standards. As such, cumulative impacts to geology and soils would not be substantial.

### **4.5.4 Waters of the U.S., including Wetlands**

Improvements to the SH 174 Bridge would require work in and around approximately 2.0 acres of surface water on the Brazos River. All work would be done in accordance with Texas Department of Transportation (TxDOT) guidelines, and would not have substantial impacts upon the river channel. These impacts, in addition to the direct impacts from any of the alternatives, would result in minor cumulative impacts to waters of the U.S., including wetlands.

### **4.5.5 Water Quality**

Ground disturbance around Whitney Lake would temporarily increase sedimentation during construction. Improvements to Ham Creek Park, Kimball Bend Park, White Bluff Inn, construction of homes in White Bluff Resort, and the SH 174 Bridge would contribute to sedimentation levels within the lake. Impacts would be minimized by BMPs and other guidelines. In addition, these effects would be temporary and only felt during construction of each of the projects. Overall impacts to water quality would be minor.

### **4.5.6 Wildlife and Fish**

Most of the proposed ground disturbing activities would take place in areas of maintained vegetation and areas previously disturbed by development. As such, impacts to local wildlife and fish would be minimal.

### **4.5.7 Aquatic Vegetation**

Impacts to aquatic vegetation could occur in conjunction with the improvements at Ham Creek, Kimball Bend, and the SH 174 Bridge. Any impacts to aquatic vegetation would be negligible due to the size and surface area of Whitney Lake, and BMPs which would be in place during construction.

#### **4.5.8 Terrestrial Vegetation**

Impacts due to the expansion of the White Bluff Marina would be restricted to areas of maintained grass. The other projects listed have the potential to impact approximately 40 to 45 acres of similar areas. Construction of homes throughout the White Bluff Resort would have an impact on areas already cleared for building sites. However, home builders would likely preserve mature woody vegetation near home sites for use as native landscaping after construction. These effects would be considered negligible because substantial amounts of vegetation in the form of trees, wildflowers, and other types exist throughout the vicinity. In addition, maintained grass is not considered high quality vegetation or habitat, so any cumulative effects would be considered negligible.

#### **4.5.9 Threatened and Endangered Species**

The improvements to Ham Creek and Kimball Bend Parks have the potential to affect small pockets of possible habitat for GCW birds. These do not regularly support GCW birds and effects would not be substantial. In addition, all impacts would conform with TPWD and USFWS guidelines. As such, no substantial effects would occur from the construction of the proposed projects.

#### **4.5.10 Noise and General Aesthetics**

Temporary noise impacts would occur due to construction of each of the proposed projects. Around Whitney Lake, these projects are removed from each other and would not cause a cumulative effect. In Whitney, construction of the Alco store and dentist's office could occur concurrently and in the same area. All construction activities would conform with city guidelines, and would not have long-term effects on noise. Minor long term increases to noise impact would be expected from additional traffic; however, this would not have a significant cumulative impact.

#### **4.5.11 Cultural Resources**

No cultural resources would be affected by the construction of the proposed White Bluff Marina; therefore, no cumulative impacts would occur.

#### **4.5.12 Hazardous, Toxic, and Radioactive Wastes**

Construction of Alternative 3 would involve extension of the existing fuel line to the proposed new ship's store. Of the other actions taking place in the vicinity, none would have direct or

indirect effects on HTRW. Construction on the SH 147 Bridge would include BMPs as put forth by TxDOT, including stormwater prevention plans. Any effects would be minimized by such practices and guidelines, and would not require mitigation.

#### **4.5.13 Air Quality**

Impacts to air quality would be temporary as construction activities locally increase the amount of dust in the air. The improvements of Ham Creek and Kimball Bend Parks could increase the number of boaters using Whitney Lake at any given time. Increases in boat and vehicle emissions are possible, but would have little effect generally on air quality in the vicinity. After construction, it is not anticipated that any of the other proposed actions would affect air quality.

#### **4.5.14 Recreation**

Improvements to Ham Creek Park, Kimball Bend Park, and White Bluff Resort would increase recreational opportunities on Whitney Lake. All three projects have the potential to increase the number of boats on the lake at any given time. The Kimball Bend Park plans include 30 parking spaces serving the boat ramp, while Ham Creek plans include 50 parking spaces for a new boat ramp. When full, this would increase the number of boats on the lake by 80. The largest proposed marina at White Bluff would have a potential maximum of 511 boat slips (under Alternative 3), which represents an increase 426 slips in addition to the 85 slips already in the marina cove. As discussed in **Section 3.10**, the current boat loading on the lake with 926 authorized wet slips is estimated to be 31.4 acres per boat. This boat loading calculation by USACE includes the parking spaces for vehicles and trailers for Ham Creek Park and Kimball Bend Park. The largest expansion of the White Bluff Marina under an alternative (426 new slips), combined with the 80 additional boats from foreseeable projects described above, would result in a modified lake boat loading of 30.1 acres per boat. This level of lake boat loading is well within the Fort Worth District lake carrying capacity of 22 acres per boat (see Pages 39-43 of **Appendix A**). No adverse cumulative effects to recreation would result from this project.

#### **4.5.15 Socioeconomics**

Positive impacts to the local economy would be realized during construction of the proposed projects. After construction, the Alco store and dentist's office would be permanent commercial facilities which could provide jobs within the vicinity. Combined with the economic benefits associated with expanding White Bluff Marina, it is anticipated that construction of these projects would result in beneficial cumulative impacts. Beneficial effects to local populations

would also be felt in the form of increased road safety (SH 174), retail options (Alco, dentist), and recreational activities.

Based on the study of economic benefits of the existing White Bluff Marina and proposed alternatives in **Section 3.11** (see also detailed analysis in **Appendix A**), conversion of the marina to a public facility and addition of modern boat slips would have substantial and beneficial economic cumulative benefits affecting sales, tax revenues, jobs and job-related income, property values, and trip related purchases within the local community. This study also examined the potential for direct or indirect impacts to other marinas at Whitney Lake. It was determined that other marinas are not likely to be expanding appreciably, and that expansion of the White Bluff Marina would have little if any effect on those marinas.

#### **4.5.16 Native American Concerns**

No cumulative impacts would occur to Native American Concerns.

#### **4.5.17 Environmental Justice**

In light of the overall positive economic benefits expected from the foreseeable actions described above, no minority groups would be adversely affected by the construction of the marina, or by the construction of the other projects in the area.

### **4.6 SUMMARY OF CUMULATIVE IMPACTS**

The analysis of cumulative impacts identified both beneficial and adverse impacts to project-area resources. Beneficial impacts to recreation and socioeconomics would result from the proposed project and projects listed above. No adverse cumulative effects would occur to existing marinas at Whitney Lake.

The potential for cumulative adverse impacts to waters of the U.S. and terrestrial vegetation are possible as a result of these projects. Impacts associated with Alternative 2 would include approximately 9.3 acres of surface water and 1.1 acres of maintained grass. Impacts associated with Alternative 3 would include approximately 18 acres of surface water, 2.1 acres of maintained grass, and less than 0.1 acre of forest. Waters of the U.S. are regulated by the USACE under authority of Section 404 of the CWA, and authorization for the proposed expansion would not occur until after public and agency comments have been received. With regard to vegetation impacts, maintained grass is not generally considered to be valuable

vegetation for wildlife habitat and potential loss of 1.1 to 2.1 acres of this vegetation type would not contribute to a meaningful cumulative impact. Although forest habitat is relatively valuable for wildlife, the expected minor loss of forest vegetation under either alternative would not contribute to a substantial cumulative impact in the project area.

Potential cumulative impacts to all other resources or issues considered would be negligible to minor.

## 5.0 MITIGATION FOR THE PROPOSED ACTION

No mitigation is warranted for vegetation impacts associated with either the No-Action Alternative or Alternative 1, including the possibility that the existing marina could expand to 190 total boat slips. These alternatives would place new boat slips within the marina cove and ground-disturbing impacts would effectively be limited to minor soil removal to construct short sidewalks and install shore cables. All fill material above the conservation pool elevation would be balanced by the removal of an equal volume of excavated material to an area on private property above the flowage easement elevation. Any areas of surface soil disturbance will be reseeded with native herbaceous vegetation.

Alternatives 2 and 3 would both result in introduction of fill material within the flood storage elevation zone for Whitney Lake to construct parking facilities and access sidewalks to docks, and to install shore columns. In addition, Alternative 3 would construct a restroom facility within the flood storage zone of the lake. Final design plans for either of these alternatives will ensure that no net reduction in the lake's flood storage capacity will occur. This will be accomplished primarily by removing an equal amount of excavated earth material and relocating it on Double Diamond property above the flowage easement elevation (573 feet above MSL). A flood storage mitigation area will be used to achieve this volumetric balance in the event there is insufficient volume of excavated material on site.

Mitigation has already occurred for potential impacts to secondary lake water uses attributable to water at or below conservation pool elevation (533 feet above MSL). These impacts would occur with the installation of concrete anchor blocks under the water surface and from water displacement resulting from the submerged portion of floating docks. The volume of water displacement from these sources ranges from 553 to 3,926 cubic yards for the potential construction of docks under all of the alternatives. Such potential impacts would be offset by the estimated 60,000 cubic yards of material that was dredged from the marina cove in 2009, thereby contributing to the overall lake volume of water for secondary uses.

Potential impacts to water quality will be prevented or minimized by implementation of a SW3P incorporating BMPs to control erosion and to dispose of any hazardous waste during the construction of docks. The White Bluff Marina will continue to be operated as a Clean Texas Marina and implement measures required under the CTMP to prevent shoreline erosion, and, in the case of Alternative 3 only, spillage of sewage relating to a planned pump out station.

No trees greater than six inches dbh would be removed or damaged for the construction of land-based facilities for any of the alternatives. Mitigation for the loss of sapling trees on USACE land would occur by replacing trees on a 1:1 within the lease area. Impacts to grass-dominated areas on USACE land would affect 1.1 acres for Alternative 2, and 2.1 acres for Alternative 3. As discussed in **Section 3.5.3**, mowed grass is not generally considered a highly valuable vegetation type for wildlife use and habitat; therefore, no mitigation is planned for the loss of mowed grass areas. All areas temporarily disturbed during construction would be reseeded with native herbaceous vegetation.

## 6.0 PERMITS AND OTHER REGULATORY REQUIREMENTS

The proposed alternatives are subject to the policy regulating outgrants of federal land for recreational purposes (ER 1130-2-550, see USACE, 1996). The existing lease would need to be modified to reflect a change in the status of the White Bluff Yacht Club to a public marina. For Alternatives 2 and 3, construction of up to 190 boat slips would be authorized under the limitations of the existing lease, but the regulation would require USACE approval of market and feasibility studies before additional slips could be approved.

The alteration of the existing lease to render the marina a public facility requires the Fort Worth District Engineer to approve a waiver under ER 405-1-12 (USACE, 1985) regarding competition in awarding concessions on USACE property. Under Section 8-105a of this regulation, waiver of competition is appropriate for White Bluff Marina because the only means of access to the marina is across land owned by Double Diamond.

As all alternatives could result in the placement of concrete anchor blocks below the ordinary high water mark of Whitney Lake, compliance with Section 404 of the Clean Water Act would be required. Regional General Permit 8 (CESWF-09-RGP-8) would address potential fill from marina expansion that could occur under both the No-Action Alternative and Alternative 1, as the total anchorage volume for either alternative would not exceed the permit's limit of 50 cubic yards. As the volume of anchor blocks for Alternatives 2 and 3 would exceed this limitation, the deposition of anchorage for these alternatives would be authorized by NWP 25. Placement of anchorage for these alternatives would be subject to the General Conditions for NWPs and the specific conditions for NWP 25.

Environmental compliance for the proposed action under NEPA would further be achieved upon coordination of this EA and FONSI with appropriate agencies, organizations, and individuals for review and comment. For the proposed project these include: USFWS concurrence that the proposed action would not be likely to adversely affect any federally-listed endangered or threatened species; and TPWD concurrence that the proposed action would not impact state-listed endangered or threatened species. Coordination has already been effected with the Texas State Historic Preservation Officer, who has made a Determination of No Affect on cultural resources (see **Appendix E**). The Finding of No Significant Impact would be signed once the proposed action achieves environmental clearance with regard to applicable laws and regulations.



## **7.0 PUBLIC INVOLVEMENT**

### **7.1 AGENCY COORDINATION**

USACE has effected coordination with the State Historic Preservation Officer (see **Appendix E**), who concurred with the finding that no historic properties will be affected by any of the proposed alternatives. USACE will also coordinate the information in this draft EA with the USFWS and TPWD, and other federal, state, or local government agencies that may be appropriate. In addition, the draft EA will be coordinated with any appropriate Indian tribes. Correspondence with these and other agencies will be added to **Appendix E** once received.

### **7.2 PUBLIC INFORMATION AND REVIEW**

This section will be completed after USACE completes its public involvement process, and any materials received will be included in **Appendix F**.

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## 8.0 FINDINGS AND CONCLUSIONS

Implementing Alternative 2 (the preferred action) for the expansion of White Bluff Marina within its existing cove would have minor overall impacts to the environment. Minor impacts would occur to soils, waters of the U.S., water quality, fish and wildlife resources, aquatic and terrestrial vegetation, noise and general aesthetics, and air quality. Anticipated benefits would occur to socioeconomics and recreation, and would likely attract new boaters to Whitney Lake. Based on an evaluation of environmental records relating to hazardous, toxic, and radioactive wastes, no impacts related to these substances are likely. A cultural resources survey was completed for the project area which concluded no historic properties or cultural resources would be affected; the State Historic Preservation Officer concurred with this conclusion. There would be negligible to minor cumulative adverse impacts to other resources and environmental issues considered. Taken together, none of the effects anticipated to any of the above resources would push the resources into an impaired state.

The No-Action Alternative and Alternative 1 could both include expansion of the existing marina from the existing 85 boat slips to 190 slips, as authorized by the existing lease. However, as the primary business purpose of expanding the marina is to attract owners of boats (particularly boats in the 20 feet to 40 feet range) from surrounding counties, Double Diamond this limited amount of expansion would not warrant the major investment required. Consequently, the expected return on investment for these alternatives will not likely generate the business incentive to construct either one.

Although viable, Alternative 3 is not preferred because it would have the greatest environmental impacts to terrestrial vegetation and habitat of the alternatives. Also, an initial study of lake currents has raised concerns about the effects of those currents on a marina located on the main body of the Whitney Lake at White Bluff.

Implementation of any alternative would be funded entirely by Double Diamond, and would not require the expenditure of federal funds.

The construction of either Alternative 2 or Alternative 3 would be in phases based on demand. Expansion of the marina within the existing cove above the 190 slips in the existing lease would require completion of market and feasibility studies indicating a need for additional boat slips,

potential impacts on other lake marinas, and demonstrating the business viability of the expansion.

Based on the findings and conclusions in this EA and the attached draft Finding of No Significant Impact (FONSI), it is determined that the proposed Alternative 2 expansion of White Bluff Marina would not be a major federal action that would require an Environmental Impact Statement. Also, a waiver of competition under ER 405-1-12 is warranted because the only landside access to White Bluff Marina is from Double Diamond property in White Bluff Resort.

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