# DRAFT FINDING OF NO SIGNIFICANT IMPACT
# AND ENVIROMENTAL ASSESSMENT
# FOR
# REVISIONS TO MANSFIELD (MARSHALL FORD) DAM AND LAKE TRAVIS WATER CONTROL MANUAL,
# COLORADO RIVER, COLORADO RIVER BASIN, TEXAS

**U.S. Army Corps of Engineers**
**Fort Worth District**
**Fort Worth, Texas**

**July 2013**

# ENVIRONMENTAL ASSESSMENT
# for
# Revisions to Mansfield (Marshall Ford) Dam and Lake Travis Water Control Manual, Colorado River, Colorado River Basin, Texas

## I. INTRODUCTION

This environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and United States Army Corps of Engineers (USACE) Engineering Regulation 200-2-2, *Procedures for Implementing NEPA.* The EA describes the potential environmental consequences resulting from implementing proposed revisions to the operations rules of Mansfield Dam and Lake Travis in the Highland Lakes region of the Lower Colorado River Basin, Texas.

Completed in July 2002, the initial Phase I Lower Colorado River Flood Damage Evaluation Project (FDEP Phase I) study provided baseline hydrology, reservoir operations, and hydraulics throughout the Lower Colorado River Basin, Texas. In August 2005, USACE completed a Programmatic Environmental Impact Statement (PEIS) for Flood Damage Reduction and Ecosystem Restoration, Lower Colorado River Basin, Colorado River, Texas. The PEIS was prepared to establish existing conditions, identify direct and indirect impacts, and cumulative impacts to the environment as a result of implementing water resource projects in the Lower Colorado River Basin. This EA, which is tiered to the PEIS, addresses proposed revisions to the Mansfield (Marshall Ford) Dam and Lake Travis, Colorado River, Texas, Water Control Manual by identifying and evaluating impacts that would result from proposed adjustments to water stage elevations included in the new Water Control Manual. The Lower Colorado River Authority (LCRA) is the nonfederal sponsor. For the purposes of this EA, the terms Colorado River, Colorado River Basin, Lower Colorado River, and the Lower Colorado River Basin are used interchangeably due to variations in the aforementioned documents.

## STUDY PURPOSE, NEED, AND SCOPE

**Purpose.** One of the major results from the basinwide feasibility study (FDEP Phase I) was the increase of the 1% annual chance of exceedence, or 100-year, flood pool elevation at Lake Travis from 716.0 feet above mean sea level (msl) to 722.0 feet msl using the current regulation plan. As a result of this increase at Lake Travis and increases to the floodplain in other areas, the Highland Lakes Interim Feasibility Study was initiated with the LCRA. The study focused on formulating potential alternative measures to minimize existing and future flood losses and protecting and restoring aquatic habitat integrity in the lower Colorado River watershed, concentrating on the Highland Lakes area. During the course of these study efforts, LCRA determined that they did not want to pursue implementation of any structural measures for flood damage reduction, but were interested in moving forward with investigating water control and management at Lake Travis, which is the only flood control reservoir in the Highland Lakes system.

As a result, the primary purpose of the Phase II Flood Damage Evaluation Project study (FDEP Phase II) is to assess the flood damage reduction problems and/or benefits of modifying the existing operating rules and downstream controls for releases from Mansfield Dam and Lake Travis, develop, analyze, and evaluate potential revisions of U.S. Army Corps of Engineer (USACE) rules relating to flood releases from Mansfield Dam, recommend a plan for formally revising the operating rules for Mansfield Dam and Lake Travis, and,

if applicable, prepare a revised Water Control Manual to replace the current manual, which was developed in the 1970's, approved and published in the Federal Register in 1979, and last updated in 1999.

**Need.** Water control manuals for regulation of the flood control storage space in a reservoir are generally based on the goal of maximizing use of the flood storage space in order to minimize downstream flood damages. Flood runoff is stored in the reservoir until it can be released at a non-damaging or minimally damaging rate of discharge, or until water must be released at higher rates of discharge because flood storage capacity has been depleted. Higher rates of utilization of flood storage space may require higher rates of release from a reservoir in order to reduce the probability of the need for even larger, more damaging rates of release should additional runoff into the reservoir occur before occupied flood storage space can be sufficiently evacuated.

At the time the plan was developed in the late 1970's, the controlling discharges and associated river stage elevations in the Colorado River were established in accordance with the U.S. Geological Survey (USGS) stage-discharge ratings at the time and control points were set at USGS gauging stations at Austin, Bastrop and Columbus. That was appropriate in the late 1970's when the control discharge rates at the Mansfield Dam and the downstream stage controls (elevation) provided the maximum benefit of releases from Lake Travis. However, it has now became apparent that channel movement, datum shifts, channel topography and vegetation changes have reduced hydraulic conveyance, resulting in a change in the stage-discharge relationship at the Austin and Bastrop control points that significantly reduces the discharge associated with the control stages specified in the 1979 Water Control Manual. Thus, the current flow and stage controls are no longer providing the maximum benefit of releases.

**Scope.** The scope of the study is to develop a new Water Control Manual with appropriate revisions to the operations rules of the Mansfield Dam and Lake Travis that provide for maximized benefit of releases balanced with minimized downstream flood damages and an associated environmental assessment document that informs the public about the proposed revisions and describes potential environmental consequences.

## STUDY AUTHORITY AND NEPA REQUIREMENTS

Authorities for conducting studies within the Colorado River Basin in Texas have been in place since the mid-1930s. For this study, there are several historical, but applicable authorities. They include as follows:

- Flood Control Act, approved June 22, 1936, "*Section 6. The Secretary of War is hereby authorized and directed to cause preliminary examinations and, surveys for flood control at the following named localities, ... Colorado River, Texas, above the county line between Coke and Runnels Counties…Lower Colorado River, Texas."*

- Resolution by the Committee on Commerce, United States Senate, adopted August 4, 1936: *"Resolved by the Committee on Commerce of the United States Senate, That the board of Engineers for Rivers and Harbors created under Section 3 of the River and Harbor Act, approved June 13, 1902, be and is hereby, requested to review the reports on Colorado River, Texas, submitted in House Document Number 361, Seventy-first Congress, second session, and previous reports, with a view to determining if improvement in the interest of commerce and flood control is advisable at the present time."*

- River and Harbor Act, approved August 26, 1937: "*Section 4. The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at the following named localities…Colorado River, and its tributaries, Texas, with a view to its improvement in the*

*interest of navigation and flood control."*

- River and Harbor Act, approved March 2, 1945: *"Section 6. The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at the following named localities…Colorado River, Texas."*

- Committee Resolution, United States Senate, Committee on Environment and Public Works, 110th Congress, 1st Session, July 31, 2007: *"That the Secretary of the Army is requested to review the report of the Chief of Engineers on the Colorado River, Texas, published as House Document 378, 102nd Congress, 2nd Session, and other pertinent reports, to determine whether modifications to the recommendations contained therein are advisable to address water resources needs in Texas within the Colorado River basin in the interest of comprehensive watershed and stream corridor management, including flood damage reduction, environmental restoration and protection, water conservation and supply, water quality improvement, aquifer recharge, and other related purposes in the Colorado River basin, Texas."*

The National Environmental Policy Act (NEPA) of 1969 requires all Federal agencies to consider the environmental consequences of proposed major Federal actions and to include these considerations in the decision-making process. Title II of NEPA created the Council on Environmental Quality (CEQ) to implement Federal policy under NEPA. In 1978 the CEQ issued Regulations For Implementing The Procedural Provisions Of The National Environmental Policy Act (40 CFR Parts 1500-1508), referred to as the CEQ Regulations. USACE regulatory guidance for implementing the procedural provisions of NEPA is found in Engineering Regulation (ER) 200-2-2 and ER 1105-2-100. This guidance is intended to supplement CEQ Regulations.

The CEQ recommends Programmatic Environmental Impact Statements (PEIS) for assessing the environmental effects of individual projects in a given geographical area or the overall impact of a large-scale program or chain of contemplated projects and promotes the concept of tiering EA's and EISs in order to eliminate repetitive discussions of the same issues and focus instead issues relating to specific actions. Whenever a PEIS has been prepared and a subsequent EA or EIS is required for a site-specific action included within the program already evaluated, the more specific EA or EIS need only refer to pertinent data from the PEIS and focus on specific impacts of the proposed project.

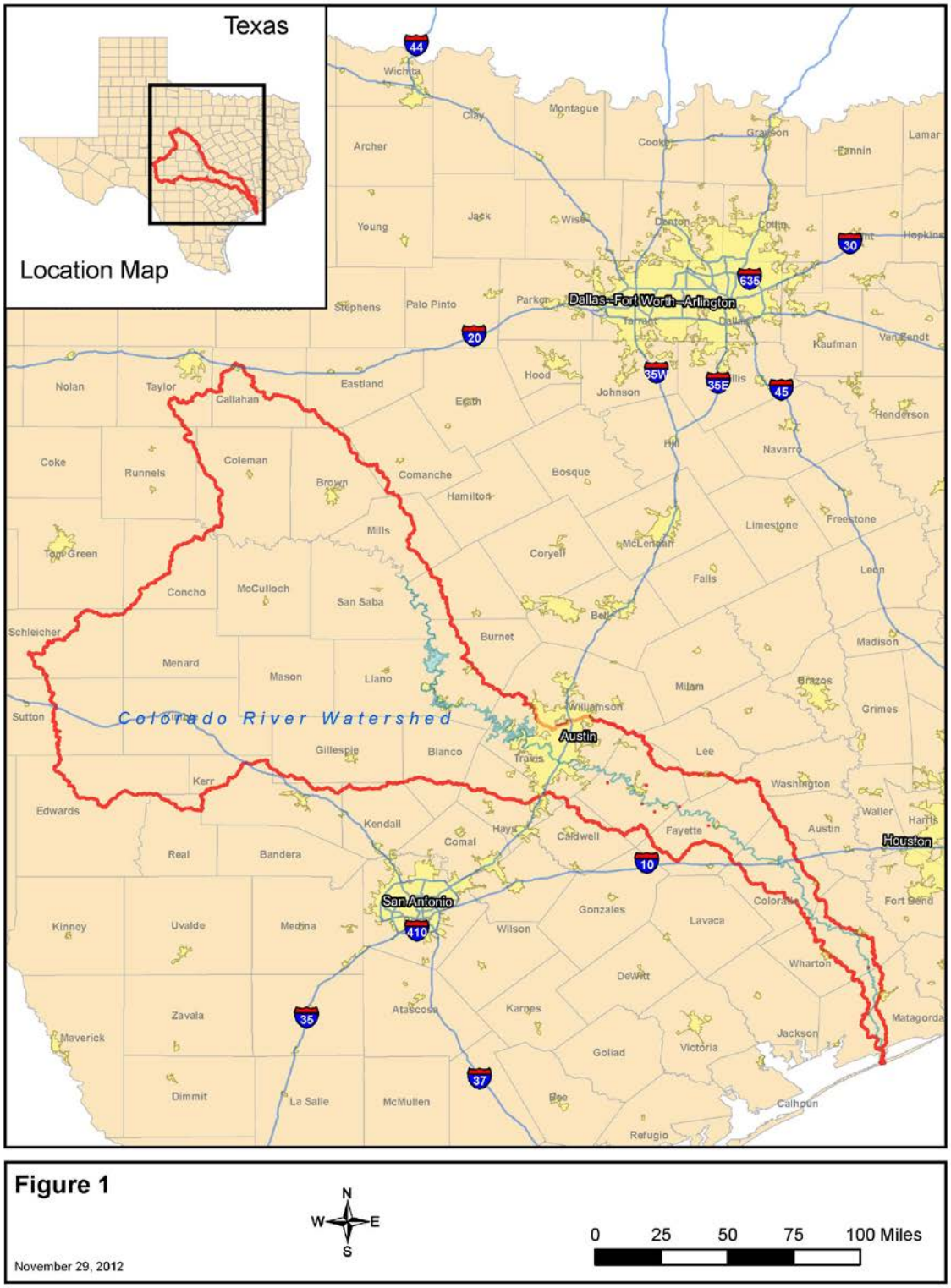
The Final Programmatic Environmental Impact Statement for Flood Damage and Ecosystem Restoration, Lower Colorado River Basin, Colorado River, Texas established the existing baseline conditions for the Lower Colorado River Basin and serves as the foundation for this tiered environmental assessment. Since this document is being tiered to the PEIS only those parameters that have changed or where pertinent updated data are available are being discussed in this EA.

## STUDY AREA

The overall study area for the Phase II Flood Damage Evaluation is the lower Colorado River basin from O.H Ivie to the Gulf of Mexico, with emphasis on the Highland Lakes.

**Lower Colorado River Basin**. The lower Colorado River basin has a drainage area of approximately 18,300 square miles, and is defined as the drainage area below O.H. Ivie Reservoir downstream to the Gulf of Mexico, a distance of approximately 615 river miles (see Figure 1). Major tributaries include the Llano River, Pedernales River, San Saba River, Pecan Bayou, Sandy Creek, and Onion Creek. Other reservoirs in the lower Colorado River basin include Lake Buchanan, Inks Lake, Lake LBJ, Lake Marble Falls, Lake Travis, Lake Austin, and Lady Bird Lake located in Burnett, Llano, and Travis Counties.

**Figure 1. Lower Colorado River Basin Study Area**



**Highland Lakes**. The Highland Lakes (Figure 2) are a series of dams and reservoirs located in Burnet, Llano, and Travis Counties. The reservoirs, from upstream to downstream are Lake Buchanan (Buchanan Dam), Inks Lake (Inks Dam), Lake LBJ (Alvin Wirtz Dam), Lake Marble Falls (Max Starcke Dam), Lake Travis (Mansfield Dam) (formerly known as Marshall Ford Reservoir and Dam), Lake Austin (Tom Miller Dam), and Lady Bird Lake (Longhorn Dam). These reservoirs are known collectively as the "Highland Lakes." Figure 3 provides a conceptual view of the orientation of the lakes within the series.

The Highland Lakes serve multiple purposes. Lake Buchanan is a water storage lake. Inks Lake, Lake LBJ, and Lake Marble Falls are "pass-through" lakes, which mean they do not have flood pools. Lake Travis provides flood risk management and is regulated under USACE Section 7 guidelines. Lake Austin and Lady Bird Lake are also pass-through lakes. All of the lakes except Lady Bird Lake generate hydroelectricity. All the lakes provide recreation opportunities.

The Lower Colorado River Authority (LCRA) owns and operates Lake Buchanan, Inks Lake, Lake LBJ, Lake Marble Falls and Lake Travis. Lake Austin is owned by the city of Austin and leased to LCRA to operate. The City of Austin owns and operates Lady Bird Lake.

Although a water storage lake, since the late 1980's Lake Buchanan has been operated to reduce potential flood damages. The LCRA has agreed to keep Lake Buchanan two feet lower than the spillway elevation (1020 feet msl) from May through October to reduce peak flood flows through the middle lakes. Lake Travis, which was originally constructed by the Bureau of Reclamation, is the only flood control reservoir whose operations are governed by an operating plan approved by the U.S. Army Corps of Engineers under authority of Section 7 of the Flood Control Act of 1944. The reference Section 7 provision requires that USACE provide regulations governing the use of flood control storage in lakes governed by this regulation. Essentially, the Water Management Section of the Engineering and Construction Division, Fort Worth District, prescribes the flood control regulations for the project and LCRA operates the project accordingly. In unusual situations where it may be desirable to operate differently, LCRA may request a deviation from the regulations. The Fort Worth District forwards deviation requests to the Southwestern Division for review and approval or rejection.

While the proposed action is within the Highland Lakes region of the Lower Colorado River Basin, the area of affect, and thus the focus of the investigations for this EA, is the area from Lake Travis approximately 187 river miles downstream to the Columbus gauge (Figure 4). There are three major reservoirs and associated dams- Lake Travis (Mansfield Dam), Lake Austin (Tom Miller Dam), Lady Bird Lake (Longhorn Dam), along with three gauges U.S Geological Survey observation gauges - Austin, Bastrop, and Columbus (see Table 1.), in this area.

## AFFECTED ENVIRONMENT

**General.** Mansfield Dam is located at river mile 322.2 on the Colorado River in Travis County about 12 miles northwest of Austin, Texas. Lake Travis, which is formed by Mansfield Dam, extends from Travis County into Burnet County. Water is impounded approximately 64.5 river miles upstream of the dam to the downstream face of Max Starcke Dam (Lake Marble Falls), another LCRA Highland Lakes project. F.M. Highway 620 crosses the Colorado River immediately downstream of Mansfield Dam.

Mansfield Dam is a multi-purpose project which is used for flood control, water supply, hydropower, recreation, and fish and wildlife. Construction of Mansfield Dam was authorized by Section 3 of the Rivers and Harbors Act of 1937. The dam consists of twenty-four 8.5 foot diameter outlet conduits, an uncontrolled spillway, and a hydroelectric power plant with three turbines, which can generate up to a total of 116

**Figure 2. The Highland Lakes area of the Lower Colorado River Basin.** (Source – LCRA website)

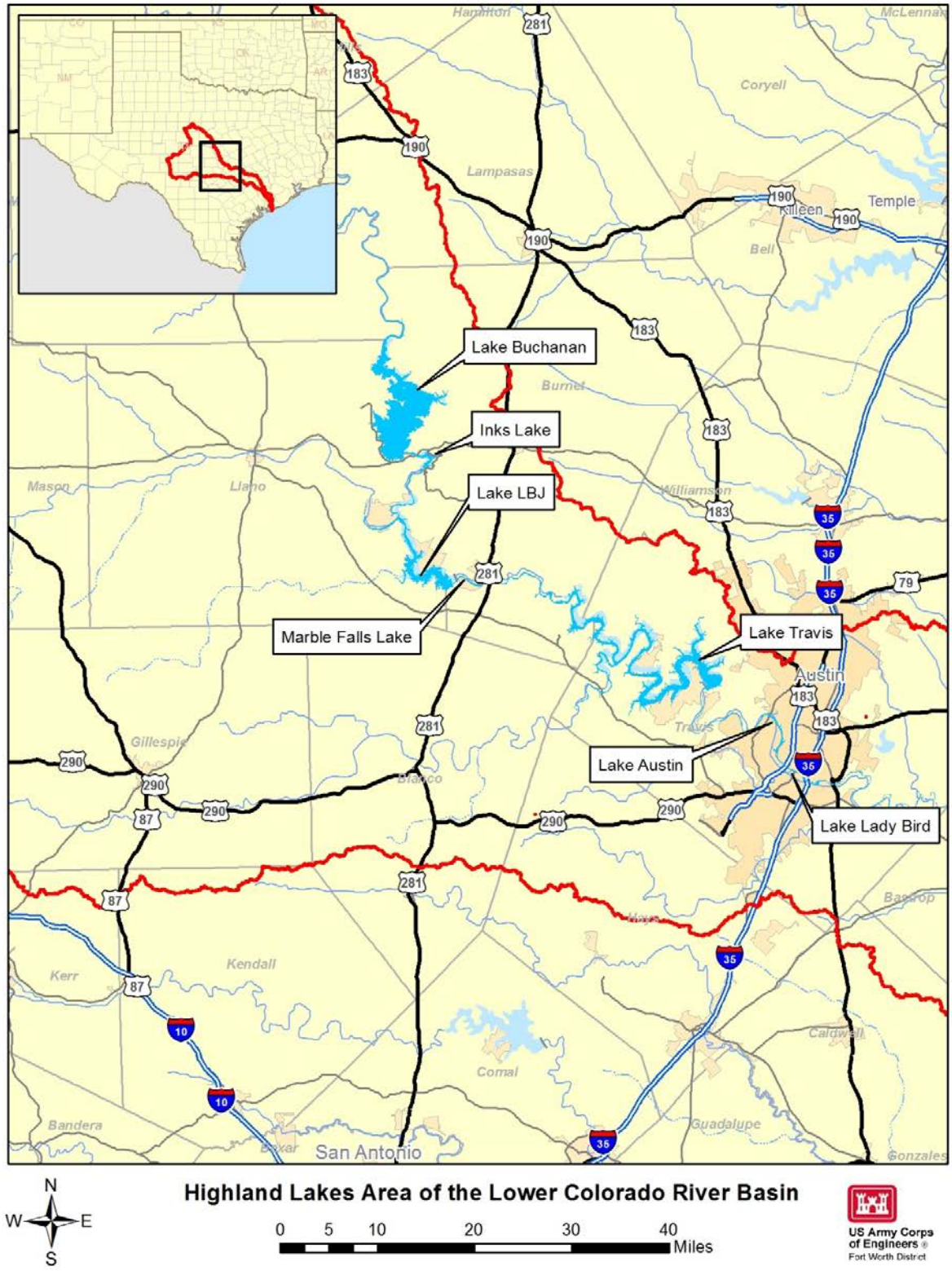


**Figure 3. Conceptual view of the Highland Lakes orientation in the Lower Colorado River Basin moving downstream from right to left.** (Source: LRCA website - www.lrca.org)

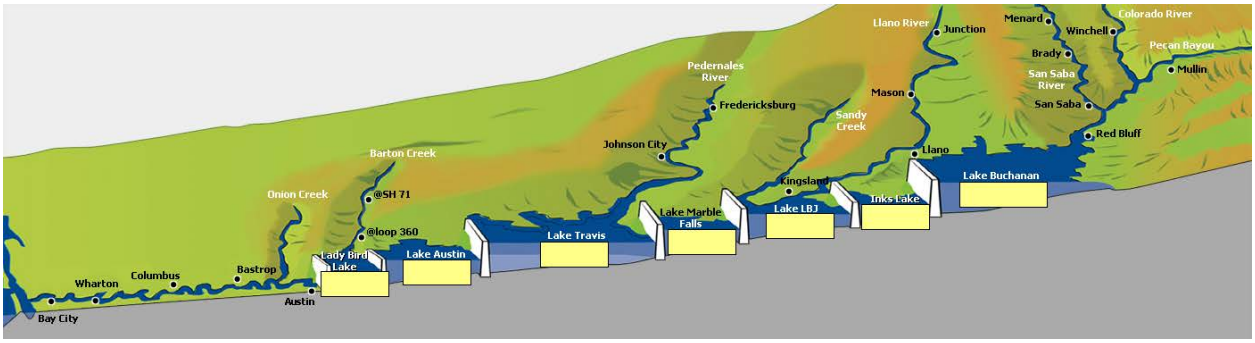



**Table 1. River Miles and Drainage Areas at the various gauges located within the study area**

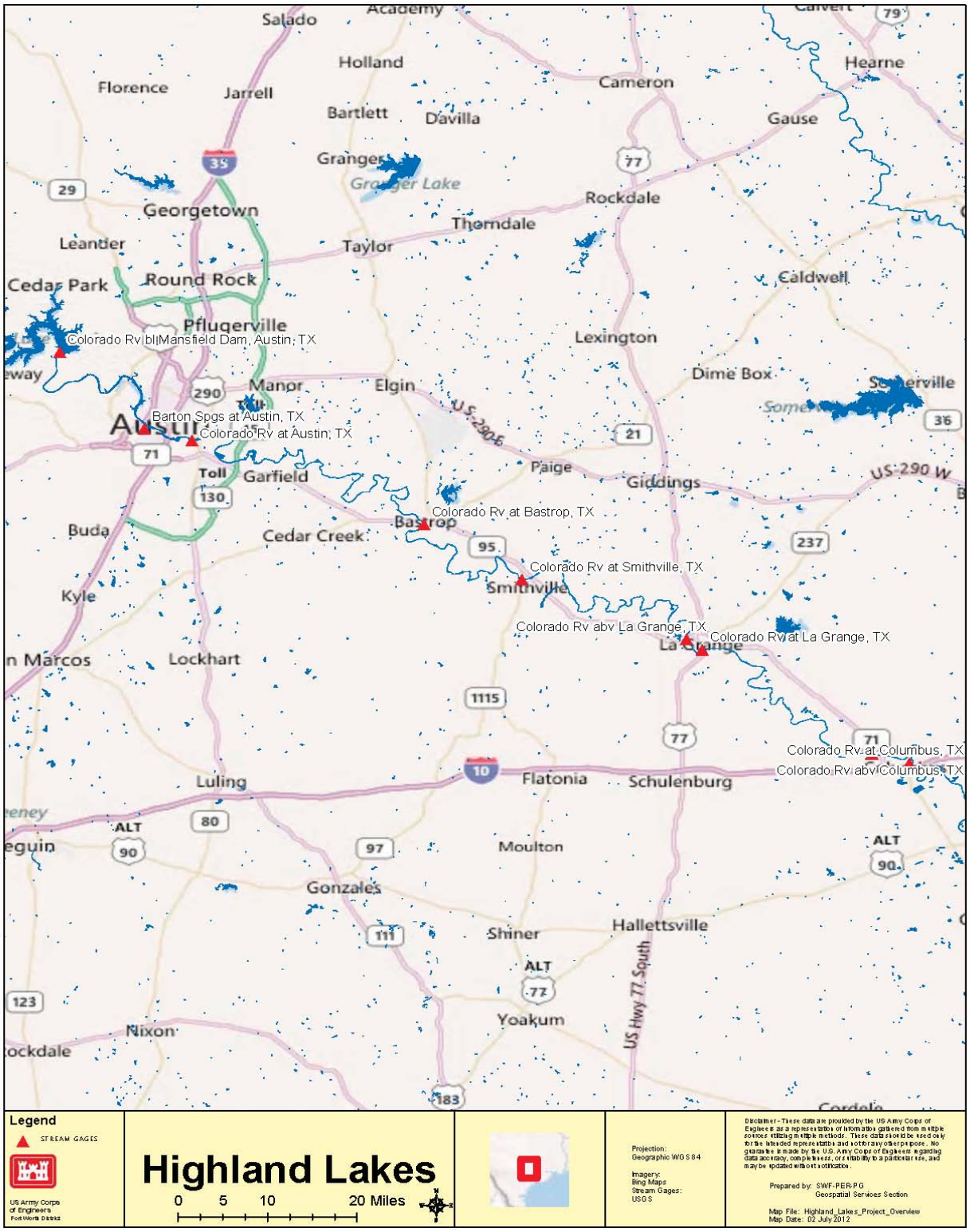
| Location on | River | Drainage Area in Sq Mi | |
|---|---|---|---|
| Colorado River | Mile (1) | Total | Contributing |
| At Austin Gauge (08158000) | 290.3 | 39,009 | 27,606 |
| At Bastrop Gauge (08159200) | 236.6 | 39,979 | 28,576 |
| At Columbus Gauge (08161000) | 135.1 | 41,640 | 30,237 |

megawatts. The dam consists of a concrete gravity section across the river, flanked on both ends by earth and rock fill embankments. The top of the dam is at elevation 750.0 feet msl, and extends to elevation 754.0 feet msl with the parapet wall. The concrete gravity section has a maximum height of 278 feet and a length of 2,423 feet, making it one of the largest gravity type dams in the United States. The left embankment is 2,403 feet long and curves into the concrete section from the northeast. The right embankment is shorter at 260 feet in length. The upstream sides of both embankment sections have a 1V:3H slope and are protected by a uniform riprap blanket, 3 feet thick. The downstream sides of both embankment sections have a 1V:2H slope and are covered by rock fill which tapers in thickness from bottom to top. In addition, there is a saddle dam beyond each end of the structure. The left abutment saddle dam is approximately 1,450 feet long and the right abutment saddle dam is approximately 800 feet long. The crest elevation of both saddle dams is 754.0 feet msl.

The spillway is an ungated ogee type weir with a crest elevation of 714.0 feet msl. The spillway is formed into part of the concrete portion of the dam and has a net length of 700 feet. Concrete piers support a steel girder bridge above the spillway dividing the spillway into five bays, each with a length of 140 feet. The center line of the old F.M. Highway 620 along the bridge is at elevation 750.0 feet msl. In January 1995, a re-routed new F.M. Highway 620 was completed just downstream of the dam. Access across Mansfield Dam is now closed to the public and open only to LCRA service vehicles. Flows over the weir are discharged into the main channel of the Colorado River.

The Bureau of Reclamation (BOR) was the Federal agency involved in the planning, design, and construction of Mansfield Dam along with LCRA and continued to be involved in lake operations until May 1997 when the BOR, U.S. Department of the Interior, and LCRA mutually agreed to terminate the existing contracts and BOR formally relinquished all rights and obligations of administration, operation, and oversight of all activities at Mansfield Dam to LCRA.

**Figure 4. Proposed action impact area - Lake Travis downstream to the Columbus gauge.**



As noted earlier, since this document is being tiered to the PEIS only those parameters under the Existing Environment section of that document that have changed or where pertinent updated data was available are discussed. Discussions of the affected environment in this EA have been further limited by the fact that modification of the operating rules for Mansfield Dam and Lake Travis has no construction element, which greatly reduces potential impacts to environmental resources. Therefore, this EA will not include descriptions for land use, physiography, geology, climatology, hydraulics & hydrology, vegetaional areas and soils, wildlife resources, wetlands, air quality, water and sediment quality, cultural resources, recreation and open space, hazardous, toxic, and radioactive waste, and environmental justice as these elements have essentially remained unchanged since the PEIS was completed in 2005. For description of these elements, please refer to the Existing Environment descriptions on pages 3-1 through 3-126 of the published PEIS or in the electronic document on the Fort Worth District Internet Home Page at http://www.swf.usace.army.mil/Media/PublicNotices/tabid/6600/Article/11711/lower-colorado-river-programmatic-environmental-impact-statement-final-and-draft.aspx.

**Threatened & Endangered Species.** The lower Colorado River basin provides a variety of habitats for numerous species that have been listed, or are candidates for listing, as threatened or endangered by the USFWS, the NMFS, and/or the State of Texas. According to a search of the USFWS Website in March 30, 2013, 26 federally listed have potential to occur in counties that border the Colorado River in the study area. Many of these are also listed as threatened or endangered (Table 2). The Jollyville plateau salamander (*Eurycea tonkawae*) is a candidate species listed in Travis County. The bald eagle (*Haliaeetus luecocephalus*) has been delisted, but is currently being monitored for the first five years. In addition to the twenty-six federal species, there are several state T&E species on its annotated list of rare species that could occur in the study area including the blue sucker (*Cycleptus elongates*), Texas horned lizard (*Phrynosoma cornutum*), timber/canebrake rattlesnake (*Crotalus horridus*), white-faced Ibis (*Plegadis chihi*), white-tailed hawk (*Buteo albonotatus*), and the wood stork (*Mycerteria Americana*). In addition, several species of mollusks have been added as Federal candidates for listing and to the State's T&E list since the PEIS was completed in 2005. These include: smooth pimpleback (*Quadrula houstonensis*), False spike mussel, (*Quadrula mitchelli*), Texas pimpleback (*Quadrula petrina*), Texas fawnfoot (*Truncilla macrodon*), and Texas fatmucket (*Lampsilis bracteata*). Finally, the Creeper (squawfoot) (*Strophitus undulates*) is another mollusk that is on the State's Threatened list, but is not listed as a candidate on the Federal list.

## FUTURE WITHOUT PROJECT CONDITIONS

The future without project condition is equivalent to a description of the "no action" alternative. In order to effectively evaluate changes to the environment of the study area if proposed modifications to the operating rules for Mansfield Dam and Travis Lake are implemented, it is necessary to forecast likely future conditions if they are not. Under the "no action' alternative there would be no modification to the operating rules for the Mansfield Dam and Lake Travis; however, it is anticipated that other planned activities by USACE, LRCA, other state and local agencies and private development would continue to occur. The following is a general description of the likely future conditions in the study area under the No Action Alternative.

The majority of the study area is in the Blackland Prairie ecoregion, which represents the southern extension of the true prairie that occurs from Texas to Canada. Human activities have substantially altered the habitats in this eco-region. In fact, based on TPWD analyses (2002), approximately 75% of the Blackland Prairies in Texas have been lost due to conversion to agricultural use, since the soils are fertile and productive, or to urban use. It is anticipated that this conversion will continue.

**Table 2. Federally Listed Threatened and Endangered Species That May Exist in the Lower Colorado River Basin (2012) within the proposed project Texas counties.**

| Common Name | Scientific Name | Bastrop | Colorado | Fayette | Travis | Wharton |
|---|---|---|---|---|---|---|
| Austin blind salamander | *Eurycea waterlooensis* | | | | X | |
| Barton Springs salamander | *Eurycea sosorum* | | | | X | |
| Bee Creek cave harvestman | *Texella reddelli* | | | | X | |
| Attwater's greater prairie-chicken | *Tympanuchus cupido attwateri* | | X | | | |
| Black-capped vireo | *Virea articapillus* | | | | X | |
| Bone cave harvestmen | *Texella reyesi* | | | | X | |
| Golden-cheeked warbler | *Dendroica chrysoparia* | | X | X | X | |
| Houston toad | *Bufo houstonensis* | X | X | | | |
| Kretschmarr cave mold beetle | *Texamaurops reddelli* | | | | X | |
| Navasota ladies' – tresses | *Spiranthes parksii* | X | | X | | |
| Tooth cave ground beetle | *Rhadine persephone* | | | | X | |
| Tooth Cave pseudoscorpion | *Tartarocreagris texana* | | | | X | |
| Tooth cave spider | *Neoleptoneta myopica* | | | | X | |
| Warton's cave meshweaver | *Cicurina wartoni* | | | | X | |
| Whooping crane | *Grus americana* | X | X | X | X | X |

From 1950 to the present, there has been a significant increase in population growth that is expected to continue, with the majority of future population growth expected to occur in the Austin metropolitan area. Although population growth is anticipated to stabilize over the next 50 years in Travis County, the remaining counties within the Austin metropolitan area are expected to grow rapidly, and the overall population of the metropolitan area is projected to more than double by 2060.

The LCRA, city of Austin, and other Federal, state and local entities have numerous water supply, water quality, flood and erosion protection, channel stabilization and channel improvement projects, road and bridge upgrades and replacements, storm water and drainage construction and/or improvements and buyouts of flood-prone structures that are expected to be implemented in the future. Additionally, private sector development will continue, including the construction of housing and commercial developments, especially

in the growing Austin metropolitan area. Also, ongoing sand and gravel mining in the study area is anticipated to increase.

Outside of the Austin metropolitan area, agriculture, forest and rangeland will continue to be the major land uses in the future and, much like the current setting, these three classifications will continue to comprise a majority of the study area.

Specific to the operation rules for the Mansfield Dam and Lake Travis, under the 'no action' alternative, operations would continue under the old plan, flood damages on properties upstream of the dam would continue to be experienced, especially under the more frequent, 10- to 25-year flood events, since the duration for evacuation of flood waters has been increased to ensure compliance with stage elevations controls as identified in the current Water Control Manual.

## II. PLAN FORMULATION

Generally reservoirs have operation plans which establish rules as to when and how much water will be released during a flood event. Ideally, all runoff entering the reservoir would be stored and released downstream at a rate so as to not produce flooding. During a large event when inflows cannot be stored long enough to manage non-flood releases, the operation plan guides the operator to establish how much water to release and when to make releases, generally with priority consideration being given to maximizing the safety of the structure and minimizing downstream damages.

The FDEP Phase II study extended and updated the previously developed HEC-HMS and HEC-ResSIM models (FDEP Phase I) in order to establish baseline conditions for the operating rules of the current Water Control Manual for Mansfield Dam and Lake Travis. As a result of the studies and analyses conducted, it became apparent that due to channel movement, datum shifts, channel topography and vegetation changes, the stages currently published in the official regulation plan for Mansfield Dam are more restrictive than the controlling discharges at Austin, Bastrop, and Columbus (30,000 cfs, 45,000 cfs, and 50,000 cfs, respectively). As a result, Mansfield Dam holds back more water during more frequent flood events based on the stage controls. This has resulted in an approximately 2 foot increase in the 25-year frequency water surface elevation at Lake Travis. The study team recognized that continuing to adhere to the circa 1979 stage controls meant releasing water from Lake Travis at less than the desired rate for a given lake flood storage condition, thereby extending the time required to evacuate occupied flood storage space, and, thus, increasing risks to the dam structure and potential for higher flood damages upstream of the dam.

Table 3 below is a copy of the current regulation plan for Mansfield Dam from the official Water Control Manual with the established downstream control points and capacities (maximum flow and stages) at Austin, Bastrop and Columbus for various Lake Travis elevations.

**Table 3. Current Regulation Plan for Mansfield (Marshall Ford) Dam and Lake Travis.**

Table 1. Mansfield Dam Normal Flood Control Regulation Schedule

| Hydrologic Condition | Reservoir Level | Flood Control Release | Flow Control Points | Stage Control Points |
|---|---|---|---|---|
| Pool Rising, Standing or Falling | forecast: 681-683 | 3,000 c.f.s.[1] | 30,000 c.f.s. at Austin<br>45,000 c.f.s. at Bastrop<br>50,000 c.f.s. at Columbus | 20.5 ft at Austin<br>25.1 ft at Bastrop<br>25.5 ft at Columbus |
| Pool Rising, Standing or Falling | forecast: 683-685 | 5,000 c.f.s.[2] | 30,000 c.f.s. at Austin<br>45,000 c.f.s. at Bastrop<br>50,000 c.f.s. at Columbus | 20.5 ft at Austin<br>25.1 ft at Bastrop<br>25.5 ft at Columbus |
| Pool Rising, Standing or Falling | forecast: 685-691<br>(a) during Jan, Feb, Mar, Apr,<br>Jul, Aug, Nov, Dec | 5,000 c.f.s.[3] | 30,000 c.f.s. at Austin<br>45,000 c.f.s. at Bastrop<br>50,000 c.f.s. at Columbus | 20.5 ft at Austin<br>25.1 ft at Bastrop<br>25.5 ft at Columbus |
| | (b) during May, Jun, Sep, Oct | 30,000 c.f.s. | 30,000 c.f.s. at Austin<br>45,000 c.f.s. at Bastrop<br>50,000 c.f.s. at Columbus | 20.5 ft at Austin<br>25.1 ft at Bastrop<br>25.5 ft at Columbus |
| Pool Rising, Standing or Falling | forecast: 691-710 | 30,000 c.f.s. | 30,000 c.f.s. at Austin<br>45,000 c.f.s. at Bastrop<br>50,000 c.f.s. at Columbus | 20.5 ft at Austin<br>25.1 ft at Bastrop<br>25.5 ft at Columbus |
| Pool Rising, Standing or Falling | forecast: 710-714 | 50,000 c.f.s. | 50,000 c.f.s. at Austin<br>50,000 c.f.s. at Bastrop<br>50,000 c.f.s. at Columbus | 24.8 ft at Austin<br>26.7 ft at Bastrop<br>25.5 ft at Columbus |
| Pool Rising, Standing or Falling | forecast: 714-722 | 90,000 c.f.s.[4] | no controls | no controls |
| Pool Rising, Standing or Falling | forecast: above 722 | The Bureau of Reclamation will specify the releases for safety of the structure. | | |

[1]Special Note - An operational variance may be requested at any time to deviate from this schedule. If it is desirable to continue with gates during a falling pool, the request to continue utilizing gates, until a target elevation is attained, should be submitted once the need has been established. If a variance is granted and conditions change, the variance can be canceled simply by requesting cancellation over the telephone.

[2]See 1

[3]See 1

[4]Releases shall not exceed the associated peak flood reservoir inflow.

Table 4 displays the discrepancies between the stage elevation and control discharge flows under today's conditions. The first column in the table shows the existing operating rules (circa 1979) for stage elevations and control discharges at each of the downstream control points and the second column reflects model simulations using the same stage elevations and their associated control discharge rates under current conditions.

**Table 4. Summary of FDEP Phase II study results.**

| | Existing 1979 Water Control Plan (No Change) | | Actual Results from FDEP Phase II study | |
|---|---|---|---|---|
| **Station** | **Equivalent Stage (feet)** | **Control Discharge** | **Equivalent Stage (feet)** | **Control Discharge** |
| Austin (081592000) | 20.5 | 30,000 | 20.5 | 24,500 |
| | 24.8 | 50,000 | 24.8 | 32,200 |
| Bastrop (08161000) | 25.1 | 45,000 | 25.1 | 39,800 |
| | 26.7 | 50,000 | 26.7 | 43,700 |
| Columbus | 35.5 | 50,000 | 35.5 | 50,000 |

Note that under the existing, circa 1979 operating plan, the stage elevations of 20.5 and 24.8 feet at the Austin control guage and 25.1 and 26.7 feet at the Bastrop control guage matched the discharge control flows of 30,000 and 50,000 cfs and 45,000 and 50,000 cfs, respectively. However, under today's actual conditions, the stage elevations of 20.5 and 24.8 feet at the Austin control point and 25.1 and 26.7 feet stage elevation at the Bastrop control point show that control discharge is reduced by 5,500 and 17,800 cfs and 5,200 and 6,300 cfs, respectively. This shows the extent of the channel movement, datum shifts, channel topography and vegetation changes that have occurred since the time the 1979 operating rules were developed and approved and the conditions today and why modifications to the Water Control Manual are necessary.

## OBJECTIVE

The major objective of the study, conducted by Halff Associates under contract to the Government, and in conjunction with USACE Fort Worth District, is:

- To prepare an updated Water Control Manual for the Mansfield Dam and Lake Travis with appropriate modifications to the operating rules that would maximize the benefits of releases, while minimizing risks to the dam structure and downstream damages to landowners and stakeholders.

## ALTERNATIVES ANALYSIS

As part of the Colorado River Flood Damage Evaluation Project, damages were updated to reflect 2000-2003 development conditions at Lake Travis and the greater Austin area below the dam. These damages were further updated in selected areas in the mid to late 2000s.

**Lake Travis Area.** A large number of residential, recreational, and commercial facilities have been constructed in the lake area. Development is expected to continue. Significant property damages were found to begin at elevation 690.0 feet msl. A rise of the water level to elevation 714.0 feet msl, the crest of the spillway, would cause over $140 million in damages (2012 dollars). It was also estimated that a further rise of the lake level to elevation 722.0 feet msl (1% ACE) would cause over $300 million in property damages (2012 dollars). The total damages at elevation 732.0 feet msl approaches $700 million.

During flood events, homes, properties, and businesses around Lake Travis are impacted. The Graveyard Point area of Lake Travis includes homes that are flooded by pool elevations below 691.0 feet msl. Flood storage and operations can also impact recreation by forcing the closure of boat ramps around the lake.

**Downstream of Lake Travis Areas.** Areas downstream of Lake Travis (particularly metro Austin and Bastrop County) have and continue to experience rapid growth and development. There have been few complaints by residents of Austin as a result of past flood control releases from the project. However, the maximum discharge since the construction of Mansfield Dam has only been 41,000 cfs, which occurred during the 1957 flood. Since the 1957 flood, the Colorado River floodplain in the Austin area has experienced considerable development. Based on current development, a release of 30,000 cfs (lowest downstream control discharge) from Mansfield Dam would result in upwards of $1 million in damages along the shoreline of Lake Austin. A 90,000 cfs release (2% ACE) would result in over $12 million in damages through Lake Austin. There are an estimated $8 million in structural damages along Lady Bird Lake and downstream to the Austin/Bastrop county line. Below Bastrop, agricultural damages increase significantly.

A total of seven Mansfield Dam operating plan alternatives were simulated with HEC-ResSim, including: 1) a 'no action' plan (actual field conditions); 2) a plan that mimics control discharge flow rates in cubic feet per second (cfs) from the existing Water Control Manual, but corrects stage elevations discrepancies at the

downstream control points to match current day channel hydraulic conveyance conditions; and 3) five increasingly more aggressive release alternatives (50,000 cfs, 70,000 cfs, 90,000 cfs, 105,000 cfs, and 120,000 cfs) that would evacuate the Lake Travis flood pool quicker and reduce peak lake elevations, respectively. In addition to simulating releases, simple economic calculations were made to determine whether the varying simulated discharges would increase downstream damages over what is included in the existing Water Control Manual.

Even though the simulations show that for each of the alternatives modeled, except the "no action" alternative, peak elevations in Lake Travis would be reduced, in comparing the potential economic damages associated with each alternative plan, only Alternative 2, which maintains the current control discharges, but corrects the stage elevations discrepancies, maximizes the benefits of the releases by providing moderate flood damages benefits to upstream properties and reducing safety risks to the dam structure, all without significantly increasing downstream damages. Since increasing downstream damages does not meet the study objective and would not be supported by either USACE or LCRA, the non-Federal sponsor, the more aggressive release alternatives were eliminated from further consideration and only the "no action" and Alternative 2, or the Proposed Action alternative were carried forward for analysis in the Environmental Consequences section.

Under the Proposed Action plan, the existing operating rules would be modified to provide the maximum benefit of releases by changing the stage elevations at both the Austin and Bastrop gauges to match the actual control discharges noted in the 1979 Water Control Plan (see Table 5). This Proposed Action alternative would have the least impact to interests downstream from Mansfield Dam and would provide for moderate reductions in flood inundation damages upstream from Mansfield Dam, especially for the events with recurrence intervals in the 10- to 25-year range. The modifications to the operating plan would update the published stages so the regulating discharges control releases as was originally intended.

**Table 5. Summary of FDEP Phase II study results with the recommended alternative plan.**

| | Existing Water Control Plan (No Change) | | **A** Actual Results from FDEP Phase II study | | **B** New Stage Readings to Match Actual cfs | | **C** Recommended Plan | |
|---|---|---|---|---|---|---|---|---|
| **Station** | Equivalent Stage (feet) | Control Discharge | Equivalent Stage (feet) | Control Discharge | Equivalent Stage (feet) | Control Discharge | Equivalent Stage (feet) | Control Discharge |
| Austin (081592000) | 20.5 | 30,000 | 20.5 | 24,500 | 23.61 | 30,000 | 24 | 30,000 |
| | 24.8 | 50,000 | 24.8 | 32,200 | ** | 50,000 | ** | 50,000 |
| Bastrop (08161000) | 25.1 | 45,000 | 25.1 | 39,800 | 27.2 | 45,000 | 27.2 | 45,000 |
| | 26.7 | 50,000 | 26.7 | 43,700 | 29.1 | 50,000 | 29.1 | 50,000 |
| Columbus | 35.5 | 50,000 | 35.5 | 50,000 | 35.5 | 50,000 | 35.5 | 50,000 |

**Official USGS rating curve currently unavailable in this discharge range

Within Table 5, "A" reflects actual existing conditions and shows the control stages and associated discharges at each gauging stations. "B" shows the maximum control stages needed to achieve the cubic feet per second (cfs) discharge measurements in the existing Water Control Plan. For example, for 30,000 cfs at the Austin Station, the control stage would be 23.6 feet and not 20.5 feet as recorded in the Water Control

Plan (1999). "C" is the modified stage recommended in order to meet the recorded Water Control Plan discharge.

## TENATIVELY SELECTED PLAN

Under the Propose Action, or Tentatively Select Plan, Lake Travis would be regulated to maximize the benefits of releases, while minimizing risks to the dam structure and downstream damages to landowners and stakeholders. Flood control storage in Lake Travis would be evacuated as rapidly as downstream channel capacity permits in order to provide flood protection against future storms. Hydroelectric power shall be produced, to the extent possible, during the evacuation of flood water. Hydroelectric turbine releases may be used to regulate discharges to prevent the project from contributing to an exceedance of downstream control discharges. Forecasted reservoir inflows, and observed and forecasted rates of flow at the following upstream USGS gauging stations would be considered when scheduling flood releases:

(i) Colorado River near San Saba (08147000)
(ii) Llano River at Llano (08151500)
(iii) Pedernales River near Johnson City (08153500)

Until such time as the lake level exceeds, or is forecast to exceed, elevation 714.0 feet msl (top of flood pool), releases from Lake Travis will be made at a rate which, when combined with downstream inflows to the Colorado River, would not cause the control discharges shown in Table 6 to be exceeded. Control discharges would not be modified due to minor shifts in the respective control point stage-discharge relationships, but would be reassessed if significant shifts indicate the possibility of negative impacts.

**Table 6. Control discharge at key downstream control points (Draft Mansfield (Marshall Ford) Dam and Lake Travis, Colorado River, Colorado River Basin Water Control Manual revised March 2013)**

| Station | USGS Station ID | Control Stage (ft) | Control Discharge (cfs) |
|---|---|---|---|
| *Austin | 08158000 | 33.0 | 30,000 |
| | | NA [1/] | 50,000 |
| Bastrop | 08159200 | 27.2 | 45,000 |
| | | NA [1/] | 50,000 |
| Columbus | 08161000 | 35.5 [1/] | 50,000 |

[1/] No downstream control stages when pool elevation 710.0 is forecast to be exceeded; control is discharge only.

*Prior to 1 Jan 2012, the Austin control point gauge (USGS Station ID 08158000) was located about 1,400 feet upstream from the northbound U.S. Highway 183 bridge. Effective 1 Jan 2012, the gauge was officially relocated and activated at its present site, about 3,200 feet downstream from the northbound U.S. Highway 183 bridge. At the time of relocation, the discharge associated with a stage of 33.0 feet at the new gauge site was determined to be equivalent to the discharge associated with a 24.0 foot stage at the old gauge site.

Implementation of the new operation rules as identified above eliminates the discrepancies found in the current manual and provides LCRA and USACE a technically sound basis for making informed operations decisions in the future.

## III. ENVIRONMENTAL CONSEQUENCES

This section describes the potential impacts, both beneficial and adverse, of the No-action and Proposed Action alternative on the human and natural environment. Impacts can be direct or indirect (i.e., secondary or synergistic) and short-term, long term, or permanent. They can vary from a negligible change in the environment to a total change. Impacts that would result in substantial changes to the environment received the greatest attention in the decision making process. Table 7 provides a summary of the environmental consequences associated with both the No Action and Proposed Action alternatives. More detailed descriptions of the impacts to those resources that have identified impacts follow in the Environmental Consequences section.

**Table 7. Summary of Environmental Consequences of the No Action & Proposed Action alternatives.**

| Resources | No Action | Proposed Action |
|---|---|---|
| Climate | No impacts. | No impacts. |
| Physiography | No impacts. | No impacts. |
| Land Use | No impacts. | No impacts. |
| Prime and Unique Farmlands | No impacts. | No impacts. |
| Hydrology and Hydraulics | No impacts. | Minimal beneficial impacts overall. Moderate benefits in the flood damage area of Lake Travis for the 10- to 25-year flood events; slight increase in inundation acreage downstream of Mansfield Dam to the Columbus gauge. |
| Water Quality | No impacts. | No impacts. |
| Vegetation | No impacts. | Minimal temporal impacts to vegetation in the 100-year floodplain during the 10- to 25-year flood events only. |
| Wildlife Resources | No impacts. | No impacts. |
| Aquatic Resources | No impacts. | No impacts. |
| T&E Species | No impacts. | No impacts. |
| Jurisdictional waters | No impacts. | No impacts. |
| HTRW | No impacts. | No impacts. |
| Cultural Resources | No impacts. | No impacts. |
| Noise Quality | No impacts. | No impacts. |
| Air Quality | No impacts. | No impacts. |
| Socioeconomic & Environmental Justice | No impacts. | No impacts. |
| | | |

**Hydrology and Hydraulics**

*No Action Alternative.* Hydrologic and hydraulic impacts would remain unchanged under the No Action alternative.

*Proposed Action.* With implementation of the new Water Control Manual, the operating rules would include new stage elevations as outlined in Table 6 above. It is anticipated that there would be moderately beneficial impacts to hydrology and hydraulics overall as the operating rule modifications would provide for moderate flood damage benefits upstream, especially for flood events in the 10- to 25-year range, would reduce safety risks for the dam structure as peak elevations in the flood pool are evacuated more quickly, would not significantly increase downstream damages for the 10- to 25-year events, and would again provide for technically sound operating regulations. Frequency events below the 10-year generally remain within the channel and frequencies events above the 25-year event, would not be constrained by the stage elevations because the control discharges take precedence in the higher flood events.

**Vegetation**

*No Action Alternative.* It is anticipated that remnants of Blackland Prairies habitat types will continue to be lost due to human impacts associated with either agriculture or development. In addition, due to continued population growth and urbanization in the study area, it is anticipated that the conversion from agricultural (range and crop lands) to residential and commercial use would continue, which would result in the loss of existing vegetation types and an increase in impervious surfaces and/or mowed and manicure lawns, especially in the Austin metropolitan area.

*Proposed Action.* This alternative would provide for moderate reductions in projected flood inundation damages upstream from Mansfield Dam, which would seem beneficial to vegetation, but the majority of the lands in question have already been developed, as residential property around Lake Travis is considered highly desirable. It is anticipated that reduction in projected flood damages would make any associated undeveloped land more favorable for development, which would result in modification of existing vegetation types to impervious surfaces and/or maintained and landscaped vegetation types typical of developed lands. Either way, the impact is minimal, because the extent of natural vegetation within the area of affect for the projected reduced flood damages is very limited.

Downstream of the Mansfield Dam, the potential impacts to vegetation as a result of implementation of the Proposed Action is also minimal and would occur only under a limited number of circumstances. Under relatively frequent flood events (less than the 10-year event), there would be no impacts to vegetation as releases from Mansfield Dam would generally be contained within the river channel. For less frequent flood events, somewhere in the range of the 10- to 25-year event, the new Austin stage elevation and corresponding control discharge releases from the Mansfield Dam would exceed the channel capacity and inundate a slightly larger portion of the 100-year floodplain compared to what is being impacted now. Figures 5 through 8 illustrate these differences. The lighter blue color on the figures represents inundation within the 100-year floodplain from releases at Mansfield Dam under current operations (Austin control stage elevation 20.5 or ws20_5) and the darker blue represents the additional areas in the 100-year floodplain that would be inundated by the Proposed Action operations, Austin control stage elevation of 24.0 feet or ws24_0. Table 8 provides a summary of the acres of various vegetation classification cover types, including an urban classification under the same two stage elevations, which correspond to control discharge flows of 30,000 cfs and 24,500 cfs, respectively (see Table 5).

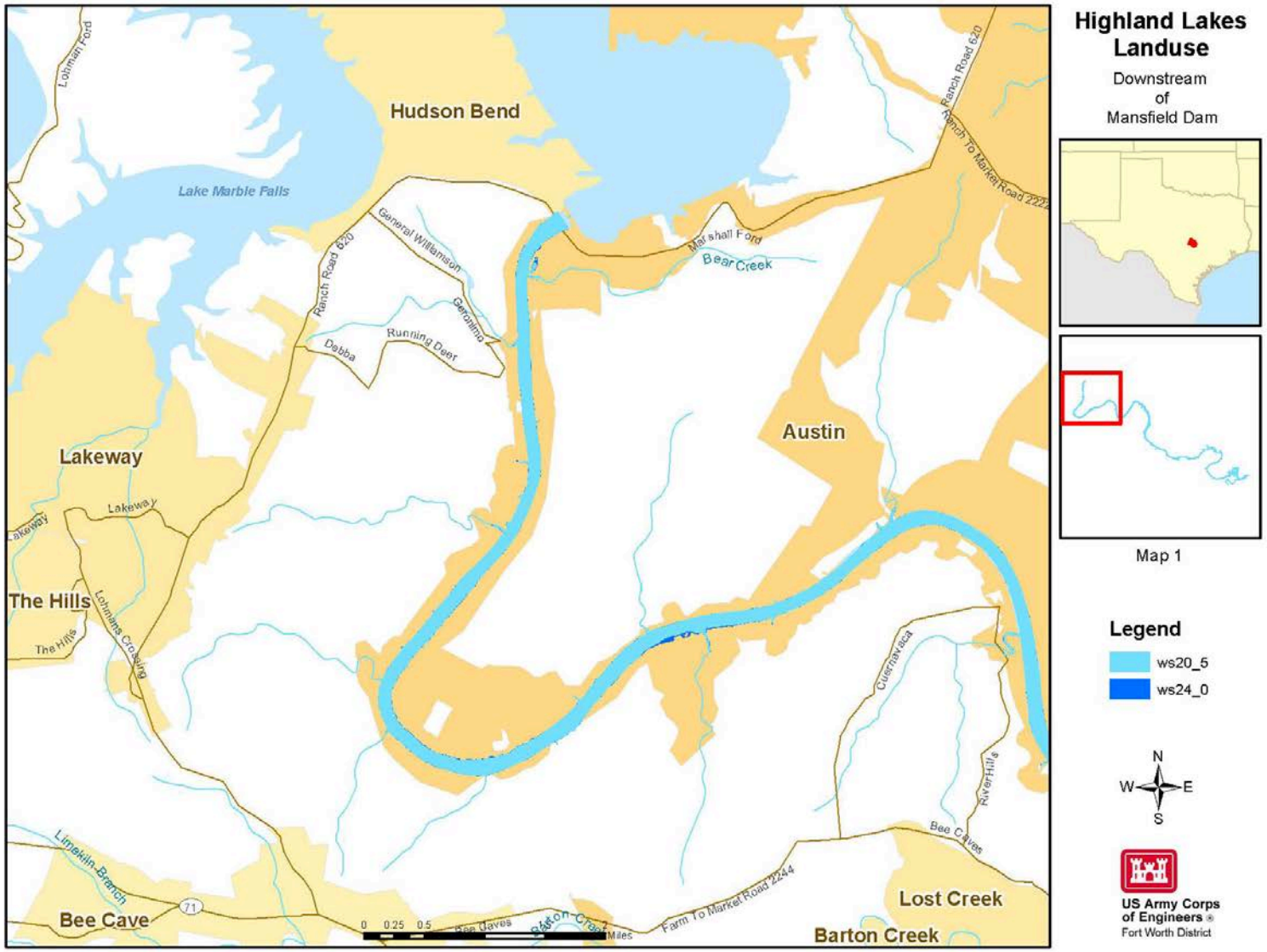

Highland Lakes
Landuse
Downstream
of
Mansfield Dam
Map 1
Legend
ws20_5
ws24_0
N
W
E
S
US Army Corps
of Engineers
Fort Worth District
Hudson Bend
Lake Marble Falls
Lakeway
The Hills
Austin
Bee Cave
Lost Creek
Barton Creek
Lohman Ford
Ranch Road 620
General Williamson
Geronimo
Running Deer
Debba
Marshall Ford
Bear Creek
Ranch To Market Road 2222
Lakeway
The Hills
Lohmans Crossing
Limekiln Branch
71
Bee Caves
Barton Creek
Farm To Market Road 2244
Cuernavaca
River Hills
Bee Caves
0 0.25 0.5
Miles

**Figure 5.**

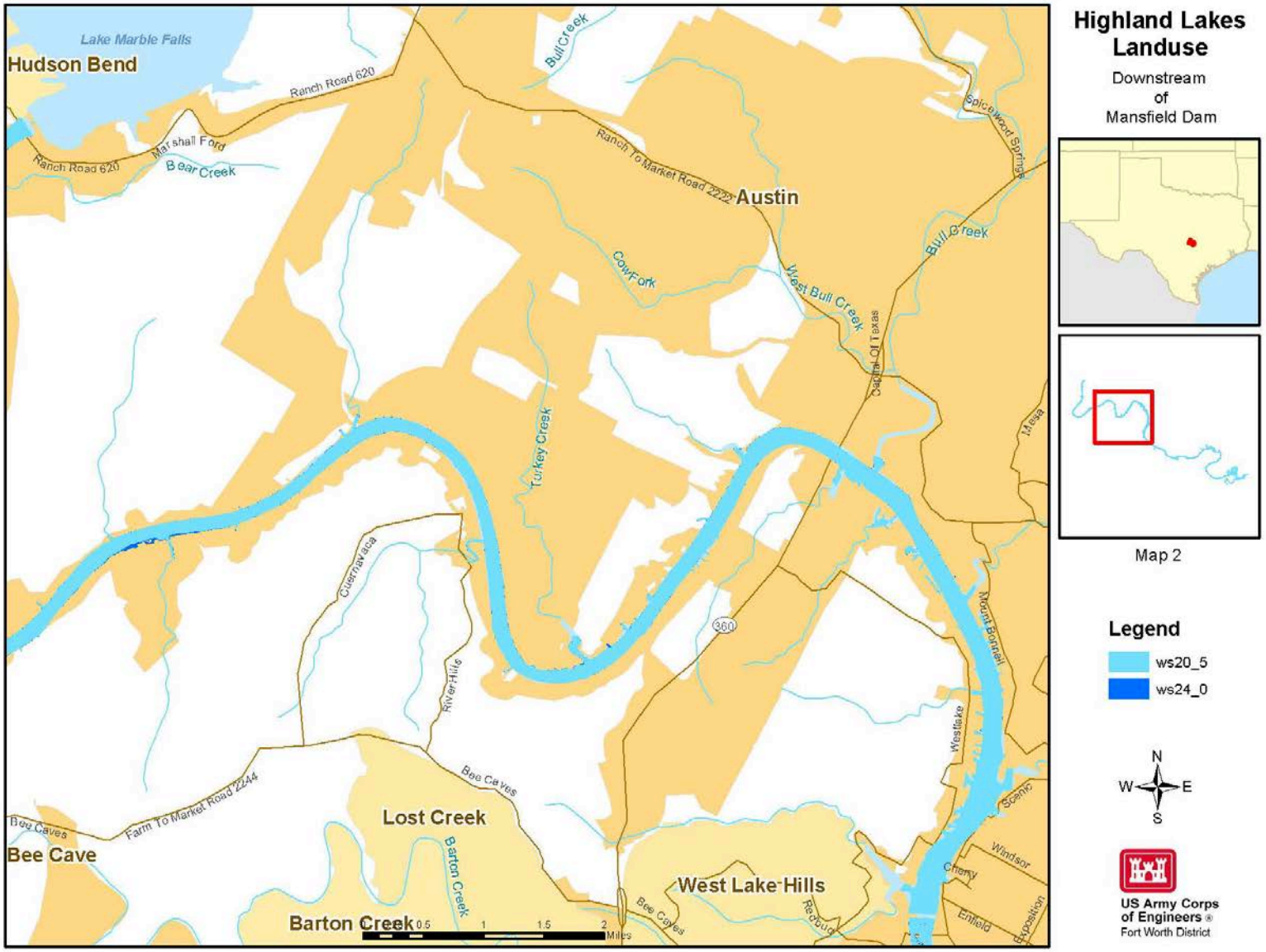

Highland Lakes
Landuse
Downstream
of
Mansfield Dam
Map 2
Legend
ws20_5
ws24_0
N
W
E
S
US Army Corps
of Engineers ®
Fort Worth District
Lake Marble Falls
Hudson Bend
Ranch Road 620
Marshall Ford
Bear Creek
Ranch To Market Road 2222
Austin
Bull Creek
Spicewood Springs
Cow Fork
West Bull Creek
Capital Of Texas
Mesa
Turkey Creek
Cuernavaca
River Hills
Mount Bonnell
360
Westlake
Bee Caves
Farm To Market Road 2244
Lost Creek
Barton Creek
West Lake Hills
Windsor
Cherry
Enfield
Redbud
Scenic
Bee Cave
0 0.5 1 1.5 2 Miles

**Figure 6.**

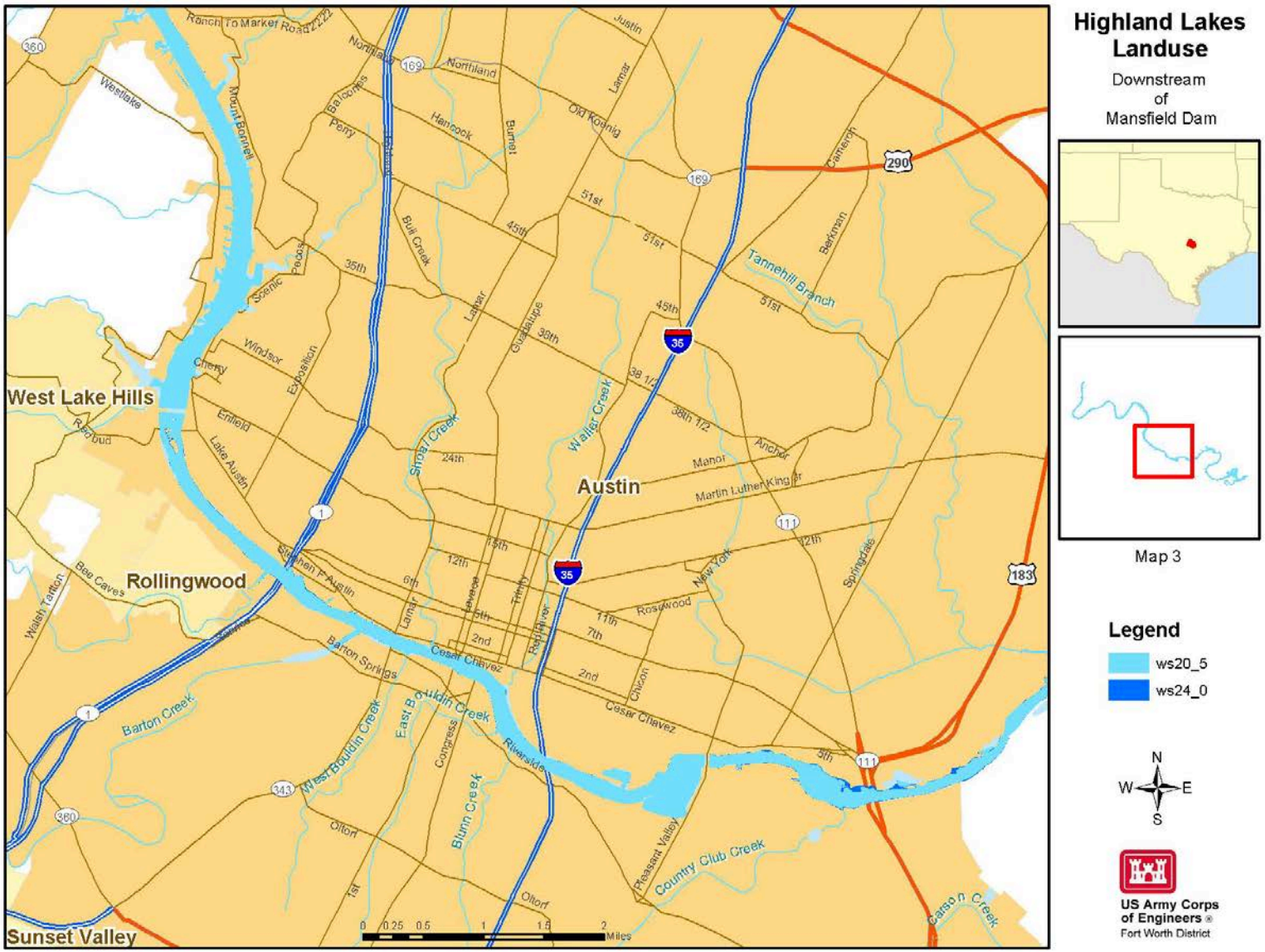

Highland Lakes
Landuse
Downstream
of
Mansfield Dam
Map 3
Legend
ws20_5
ws24_0
N
W
E
S
US Army Corps
of Engineers
Fort Worth District
West Lake Hills
Rollingwood
Austin
Sunset Valley
Barton Creek
Lake Austin
Waller Creek
Shoal Creek
Tannehill Branch
Country Club Creek
Blunn Creek
West Bouldin Creek
East Bouldin Creek
Carson Creek
Pleasant Valley
Ranch To Market Road 2222
Westlake
Mount Bonnell
Northland
Hancock
Burnet
Old Koenig
Lamar
Camerich
Berkman
Justin
Perry
Balcones
Scenic
Pecos
Bull Creek
Lamar
Guadalupe
Windsor
Cherry
Exposition
Enfield
Redbud
Bee Caves
Walsh Tarlton
Stephen F Austin
Manor
Martin Luther King Jr
Anchor
New York
Springdale
Rosewood
Chicon
Riverside
Congress
Oltorf
1st
Barton Springs
Cesar Chavez
35th
38th
38th 1/2
45th
51st
24th
12th
7th
6th
5th
2nd
11th
15th
0 0.25 0.5 1 1.5 2 Miles

**Figure 7.**

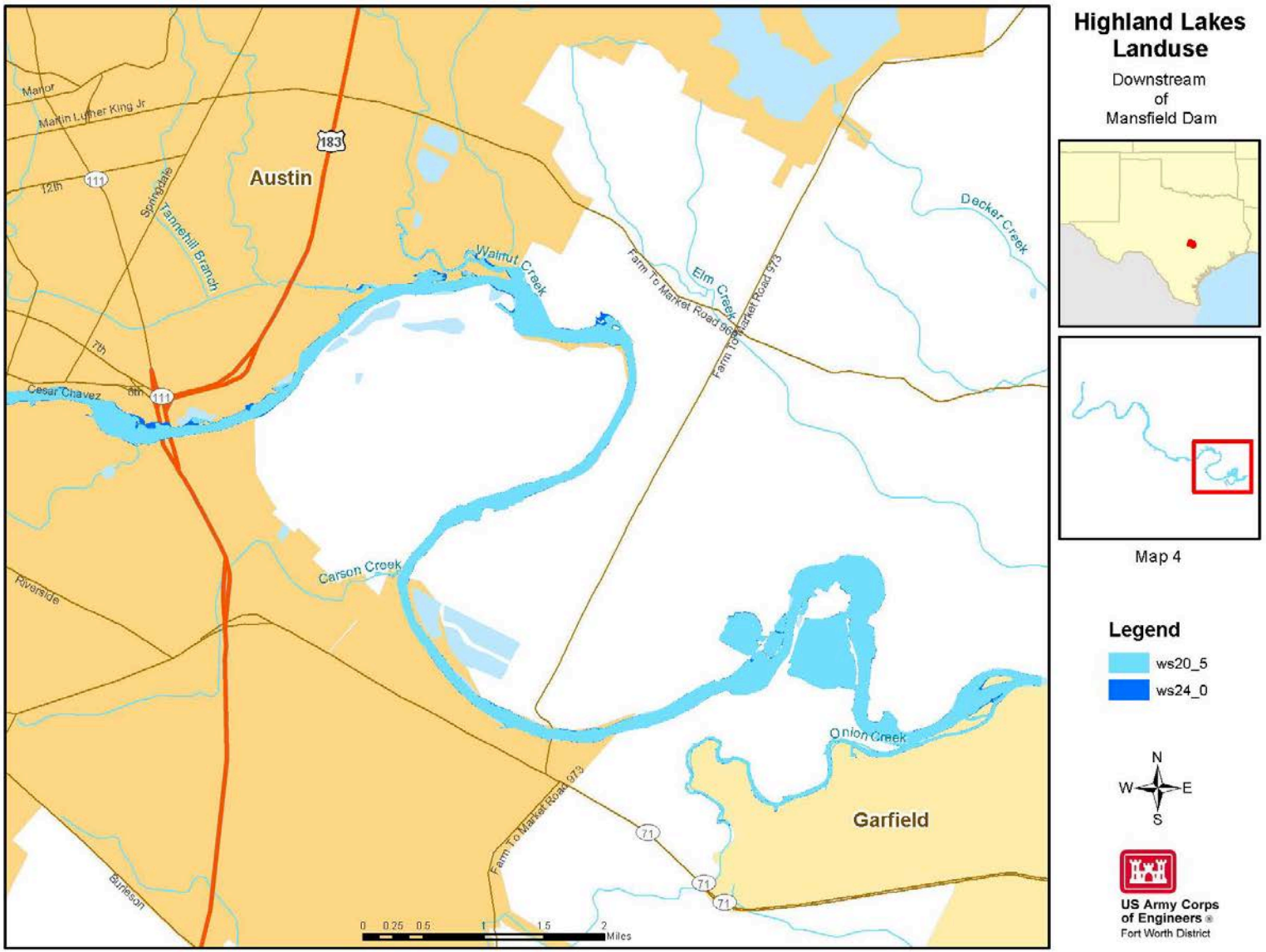

Highland Lakes
Landuse
Downstream
of
Mansfield Dam
Map 4
Legend
ws20_5
ws24_0
N
W
E
S
US Army Corps
of Engineers
Fort Worth District
Austin
Garfield
Manor
Martin Luther King Jr
12th
7th
Cesar Chavez
6th
Springdale
Tannehill Branch
Walnut Creek
Elm Creek
Decker Creek
Farm To Market Road 969
Farm To Market Road 973
Carson Creek
Onion Creek
Riverside
Bimeson
183
111
71
0 0.25 0.5 1 1.5 2
Miles

**Figure 8.**

**Table 8. Summary of Vegetation Classification Differences for the No Action and Proposed Action Alternatives at the Austin Control Point.**

| | No Action | Proposed Action | |
|---|---|---|---|
| | 20.5 Feet Stage Elevation | 24.0 Feet Stage Elevation | Differences |
| **Vegetation Cover Types** | **Acres** | **Acres** | **Acres** |
| | | | |
| Crops | 1162 | 1201 | 39 |
| Live Oak Ash Juniper Parks | 599 | 615 | 16 |
| Live Oak Ash Juniper Woodlands | 808 | 813 | 5 |
| Live Oak Mesquite Ash Juniper Parks | 119 | 121 | 2 |
| Post Oak Parks | 159 | 169 | 10 |
| Silver Bluestem Wintergrass | 210 | 222 | 12 |
| Urban | 696 | 703 | 7 |
| **Totals** | **3753** | **3844** | **91** |

As you can see from the table, inundation will affect a total of 91 acres of various cover types as a result of the Proposed Action compared to the No Action alternative, or less than 2.4 % of the total cover, in the 100-year floodplain within the study area. Therefore, adverse impacts to vegetation under the Proposed Action are considered minimal.

## FUTURE WITH PROJECT CONDITIONS

The future conditions in the study area following approval of the Mansfield (Marshall Ford) Dam and Lake Travis, Colorado River, Colorado River Basin Water Control Manual revised March 2013 and implementation of the new operating rules will be much the same as the Future Without Project Conditions discussed on pages 9-11. Blackland Prairie remnants will continue to be lost due to conversion to agricultural use or development. Population will continue to grow, especially in the Austin metropolitan area, which will further induce residential and commercial development. As the population grows and expands, LCRA, the cities of Austin, Bastrop and the other communities in the study area, along with other Federal, state and local entities will continue to implement numerous water supply, water quality, flood and erosion protection, channel stabilization and improvement, storm water and drainage construction and rehabilitation actions in the future. Additionally, private sector development will continue, as will ongoing sand and gravel mining in the study area.

The only real change in the future with implementation of the new operation rules for the Mansfield Dam and Lake Travis would occur during flood events in the 10- to 25-year range. During this range of flood events, there would be reduced flood damages upstream of the dam as the water in the flood pool is evacuated at the higher rate of discharge than is currently being used. Since the duration of storage of flood waters behind the dam will be less under those conditions, safety risks to the structure of the dam would also be reduced slightly. Finally, the control discharge rates of the revised manual are the same as those in the current manual, only the stage elevations are being modified to take into account changed hydraulic conveyance conditions, so implementation of the new operations rules has only minimal downstream impacts from what was used in the more recent past. It has only been in the last 15 years or so that LCRA has operated to the stage elevations at the downstream control points at Austin and Bastrop by reducing the discharge rates of flood waters from Mansfield Dam during the 10- to 25-year flood events. Implementation of the new operation rules eliminates the discrepancies found in the current manual and provides LCRA and USACE a scientifically sound basis for making informed operations decisions in the future.

## CUMULATIVE EFFECTS

The CEQ has defined cumulative effects as "*the impacts on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal or person undertakes such other actions*." Cumulative effects can result from individually minor, but collectively significant, actions occurring over a period of time (40 CFR 1508.7). The CEQ guidance further indicates that it is not practical to analyze cumulative effects for other than those truly meaningful environmental effects so only those resources identified as having environmental consequences are being included in the discussion of cumulative impacts.

While assessing the potential for cumulative effects for the alternatives being considered, the study team considered past, present, and reasonably foreseeable actions within the study area that could contribute to meaningful cumulative effects. Past actions by others in the basin have significantly altered the characteristics of the lower Colorado River. In particular, the river has been dammed and controlled to the point that it was converted from a free-flowing river that was periodically subject to flood events to a mostly controlled system. The timing and duration of flows and flood events in the river has changed dramatically. It is impossible to assess the cumulative impact of past projects on the lower Colorado River since the data for conditions prior to many of the significant projects do not exist. Consequently, the past actions within the study area are being considered as the existing conditions within the basin. Additionally, because present and reasonably foreseeable actions by others within the lower Colorado River basin will occur in the study area, they are considered to be part of the No Action alternative (see Future Without Project Conditions section on pages 9-11). Past, present and reasonably foreseeable projects by others above Lake Travis that are outside the focused study area, but are connected to the Highland Lakes region of the Lower Colorado River basin will be considered in the cumulative effects analysis along with those actions likely to occur that are beyond those actions described under the No Action and Proposed Action alternatives.

### Reasonably Foreseeable Future USACE Actions

Flood risk management and emergency stream bank protection projects that are close to being implemented or have or will have NEPA compliance completed before this EA is finished would not be considered as part of the Proposed Action. For this reason, the EA is considering these projects as part of the No Action alternative as reasonably foreseeable projects.

**Lower Colorado River Basin – Wharton/Onion Creek.** The authorized project consists of two separable elements: Onion Creek and Wharton. The Onion Creek watershed, which has an area of approximately 343 square miles, is located in southern Travis and northern Hays counties and is the study area for the purposes of this EA. Two major flood events estimated as approximately 40-year events occurred in 1998 and 2001, with hundreds of homes being inundated and many totally destroyed. The Onion Creek element has two components: Timber Creek and Onion Creek Forest/Yarrabee Bend. The Timber Creek component consists of the acquisition/removal of approximately 81 residential structures from the 25-year floodplain. The vacated land will be used for recreation and ecosystem restoration, with approximately 40 acres converted to a park and 16 acres restored to riparian woodlands. The Onion Creek Forest/Yarrabee Bend component consists of the acquisition/removal of approximately 410 residential structures from the 25-year floodplain. The vacated land will be used for recreation and ecosystem restoration, with approximately 100 acres converted to a park and 190 acres restored to riparian woodlands. The city of Austin and Travis County are the non-Federal sponsors for the Onion Creek project and to date they have invested millions in acquisition of flood-prone properties in the project area in advance of any Federal funding.

**Colorado River at Caldwell Lane.** This is a Section 14, Emergency Streambank Protection project, located north of the town of Garfield in southeastern Travis County, approximately 12 miles southeast of Austin. The erosion and subsequent bank failure is occurring along a 2,000-foot reach of the

Colorado River within a moderate bend and is caused by the continuous undercutting of the bank toe along the river channel in an area where there is an insufficient base to support the upper portion of the bank. This slope failure is further exacerbated when the top of the bank becomes saturated. The erosion has left a 30- to 40-foot nearly vertical bank, void of vegetation, over an approximate 1,000-foot reach. At its narrowest point, the top of the bank is less than 10-feet from the water supply facility owned and operated by the city of Garfield and less than 50-feet from the edge of Caldwell Lane, which provides the only access for a residential subdivision. Construction has recently been completed and included grading and benching the bank for greater stability and placement of filter fabric under stone riprap keyed in 6 feet at the toe. Head cutting near the water storage tanks was addressed by construction of a drop inlet with an 18-inch drainpipe that terminates on an apron at the toe of the bank protection. The non-Federal sponsor is Travis County.

**Permitted Projects.** Under direction of the Congress of the United States (U.S.), using the authorities stated in Section 10 of the Rivers and Harbors Act of 1899 and the Section 404 of the Clean Waters Act, the Regulatory Branch of the USACE regulates all work or structures in, or affecting the course, condition, or capacity of navigable waters of the U.S. and the discharge of dredged and fill material into all waters of the U.S. including wetlands. Consequently, applicants are required to submit information to the USACE for approval of construction projects that are conducted within areas subject to the USACE jurisdiction under Section 10 and Section 404. In most cases, these projects do not result in any significant impact to waters of the U.S., including wetlands, since the permitting process requires mitigation for a majority of the impacts.

**Reasonably Foreseeable Actions of Others**

**Flood Damage Reduction**

**City of Austin.** The City of Austin proposes numerous projects within the study area. The actions currently proposed or likely to occur include:

- Structural and non-structural water quality features such as storm water inlet retrofits, litter control retrofits, water quality remediation, rehabilitation of existing detention ponds and new local/regional detention ponds in various watersheds.
- Structural and non-structural erosion control features in various watersheds including buyouts,
- Structural and non-structural flood risk management features such as storm drainage upgrades, levee and floodwalls, gabion linings, channel improvements, rail and road bridge replacements, and buyouts.

**Ecosystem Restoration**

**Austin-Bastrop River Corridor Partnership.** The Austin-Bastrop River Corridor Partnership is an informal partnership of nonprofit organizations, governmental agencies, and local citizens concerned with the future of the Colorado River corridor from Austin to Bastrop, Texas. Their stated mission is to support sustainable development and a healthy riparian ecosystem along the corridor. While this organization has no specific projects planned, their stated goals are:

- To raise community awareness about issues affecting the future of the river corridor over the next twenty years of rapid development;
- To promote economic and recreational use of the river corridor that supports long-term ecological health and social equity;
- To promote actions that conserve and maintain a healthy riparian system along the Austin-Bastrop Colorado River Corridor; and
- To assist with restoration of riparian habitats along the river corridor.

**Water Supply.**

**Senate Bill 1.** Texas Senate Bill 1 (SB 1), passed in 1997, set up 16 Regional Water Planning Groups throughout Texas to investigate future water supply needs and identify potential water supply alternatives in a planning process that requires updating every five years, with the most recent State Water Planning Report dated 2012. As a result of this planning process, the latest water management strategies included in the Lower Colorado regional water plan would provide 646,167 acre-feet of additional water supply by the year 2060. The primary recommended water strategy is the Lower Colorado River Authority/San Antonio Water System (LCRA/SAWS) project that consists of off-channel reservoirs, agricultural water conversion, additional groundwater development, and new and/or amended surface water rights. Conservation strategies represent up to 37 percent of the total amount of water resulting from all recommended water management strategies in the Planning Region for every municipal water user group with a need and a target of water use greater than 140 gallons per capita per day.

**Selected Major Water Management Strategies (2012).**

- Off-channel reservoir project (LCRA/SAWS) would provide 47,000 acre-feet of water in the year 2060;
- Wastewater return flows would provide up to 78,956 acre-feet of water in 206;
- Municipal conservation and enhanced municipal/industrial conservation would provide up to 76,594 acre-feet per year in 2060; and
- Reuse of treated wastewater would provide up to 58,783 acre-feet per year in 2060.

**Transportation.**

**Texas Department of Transportation.** The Texas Department of Transportation (TxDOT) currently has 230 proposed road and bridge projects identified within the 5 county study area. These range in complexity all the way from construction of new roads and bridges to replacements and resurfacing of existing road and bridges, to installation of safety barriers, turn lanes and bicycle and pedestrian access lanes.

**Trans-Texas Corridor** (**TTC**). The Trans-Texas Corridor was a proposal for a transportation network in the State of Texas that was conceived to be composed of a new kind of transportation modality known as supercorridors. The TTC was initially proposed in 2001 and after considerable controversy was discontinued by 2010 in the planning and early construction stages.

The network, as originally envisioned, would have been composed of a 4,000-mile network of supercorridors up to 1,200 feet wide to carry parallel links of tollways, rails, and utility lines. It was intended to route long-distance traffic around population centers, and to provide stable corridors for future infrastructure improvements–such as new power lines from wind farms in West Texas to the cities in the east–without the otherwise often lengthy administrative and legal procedures required to build on privately owned land. The tollway portion would have been divided into two separate elements: truck lanes and lanes for passenger vehicles. Similarly, the rail lines in the corridor would have been divided among freight, commuter, and high-speed rail. The Texas Department of Transportation (TxDOT) intended to "charge public and private concerns for utility, commodity or data transmission" within the corridor, in essence making a toll road for services such as water, electricity, natural gas, petroleum, fiber optic lines, and other telecommunications services. The network would have been funded by private investors and built and expanded as demand warrants.

In 2009, TxDOT decided to phase out the all-in-one corridor concept in favor of developing separate rights-of-way for road, rail, and other infrastructure using more traditional corridor widths for those modes. In 2010, official decision of "no action" was issued by the Federal Highway Administration, formally ending

the project. In 2011, the Texas Legislature formally canceled the Trans-Texas Corridor with the passage of House Bill 1201.

**Transportation Actions of Local Municipalities and Counties.** In addition to the on-going and planned TxDOT projects, there are multiple, similar projects under construction or being planned by the local municipalities and counties in the study area for those roads and transportation plans under their jurisdiction.

### CUMULATIVE EFFECTS BY IMPACTED RESOURCE

**Vegetation.** Reasonably foreseeable actions proposed by USACE and by others, such as transportation, flood risk management, water supply reservoirs or pipelines, and residential and commercial development would cumulatively reduce or alter the vegetation cover types within the basin. It is expected that woody vegetation types and grasslands in upland areas would experience the greatest cumulative reduction in the study area. These impacts would be cumulatively significant and adverse, as little, if any, mitigation would likely be provided for the impacts.

While reasonably foreseeable future USACE actions would include appropriate mitigation for impacts to forested lands and waters or wetlands, there is generally no mitigation for impacts to grasslands unless they would be critical habitat for some wildlife species of concern.

All structural measures would adversely impact vegetation. Cumulatively, projects such as multipurpose- or water supply reservoirs would significantly impact existing vegetation communities by altering the species composition or eliminating vegetation from potentially hundreds, if not thousands of acres within the basin. When considered with the other reasonably foreseeable actions of others, the reservoir measures would result in significant cumulative adverse impacts to vegetation. Specific mitigation plans would be developed for each reservoir project that would help offset that project's impacts, but due to the size of these potential projects, it may not be possible to bring some of these projects below the significance threshold for impacts to vegetation. Structural measures such as levees, floodwalls, diversion channels, and channel improvements would have significant adverse cumulative impacts to vegetation over the short-term during construction, but over the long-term, revegetation and project specific mitigation would be expected to reduce these impacts below the significance threshold.

Non-structural measures would generally result in slightly beneficial effects to vegetation through revegetation and stabilization of disturbed and eroded areas. Ecosystem restoration measures would provide beneficial cumulative effects as the purpose of those types of actions is to improve habitat conditions, generally through restoration of degraded habitats to a more "natural condition.' However, the cumulative beneficial effects associated with ecosystem restoration actions would never be enough to offset the significant, adverse cumulative impacts to vegetation caused by implementation of the other multiple, reasonably foreseeable future actions of others.

## IV. COORDINATION OF PROPOSED ACTION.

### VIEWS OF SPONSOR

LCRA is the non-Federal sponsor. They have reviewed the draft Water Control Manual for Mansfield Dam and Lake Travis (2013) and concur with its proposed revisions. A copy of the draft Water Control Manual is provided in **Appendix A**.

## RESULTS OF AGENCY COORDINATION

In accordance with coordination requirements set forth in NEPA, copies of the EA will be mailed to the Texas Parks and Wildlife Department (TPWD), the United States Fish and Wildlife Service (USFWS), the Environmental Protection Agency, Region 6 (EPA), the Texas Commission on Environmental Quality, the Texas State Historic Preservation Office, and five Native American tribes, including the Comanche, Kiowa, Wichita, Mescalero Apache, and Tonkawa Tribes, at the same time a Notice of Availability (NOA) is mailed to the general public soliciting their comments during a mandatory 30-day public review period. Copies of the agency coordination letters and the NOA are provided in **Appendices B** and **C**, respectively. As a result of this coordination, any letters or electronic communications received regarding the findings of the EA shall be included in this EA. Since the environmental consequences for the proposed action as identified in this EA are minimal, it is expected that the resource agencies and tribes would be supportive of the findings.

## REGULATORY REQUIREMENTS

Table 9 shows the status of environmental compliance of this report with applicable laws, executive orders and other environmental issues. Since the Proposed Action for this EA has no construction component, it has no potential for adversely affecting many of the laws, regulations and statues listed below.

**Table 9. Relationship of Plan to Environmental Protection Statutes and Other Environmental Requirements**

| Policies | Compliance of Plan |
|---|---|
| **Public Laws** | |
| National Environmental Policy Act, 1969, as amended | Plan in Full Compliance |
| Endangered Species Act, 1973, as amended | Plan in Full Compliance |
| Fish and Wildlife Coordination Act, 1958, as amended | Plan in Full Compliance |
| National Historic Preservation Act, 1966, as amended | Plan in Full Compliance |
| Clean Water Act, 1972, as amended | Plan in Full Compliance |
| Farmland Protection Policy Act | Plan in Full Compliance |
| Clean Air Act, 1977, as amended | Not Applicable |
| Rivers and Harbor Act, 1899 | Plan in Full Compliance |
| Wild and Scenic Rivers Act, as amended | Not Applicable |
| Coastal Zone Management Act, 1972, as amended | Not Applicable |
| Magnuson Fisheries Conservation and Management Act | Plan in Full Compliance |
| Migratory Bird Treaty Act, 1918, as amended | Plan in Full Compliance |
| Native American Graves Protection and Repatriation Act, 1990 | Plan in Full Compliance |
| Archeological and Historic Preservation Act, 1974, as amended | Plan in Full Compliance |
| Archeological Resources Protection Act, 1979, as amended | Plan in Full Compliance |
| **Executive Orders** | |
| Environmental Justice (E.O. 12898) | Plan in Full Compliance |
| Flood Plain Management (E.O. 11988) | Plan in Full Compliance |
| Protection of Wetlands (E.O. 11990) | Plan in Full Compliance |

The Proposed Action has been reviewed in accordance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. In addition, Executive Order 11990, Protection of Wetlands, and Executive Order 11988, Floodplain Management, were considered during the development of the Proposed

Action. By its very nature, the Proposed Action affects the Colorado River floodplain below Mansfield Dam and Lake Travis for a distance of roughly 187 river miles. However, the proposed activities would not induce development in, alter boundaries of, or significantly impact the 100-year floodplain so the Proposed Action is in compliance with Executive Order 11988, Floodplain Management. The Proposed Action would neither adversely impact nor result in any net loss of wetland areas so the project is in compliance with Executive Order 11990. An Environmental Assessment (EA) and draft Finding of No Significant Impact (FONSI) have been completed. The FONSI is expected to be signed by the District Commander in July 2013.

**RECOMMENDATIONS**

This EA, which is tiered to the Final Programmatic Environmental Impact Statement for Flood Damage and Ecosystem Restoration, Lower Colorado River Basin, Colorado River, Texas, covers proposed modifications to the Section 7 regulation manual for Mansfield Dam and Lake Travis. For the new Water Control Manual, controlling discharges and associated river stages specified for the Colorado River at the Austin and Bastrop control points are based on results of hydrologic and hydraulic, flood damage, and environmental analyses. The new river stages associated with the controlling discharges effectively offset the reduction in channel conveyance, allowing re-establishment of the control discharges specified in the 1979 plan. The purpose of this environmental assessment is to tier the analyses outlined in the PEIS to the extent necessary to meet the requirements of NEPA and pertinent USACE regulatory guidance for implementing the procedural provisions of NEPA.

Based upon findings of the environmental consequences section, implementation of the action proposed in this EA, specifically modification of the Mansfield Dam and Lake Travis Water Control Manual, is anticipated to result in no significant adverse impacts, as long as implementation of the actions adhere to applicable regulations, policies, mitigation requirements, standards, and guidelines. Therefore, the actions are being recommended for a Finding of No Significant Impact (FONSI), which has been developed and is included in this document.

LITERATURE CITED & REFERENCES

Highland Lakes Interim Feasibility Study – Phase II Flood Damage Evaluation Project (FDEP) (Draft 2010) report, DRAFT 2010. Prepared by Halff Associates for the Fort Worth District Corps of Engineers and Lower Colorado River Authority.

Lower Colorado River Basin Study, Phase 1 – Problems, Needs and Opportunities, Prepared by HALFF Associates Inc. for the USACE and the Lower Colorado River Authority, October 2003.

Lower Colorado River Basin, Highland Lakes Interim Feasibility Study, US Army Corps of Engineers, Fort Worth District, 2003. (LCRHLIFS, 2003)

Lower Colorado River Basin, Highland Lakes Interim Feasibility Study, Appendix C, Environmental Resources, 2003.

Texas Surface Water Quality Standards Report, 2010. Texas Commission on Environmental Quality.

Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d), 2010. Texas Commission on Environmental Quality.

USFWS 2013 Endangered and Threatened Species Listing accessed online at http://www.usfws.gov

Texas Department of Transportation 2013 Project Tracker accessed online at http://apps.dot.state.tx.us/apps/project_tracker