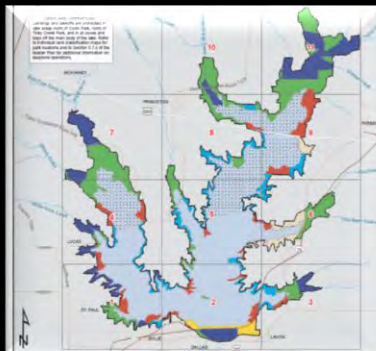


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4 **LAVON LAKE MASTER PLAN DRAFT**
5

6 **EAST FORK OF TRINITY RIVER**
7 **COLLIN COUNTY, TEXAS**
8

9 **MAY 2016**
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11



US Army Corps of Engineers



PREFACE

The Lavon Lake Master Plan (hereafter Plan) is a vital tool produced and used by the U.S. Army Corps of Engineers (USACE) to guide the responsible stewardship of USACE-administered resources for the benefit of present and future generations. The Plan provides direction for appropriate management, use, development, enhancement, protection, and conservation of the natural, cultural, and man-made resources at Lavon Lake. The original Plan for Lavon Lake was approved in February 1953, updated in 1961, and revised in May 1972 (Design Memorandum No 13). The 1972 version is the most recent Plan at the time of this revision and was intended to serve as a guide for the orderly and coordinated development and management of all land and water resources of the project. These earlier documents presented data on existing conditions, anticipated recreational use, types of facilities needed to service the anticipated use, and an estimate of future requirements.

Lavon Lake is located completely within Collin County, Texas which, according to the 2010 Census, experienced a 59 percent (%) growth in population from 2000 to 2010. Collin County and adjacent Denton and Rockwall Counties were in the top seven fastest growing counties in Texas reported by the 2010 Census. This rapid urbanization and population growth in the Dallas-Fort Worth metropolitan area, and especially Collin County, has resulted in changes to land use in the region and around Lavon Lake. Changes in outdoor recreation trends, increasing fragmentation of wildlife habitat, ever increasing demand for more infrastructure to support population growth, as well as current legislative requirements demand a fresh look at the management of federal land at Lavon Lake. By definition, the Plan does not address the technical aspects of water management for flood risk management or water conservation purposes, but seeks to provide a land management plan that balances the stewardship of natural resources and provision of high quality recreation opportunities with these primary project purposes.

The USACE vision for the future management of the natural resources and recreation program at Lavon Lake is set forth as follows:

The land, water, and recreational resources of Lavon Lake will be managed to protect, conserve, and sustain natural and cultural resources, especially environmentally sensitive resources, and provide outdoor recreation opportunities that complement overall project purposes for the benefit of present and future generations.

The Plan presents an inventory and analysis of land resources; resource management objectives; land use classifications; a resource use plan for each land use classification; current and projected park facility needs; an analysis of existing and

56 anticipated resource use; and anticipated influences on overall project operation and
57 management.
58

59 An Environmental Assessment (EA) of alternative management scenarios set
60 forth in the Plan has been prepared in accordance with the National Environmental
61 Policy Act of 1969, as amended (NEPA); regulations of the Council on Environmental
62 Quality; and USACE regulations, including Engineer Regulation 200-2-2: Procedures for
63 Implementing NEPA. The EA can be found in its entirety in Appendix B.
64

65 The EA evaluated and analyzed two alternatives as follows: the implementation
66 of the proposed Plan, and a No Action Alternative (continued use of the 1972 Master
67 Plan). The EA also analyzed the potential impact these two alternatives would have on
68 the natural, cultural, and human environments. Because the Plan is conceptual, any
69 action proposed in the plan that would result in significant disturbance to natural
70 resources or result in significant public interest would require additional NEPA
71 documentation at the time the action takes place.
72

73 Preparation of the Plan was a cooperative effort involving USACE; federal, state,
74 and local government agencies; non-government organizations; and members of the
75 general public. Listening sessions and scoping comments from government officials and
76 the general public were important for identifying issues that needed to be addressed in
77 the Plan. Details regarding the public involvement efforts for the Plan are provided in
78 Chapter 7.
79

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CHAPTER 1 - INTRODUCTION

286
287

288 1.1 OVERVIEW

289 Lavon Lake is a multipurpose water resources project constructed and operated
290 by the U.S. Army Corps of Engineers (USACE). The lake and associated federal lands
291 are located entirely within Collin County, Texas at river mile 55.9 on the East Fork of the
292 Trinity River. The Lavon Lake dam extends in an east-west direction for a distance of
293 approximately five miles and is situated two miles east of Wylie, Texas and 22 miles
294 northeast of the city of Dallas, Texas (Figure 1.1). The dam and associated
295 infrastructure, as well as all lands acquired for the Lavon Lake project, are federally
296 owned and are administered by the USACE.

297

298 The Master Plan (Plan) is intended to serve as a comprehensive land and
299 recreation management plan with an effective life of approximately 25 years. The focus
300 of this Plan is to guide the stewardship of natural and cultural resources, and the
301 provision of outdoor recreation facilities and opportunities on federal land associated
302 with Lavon Lake. The Plan does not address the flood risk management or water
303 conservation purposes of Lavon Lake (see the USACE Water Control Manual for Lavon
304 Lake for a description of these project purposes). The original Master Plan for Lavon
305 Lake was written in the mid 1950's with the most recent revision prepared in May 1972
306 and entitled *Trinity River Basin, Texas – Design Memorandum No 13, (Revised May*
307 *1972) Updated Master Plan for Lavon Lake Modification – East Fork Trinity River,*
308 *Texas*. In 1999, USACE discontinued use of the Design Memorandum (DM) system as
309 a means of organizing the many phases of civil works projects. Therefore, the term
310 “Design Memorandum” is not used in this Master Plan revision. A list of DMs previously
311 published for the Lavon Lake project is provided in Appendix C. A list of acronyms used
312 in this Plan is provided in Appendix K.

313

314 1.2 PROJECT AUTHORIZATION

315 The following paragraphs provide a summary of key legislation authorizing the
316 construction of Lavon Dam and Lake as well as stewardship of project lands and the
317 provision of outdoor recreation facilities and programs.

318

319 House Document No. 403, 77th Congress, outlined a comprehensive plan of
320 improvement of the Trinity River and Tributaries. The plan included eight reservoirs,
321 including Lavon Dam and Lake, and various channel improvement projects within the
322 upper Trinity River watershed. Congressional authority for the construction of Lavon
323 Dam and Lake was granted in the River and Harbor Act approved 2 March 1945 (Public
324 Law 14, 79th Congress, First Session). The July 24, 1946 River and Harbor Act (Public
325 Law 525, 79th Congress, Second Session, Sec. 2) modified the authorization to provide
326 for conservation storage. Subsequent to these authorizations, the initial Lavon Lake
327 Project was constructed in March 1954.

328
329 Within 10 years of completion of the initial project, the need for increased flood
330 protection and water conservation resulted in congressional authorization for the
331 modification of Lavon Dam and Lake. This was set forth in the Flood Control Act of
332 1962, approved October 23, 1962 (Public Law 87-874, 87th Congress, Second Session,
333 House Document No. 554).

334
335 Authority to initiate advanced planning was included in the Public Works
336 Appropriation Act of 1964, approved December 31, 1963 (Public Law 88-257) and in
337 Advice of Allotment C-87, dated January 13, 1964. Following several years of planning,
338 design, and land acquisition, construction of the Lavon Lake Modification was initiated in
339 May 1970 and completed in December 1975.

340
341 The authority to conduct land stewardship management activities, including
342 vegetation management for conservation purposes, is set forth in Public Law 86-717,
343 The Forest Cover Act, which is focused solely on the conservation and management of
344 USACE-administered federal lands. The conservation of Fish and Wildlife Resources is
345 authorized in accordance with the provisions of the Fish and Wildlife Coordination Act,
346 Public Law 85-264. Land stewardship at USACE projects is further supported by
347 Section 101 of the National Environmental Policy Act of 1969 (NEPA).

348
349 Section 4 of the Flood Control Act approved 22 December 1944, (Public Law
350 534, 78th Congress, Second Session), as amended, authorized the development of
351 reservoir areas under the Department of the Army for recreational purposes.

353 **1.3 PROJECT PURPOSE**

354 Lavon Lake is a multipurpose water resources project having the following purposes:

- 355 • Flood Risk Management: a primary mission
- 356 • Water Conservation: a primary mission
- 357 • Public Outdoor Recreation: a secondary mission
- 358 • Environmental Stewardship Including Fish and Wildlife Management: an inherent
- 359 • mission associated with federal land ownership.

362 **1.4 PURPOSE AND SCOPE OF MASTER PLAN**

363 In accordance with Engineering Regulation (ER) 1130-2-550, Change 07, dated
364 30 Jan 2013 and Engineering Pamphlet (EP) 1130-2-550 Change 05, dated 30 Jan
365 2013, lake project master plans are required for most USACE water resources
366 development projects having a federally-owned land base. This revision of the Lavon
367 Lake Master Plan is intended to bring the Plan up to date to reflect changes in outdoor
368 recreation trends as well as ecological and socio-demographic changes that are
369 currently impacting the lake and those anticipated to occur within the planning period of
370 2016-2041, a 25-year period.

371

372 The 1972 Plan was sufficient for prior land use planning and management until
373 recently, as rapid urbanization and suburbanization, demand for water, and changing
374 trends in outdoor recreation began to impact the Collin County area and the North
375 Central Texas region in general. These escalating pressures and changes highlight the
376 need to engage the public and important stakeholders, including elected officials, to
377 revise land classifications, adopt new resource management objectives, and project
378 recreation facility needs into the foreseeable future. To accomplish this, a full revision of
379 the 1972 Plan is required and is set forth in this Plan.

380
381 The revised Plan focuses on overall goals and objectives and not on details of
382 design, routine management, and administration. These are addressed in the Lavon
383 Lake Operational Management Plan (OMP). The OMP is a task oriented plan which
384 must implement and be compatible with the Master Plan. The Plan does not address
385 the specifics of regional water quality, shoreline management with respect to allowable
386 vegetation modification by adjacent landowners, or water level management. In
387 addition, the operation and maintenance of project operations facilities such as the dam
388 and appurtenant structures is not included in the Plan.

389

390 **1.5 PROJECT AND WATERSHED OVERVIEW**

391 Lavon Lake was originally constructed in 1953-54 and was modified and
392 enlarged in 1974-75. The modification and enlargement of Lavon Lake required
393 acquisition of additional lands bringing the total fee simple land base to 37,515 acres. In
394 addition to these lands, a total of 849 acres of flowage easement was also acquired.
395 Flowage easements grant to the Federal government the right to periodically inundate
396 the land during flood management operations. When the pool elevation is at the normal
397 or conservation pool elevation of 492.0 National Geodetic Vertical Datum (NGVD), the
398 lake has a surface area of 21,400 acres. Approximately 16,115 acres of USACE-
399 administered land lies above the normal pool from elevation 492.0 NGVD to
400 approximately 508.0 NGVD. During times of flooding, water is stored in Lavon Lake
401 between elevation 492.0 and 508.0 NGVD. The spillway crest, when all flood gates are
402 closed is 503.5 NGVD. The Federal property boundary line is approximately 155 miles
403 long and at elevation 492.0 NGVD, the shoreline is approximately 121 miles long.

404

405 The release of stored flood water is controlled by USACE until the normal or
406 conservation pool elevation of 492.0 NGVD is achieved. Water stored below elevation
407 492.0 NGVD is managed for water supply purposes in accordance with contractual
408 agreements between USACE and the North Texas Municipal Water District (NTMWD).
409 NTMWD withdraws water from the lake through three separate water intake structures
410 located along the southeast shoreline of the lake. To supplement water supply, the
411 NTMWD has the capability to pump water into Lavon Lake from Jim Chapman Lake
412 (Cooper Dam) and Lake Texoma. Recently, invasive zebra mussels were found in Lake
413 Texoma thus preventing the direct pumping of Lake Texoma water into Lavon Lake. In
414 addition to the water management responsibilities of USACE and NTMWD, the City of
415 Garland withdraws water from Lavon Lake through an intake channel near Little Ridge

416 Park. The water withdrawn by the City of Garland is used as cooling water for a steam
417 electric plant and is returned to the lake.

418
419 The Plan classifies all USACE-managed lands lying above elevation 492.0 NGVD as
420 follows:

- 421 • Project Operations.....508 Acres
- 422 • High Density Recreation2,011 Acres
- 423 • Environmentally Sensitive Areas..... 4,319 Acres
- 424 • Multiple Resource Management - Low Density Recreation.....2,468 Acres
- 425 • Multiple Resource Management - Wildlife Management.....6,476 Acres
- 426 • Multiple Resource Management – Vegetation Management.....824 Acres

427
428 * **Note:** These acreage figures were measured using Geographic Information Systems
429 (GIS) technology and may vary slightly from official land acquisition records.

430
431 Two marinas operate on the lake under a concession lease with USACE. One of
432 the marinas also operates Collin Park for day use and camping. USACE operates all
433 other parks. The majority of USACE park operations and maintenance activities,
434 including mowing, cleaning, building repairs, road repairs, utility repairs, trash removal
435 and related tasks are accomplished through service contracts.

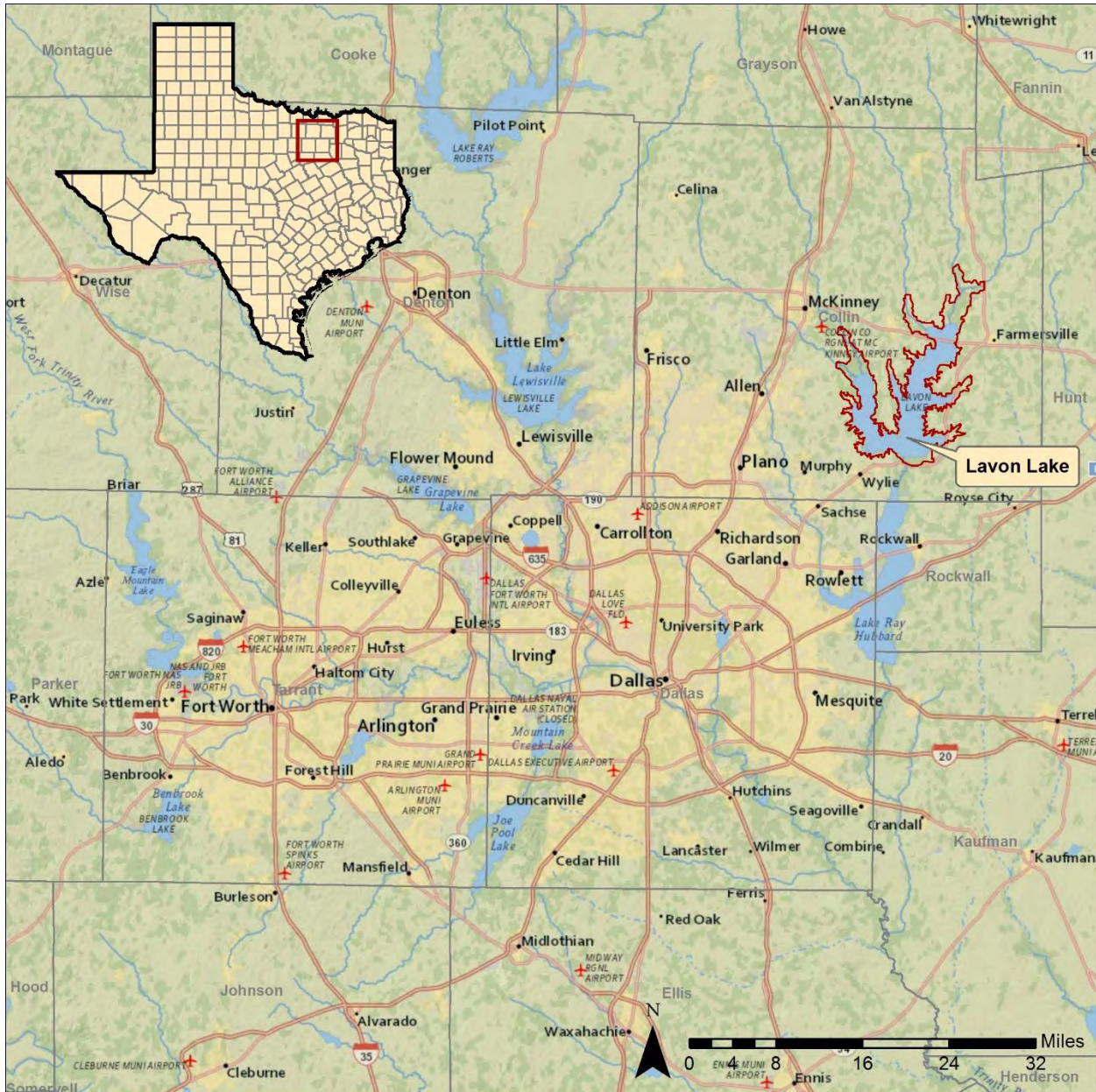
436
437 Lavon Lake is part of the Upper Trinity River watershed in the north central
438 Texas region and lies completely within Collin County, Texas. The dam is located on the
439 East Fork of the Trinity River approximately 2 miles east of Wylie, Texas. Figure 1.1
440 illustrates the location of Lavon Lake with respect to neighboring municipalities and
441 major roadways associated with the lake. Figure 1.2 illustrates the location of Lavon
442 Lake within the 16-County North Central Texas Council of Governments (NCTCOG)
443 region.

444
445 The East Fork of the Trinity River originates in the southern part of Grayson
446 County near Dorchester, Texas in north central Texas. The East Fork flows about 110
447 miles in a southerly direction until it merges with the Trinity River below Dallas. The East
448 Fork joins the main stem at approximately river mile 460 of the Trinity River near
449 Rosser, Texas.

450
451 The East Fork Watershed lies between 32 degrees (°) 30 minutes (') and 33° 32'
452 north latitude and between 96° 13' and 96° 47' west longitude. The watershed is
453 generally located north and east of Dallas, Texas and includes a portion of the Dallas
454 metropolitan area, and the cities of Garland, McKinney, Plano, Richardson, and
455 Mesquite. The watershed has a length of about 78 miles along the major axis of its
456 valley and a maximum width of about 30 miles. The East Fork watershed has a
457 drainage area of 1,314 square miles, including 770 square miles above Lavon Lake.
458 Portions of the watershed lie within Collin, Dallas, Fannin, Grayson, Hunt, Kaufman, and
459 Rockwall Counties.

460

461 The East Fork watershed has a multiple stream drainage pattern. Sister Grove,
 462 Pilot Grove, and Indian Creeks are major left bank tributaries, and Wilson Creek and
 463 Honey Creek are major right bank tributaries that are all located upstream of Lavon
 464 Dam. Major downstream right bank tributaries are Muddy Creek, Rowlett Creek and
 465 Duck Creek. There are no major left bank tributaries downstream of Lavon Dam. Lake
 466 Ray Hubbard, a water supply reservoir owned and operated by the city of Dallas is
 467 located only a few miles downstream from the dam at Lavon Lake.
 468



469
 470 **Figure 1.1** Lavon Lake Vicinity Map

471
 472

473 **1.6 DESCRIPTION OF RESERVOIR**

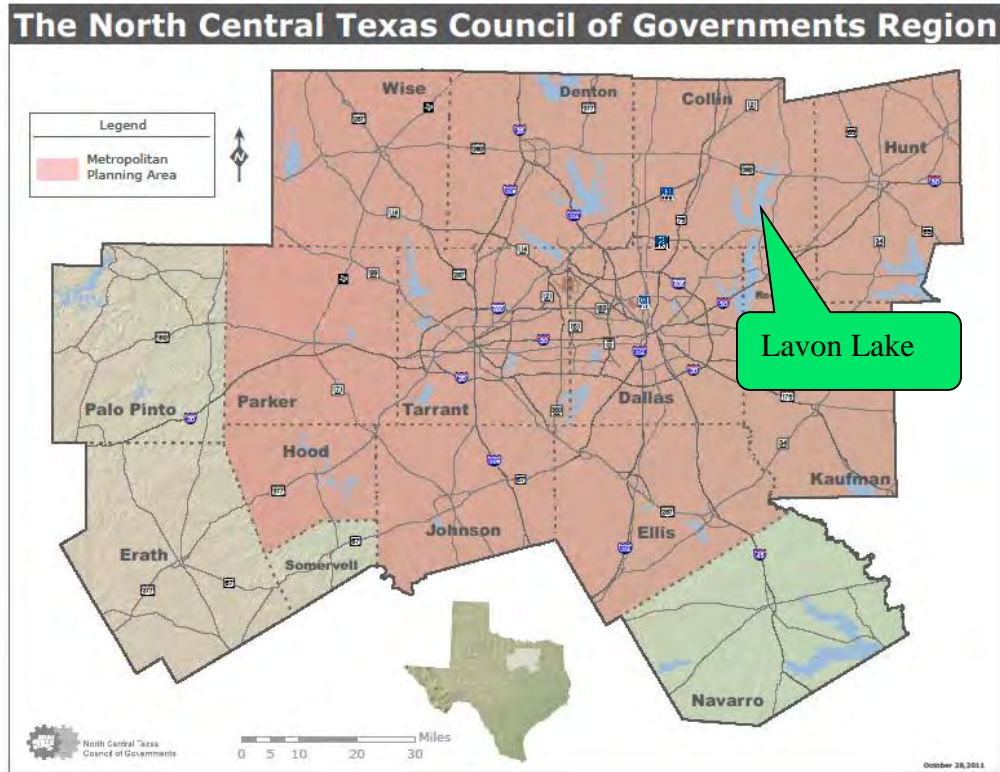
474 Lavon Lake is located in the Upper Trinity River watershed in North Central
475 Texas. The lake and all associated Federal land are located wholly within Collin County.
476 Administratively, Lavon Lake is one of seven lakes in the USACE Trinity Regional
477 Project with headquarters at Lewisville Lake in Denton County. USACE maintains an
478 office at Lavon Lake near the west end of the dam. Downstream of the dam is the
479 forested floodplain of the East Fork of the Trinity River which is part of the headwaters
480 of Lake Ray Hubbard, a reservoir owned and operated by the City of Dallas, and
481 located approximately three miles south of Lavon Lake Dam.
482

483 The topography of Lavon Lake varies from gently rolling in the upper portion of
484 the lake to relatively flat in the lower lake area. With the exception of the forested
485 floodplains along Pilot Grove Creek, Indian Creek, Sister Grove Creek, Ticky Creek, the
486 East Fork of the Trinity River and Wilson Creek, most of the land surrounding Lavon
487 Lake was cleared for agricultural purposes decades ago. The main body of the lake
488 consists of two major arms, a western arm created by the East Fork of the Trinity River
489 and an eastern arm created by Pilot Grove and Sister Grove Creeks. The western arm
490 is the larger and is approximately 12 miles long north to south and 4.75 miles wide east
491 to west.
492

493 Soils in the Lavon Lake area can be generally characterized as heavy clays and
494 clay loams in the Houston Black and Trinity-Frio associations. Widespread farming
495 activity in the watershed has resulted in moderately higher deposition of sediment in
496 Lavon Lake than was estimated during project planning. Sediment laden runoff into
497 Lavon Lake can result in moderately turbid water for extended periods. In spite of this
498 runoff, the water quality in Lavon Lake for domestic water supply purposes remains
499 good.
500

501 As designed, pool elevations of Lavon Lake can vary significantly. Extended
502 periods of drought have resulted in elevations below 480.0 NGVD while flood conditions
503 have raised the elevation above 500.0 NGVD, with the record elevation being 504.93
504 NGVD set on May 3, 1990. Pertinent pool elevations and storage capacities are
505 provided in Table 1.1.
506

507 Management of the recreation and natural resources program at Lavon Lake
508 must take into account the effects of planned operational characteristics of the project,
509 especially the significant pool elevation fluctuations.
510



511

Figure 1.2 Regional Map: 16-County NCTCOG

512

513

514

515 **1.7 PROJECT ACCESS**

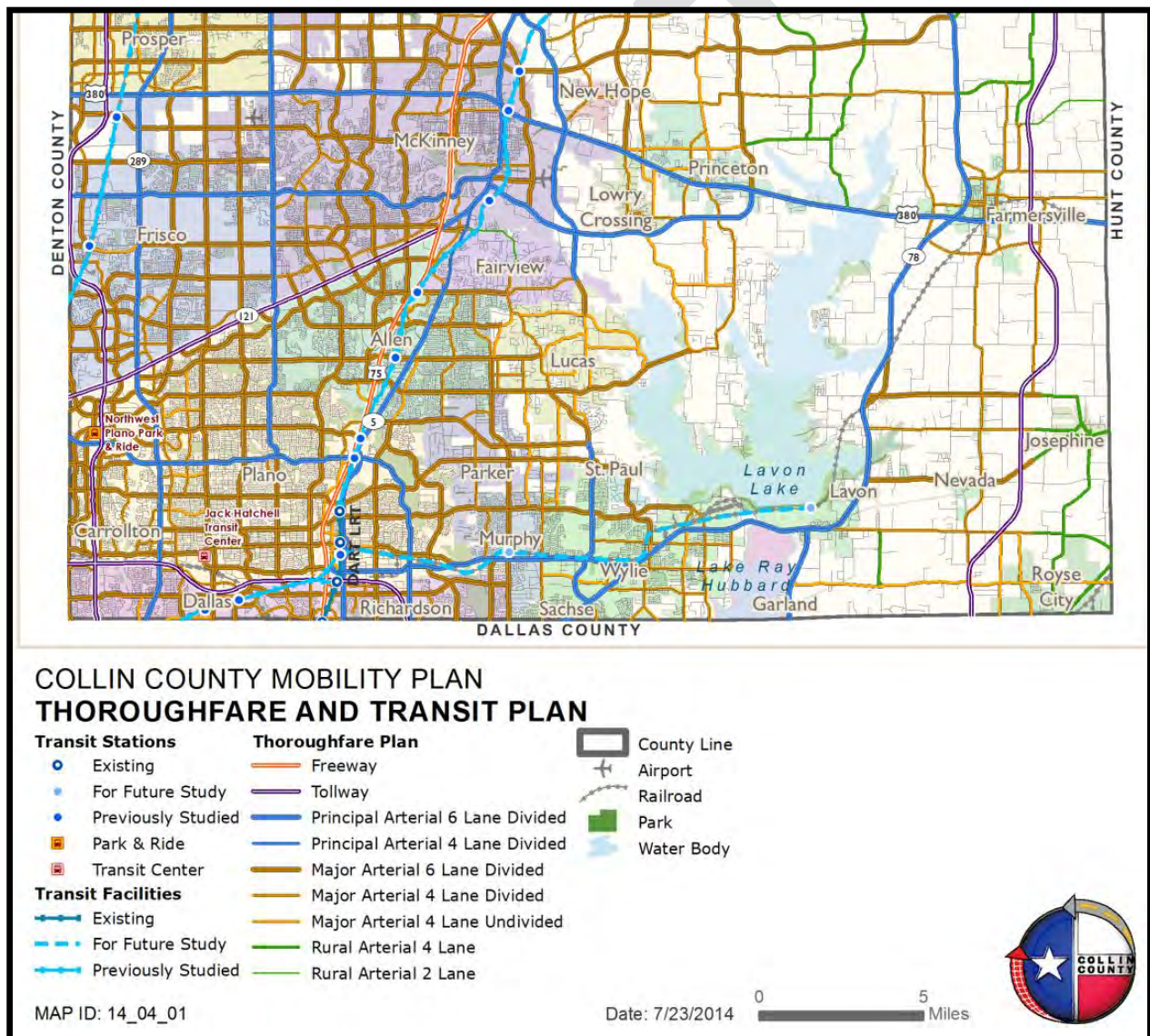
516 Lavon Lake is located in southeastern Collin County, Texas. The dam is
 517 approximately two miles east of the central business district of Wylie, Texas and
 518 approximately 22 miles northeast of the central business district of Dallas, Texas. State
 519 Highway 78 is the primary public road providing access to the area near the dam and
 520 along the east side of the lake. The west side of the lake is served by several county
 521 and municipal roadways including Parker Road and East Lucas Road. The central
 522 portion of the lake is served primarily by Farm to Market (FM) 982 and the northern
 523 sector of the lake is served by U.S. Highway 380 and FM 559. A vicinity map is provided
 524 in Figure 1.1.

525

526 Significant local road expansion/construction projects are either planned or
 527 anticipated to take place during the planning horizon of this Plan. The majority of these
 528 road projects include U.S. or State Highways and Farm to Market (FM) roads
 529 maintained by the Texas Department of Transportation (TxDOT), county roads
 530 maintained by Collin County, or municipal roads maintained by the cities of Wylie, St.
 531 Paul, Lucas, Lowry Crossing, Princeton, Farmersville or Lavon. A portion of a map
 532 depicting the 2014 Collin County Mobility Plan – Thoroughfare and Transit Plan is
 533 provided in Figure 1.3.

534

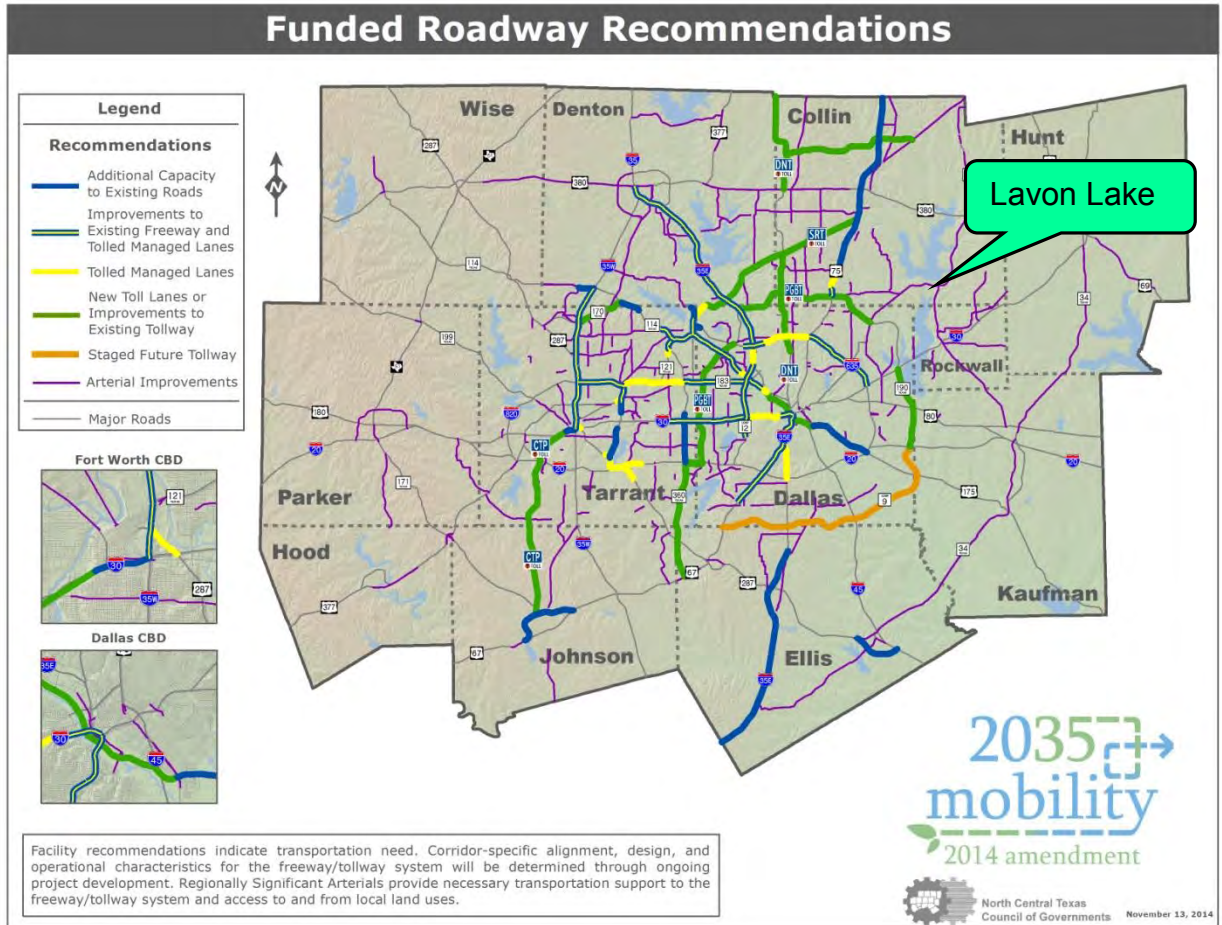
535 As shown in Figure 1.3, most of the principal roadways mentioned above are
 536 proposed to be widened in the coming years to accommodate the projected significant
 537 growth in the Collin County population. In addition to the Collin County Mobility Plan, the
 538 2035 Metropolitan Transportation Plan (MTP) published by the NCTCOG addresses the
 539 major, controlled access, regional arterial freeways and tollways constructed and
 540 operated by TxDOT or the North Texas Tollway Authority (NTTA). The MTP includes
 541 planned and envisioned roadways near Lavon Lake, but none that would directly impact
 542 USACE- managed lands or water surface. However, any major freeway or tollway
 543 constructed near Lavon Lake would carry with it the effects of increased residential and
 544 commercial development. Refer to Figure 1.4 for a map showing major arterial roads
 545 that are funded for construction and/or expansion in the 2014 amendment to the MTP.
 546
 547



548
 549 **Figure 1.3** Portion of Collin County 2014 Mobility Plan Affecting Lavon Lake

550

551 National USACE policy set forth in ER 1130-2-550, Appendix H, states that
 552 USACE lands will, in most cases, only be made available for roads that are regional
 553 arterials or freeways (as defined in ER 1130-2-550). All other types of proposed roads,
 554 including driveways and alleys, are generally not permitted on USACE lands. The
 555 proposed expansion or widening of existing roadways on USACE lands will be
 556 considered on a case-by-case basis.
 557
 558



559
 560 **Figure 1.4** NCTCOG 2035 Mobility, Metropolitan Transportation Plan

561
 562 1.7.1 Lavon Lake Bridge Study

563 In 2007, Collin County voters approved funding for a preliminary route study to
 564 find an optimum alignment for a bridge across Lavon Lake. After conducting public
 565 meetings on the topic, the Collin County Commissioners Court voted on October 11,
 566 2010, to reject the Lavon Lake bridge study and update the county Thoroughfare Plan
 567 by removing any proposed new bridges that would directly affect USACE-managed
 568 lands and water surface.
 569

570 **1.8 PRIOR DESIGN MEMORANDA**

571 Thirty-seven separate DM’s were prepared from 1961 thru 1972 setting forth
 572 design criteria for all aspects of the project including the prime flood risk management
 573 facilities, real estate acquisition, road and utility relocations, reservoir clearing, and the
 574 master plan for recreation development and land management. A complete listing of the
 575 DMs is provided in Appendix C.
 576

577 **1.9 PERTINENT PROJECT INFORMATION**

578 The Lavon Lake Dam consists of a rolled fill, earth embankment and a gated
 579 concrete spillway with low flow sluices. The total length of the dam is 19,493 feet which
 580 includes the 586-foot spillway. The top of the embankment is 81 feet above the
 581 streambed. The upstream slopes are protected with 24-inch riprap placed on nine
 582 inches of granular bedding from elevation 462.0 NGVD to the crest, at elevation 514.0
 583 feet NGVD. An additional layer of 24 inches of graded riprap was placed between
 584 elevations 482.0 and 501.0 feet NGVD during the modification. The downstream slopes
 585 were mulched and seeded at the time and continue to be grass-lined.
 586

587 **Table 1.1** Pertinent Project Features

Feature	Elevation (ft NGVD)	Area (acres)	Capacity (acre-feet)
Top of dam	514.0		
Maximum design water surface	509.0		
Upper guide contour	508.0	32,700	888,100
Spillway crest (top of flood control pool)	503.5	29,450	748,200
Five-year flood line	496.0	24,100	547,400
Top of conservation storage	492.0	21,400	456,500
Five-year drawdown	486.0	18,000	339,200
Ten-year drawdown	482.0	16,000	271,400
Streambed	433.0		
Shoreline at conservation level – approximately 121 miles			

588 Source: Updated Master Plan for Lavon Lake Modification, East Fork Trinity River, Texas, Trinity River
 589 Basin, Texas, Design Memorandum No 13 (Revised May 1972), U. S. Army Engineer District, Fort Worth
 590 Corps of Engineers, Fort Worth, TX May 1972; Volumetric and Sedimentation Survey of Lavon Lake,
 591 June-July 2011 Survey, Texas Water Development Board, January 2013; Texas Water Development
 592 Board 2011 Survey
 593

594 The Texas Water Development Board (TWDB) conducted a Volumetric Survey of
 595 Lavon Lake in June/July 2011 to determine the amount of sedimentation that has
 596 occurred in the lake since 1975. The findings from that TWDB survey indicate that
 597 Lavon Lake had a volume of 409,360 acre-feet and encompasses 20,559 acres at
 598 conservation pool of 492.0 feet above mean sea level. The study indicates that Lavon
 599 Lake has lost 47,140 acre-feet of storage or 10.3% capacity and a 3.9% decrease in
 600 surface area.
 601

602 The spillway is equipped with twelve 40-foot X 28-foot tainter gates. Five low-
603 flow, 36-inch sluices are located in the five center piers of the spillway. Each of these
604 sluices consists of a 36-inch conduit controlled by a 36-inch service gate. Each conduit
605 is capable of releasing 220 cubic feet per second (cfs) into the stilling basin.
606

607 When water is released through the tainter gates it cascades into the stilling
608 basin before flowing down the East Fork of the Trinity River. The stilling basin is 568
609 feet wide and 125 feet long with training walls on either side. The reinforced training
610 walls are 47 feet high. The floor of the stilling basin is at elevation 415.0 feet NGVD and
611 is five feet thick concrete. There are two rows of eight-foot high baffle blocks and an end
612 sill seven feet in height to dissipate the energy of the discharge. The first row has 47
613 baffle blocks, while the second row has 46 that are staggered from the first row.
614 Pertinent features of the project are shown in Table 1.1.
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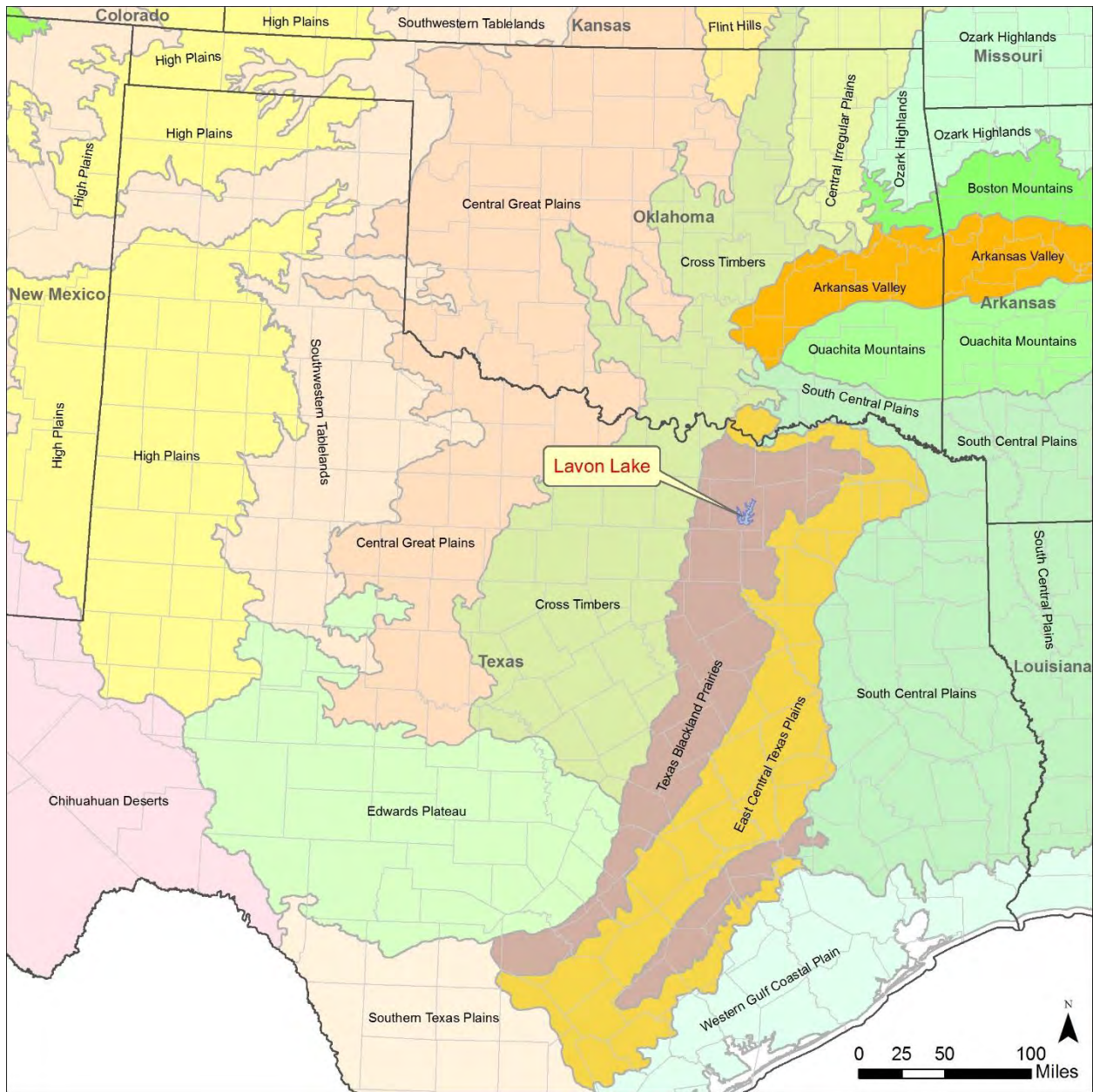
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CHAPTER 2 - PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

621 2.1 PHYSIOGRAPHIC REGION

622 2.1.1 Ecoregion Overview

623 Lavon Lake, as well as all of Collin County, is located in the Texas Blackland
624 Prairies ecological region (ecoregion). Refer to Figure 2.1 for a map of the Ecoregions
625 of Texas. The Texas Blackland Prairies Region (TBPR) form a disjunct ecoregion,
626 distinguished from surrounding regions by fine-textured, clayey soils and predominantly
627 prairie potential natural vegetation. The predominance of vertisols in this area is related
628 to soil formation in Cretaceous shale, chalk, and marl parent materials. Unlike tallgrass
629 prairie soils that are mostly mollisols in states to the north, this region contains vertisols,
630 alfisols, and mollisols. Dominant grasses included little bluestem, big bluestem, yellow
631 Indiangrass, and switchgrass. The region now contains a higher percentage of cropland
632 than adjacent regions; pasture and forage production for livestock is common. Large
633 areas of the region are being converted to urban and industrial uses.
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Figure 2.1 Level III Ecoregions of Texas (Source: Environmental Protection Agency)

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2.1.2 Climate

The climate of Collin County is warm temperate, subtropical, and humid with hot summers and mild winters. Occasional extreme temperatures occur in winter and summer months but are of short duration. The average low and high temperatures range from 36° Fahrenheit (F) in January to 96°F in July. The lowest minimum recorded temperature is 1°F in 1989 and the highest maximum 112°F in 1980. The average frost free period is 287 days but this can vary significantly from year to year. The average first freeze occurs in mid-November and the average last freeze occurs in late March. Annual precipitation within the county averages 33.7 inches per year and is fairly evenly

647 distributed throughout the year with the highest rainfall typically occurring in April and
648 May. Snow seldom falls and is an insignificant source of moisture. Relative humidity
649 ranges from 38% to 93% with the driest period around late July and the most humid
650 period in early May. The prevailing surface winds are southeasterly with strong winds
651 from the north-northwest occurring frequently in winter months. In a typical year, wind
652 speeds vary from zero to 17 miles per hour (mph) and rarely exceed 25 mph.
653

654 The topic of worldwide climate change, including the causes and extent,
655 continues to be studied by the scientific community and world governments. In the
656 United States, two Executive Orders, EO 13514 and EO 13653, as well as the
657 President's Climate Action Plan (CAP) set forth requirements to be met by Federal
658 agencies. These requirements range from preparing general preparedness plans to
659 meeting specific goals to conserve energy and reduce greenhouse gas emissions.
660 USACE has prepared an Adaptation Plan in response to the Executive Orders and
661 CAP. The Adaptation Plan includes the following USACE policy statement:
662

663 *"It is the policy of USACE to integrate climate change preparedness and*
664 *resilience planning and actions in all activities for the purpose of enhancing*
665 *the resilience of our built and natural water-resource infrastructure and the*
666 *effectiveness of our military support mission, and to reduce the potential*
667 *vulnerabilities of that infrastructure and those missions to the effects of*
668 *climate change and variability."*
669

670 2.1.3 Geology

671 Lavon Lake is underlain by an eastward and southeastward-dipping series of
672 Upper Cretaceous marine sedimentary rocks, overlain locally by Pleistocene fluvatile
673 terrace deposits of recent floodplain alluvium. Change in the strike of beds from north to
674 east across Collin County may be in response to deposition of Cretaceous units over
675 now buried, plunging folds of the Ouachita or Arbuckle mountain systems.
676

677 Shoreline geology of Lavon Lake consists primarily of fluvatile terrace deposits,
678 gravel, sand, and silt. Alluvium floodplain and channel deposits of sand, silt, clay, and
679 gravel are located in stream channels flowing into Lake Lavon. Small areas near the
680 confluence of these stream channels and the lake show deposits of Wolfe City Sand.
681 Between one and four miles east of the lake and south of Elm Creek/Tom Bean Creek
682 the geology is predominately Pecan Gap Chalk with small pockets of Marlbrook Marl.
683

684 2.1.4 Topography

685 The topography of the area varies from gently rolling in the upper portion of the
686 watershed to generally flat in the lower portion. The gently undulating slightly rolling
687 upland areas have historically been intensely cultivated. The project area lies within the
688 West Gulf Coastal Plains section of the Coastal Plains physiographic province. The
689 floodplain of the East Fork, Trinity River, has an average width of two miles and is
690 confined between valley walls that rise fairly steeply to terrace flats and rolling uplands.

691 The main body of the impounded water at elevation 492.0 (top of conservation
692 pool storage) has a maximum length of 12 miles and a maximum width of 4.75 miles.
693 The impounded water at elevation 492.0 inundates approximately 21,400 acres and has
694 a shoreline of approximately 121 miles. Maximum depth at conservation pool is
695 approximately 45 feet and the average depth is 18 feet. The water level fluctuates about
696 7.1 feet annually. The elevation of the terrain at Lavon Lake ranges from 430 feet at the
697 bottom of the inundated East Fork river channel, to approximately 675 feet NGVD in the
698 surrounding hill tops.
699

700 2.1.5 Hydrology and Ground Water

701 A basic description of surface water hydrology and the Lavon Lake watershed is
702 provided in Chapter 1, Section 1.5, Project and Watershed Overview. In addition to this
703 overview, it is notable that in the watershed above Lavon Lake, the Natural Resources
704 Conservation Service of the U.S. Department of Agriculture (NRCS) has constructed at
705 least 149 water retention structures. These structures retard runoff from approximately 242
706 square miles. The combined detention capacity of these structures is 69,170 acre-feet, but
707 this storage capacity has a limited effect on the inflow to Lavon Lake during major floods.
708 There are no major flood retention reservoirs in the Trinity River watershed above Lavon
709 Lake. As noted previously, the City of Dallas operates Forney Dam and Lake Ray
710 Hubbard approximately three miles downstream from Lavon Lake Dam.
711

712 Groundwater in the immediate Lavon Lake area and throughout most of Collin
713 County is present in two aquifers, the Trinity (subcrop) Aquifer, considered to be a major
714 aquifer by the state of Texas and the more shallow Woodbine (subcrop) Aquifer,
715 considered to be a minor aquifer. Administratively, these aquifers are included in the
716 Groundwater Management Area (GMA) 8 as designated by the TWDB. There are 12
717 Groundwater Management Districts within GMA 8, including the North Texas Groundwater
718 Conservation District which takes in Cooke, Denton and Collin Counties.
719

720 Both the Trinity and the Woodbine aquifers serve a very densely populated area
721 and have been heavily used over the past several decades by numerous municipalities,
722 and other public water supply providers. Some of the largest aquifer level declines in
723 Texas have occurred in the Trinity Aquifer in a broad corridor that encompasses and
724 parallels Interstate Highway 35. These declines have ranged from 350 feet to more than
725 1000 feet. The decline has slowed in recent years due to increasing reliance on surface
726 water for municipal purposes. Refer to Figure 2.2 for a map of the Trinity Aquifer in the
727 areas where declines have been significant. All recreational areas operated by USACE
728 and others at Lavon Lake are connected to municipal or other public water supply
729 providers.
730

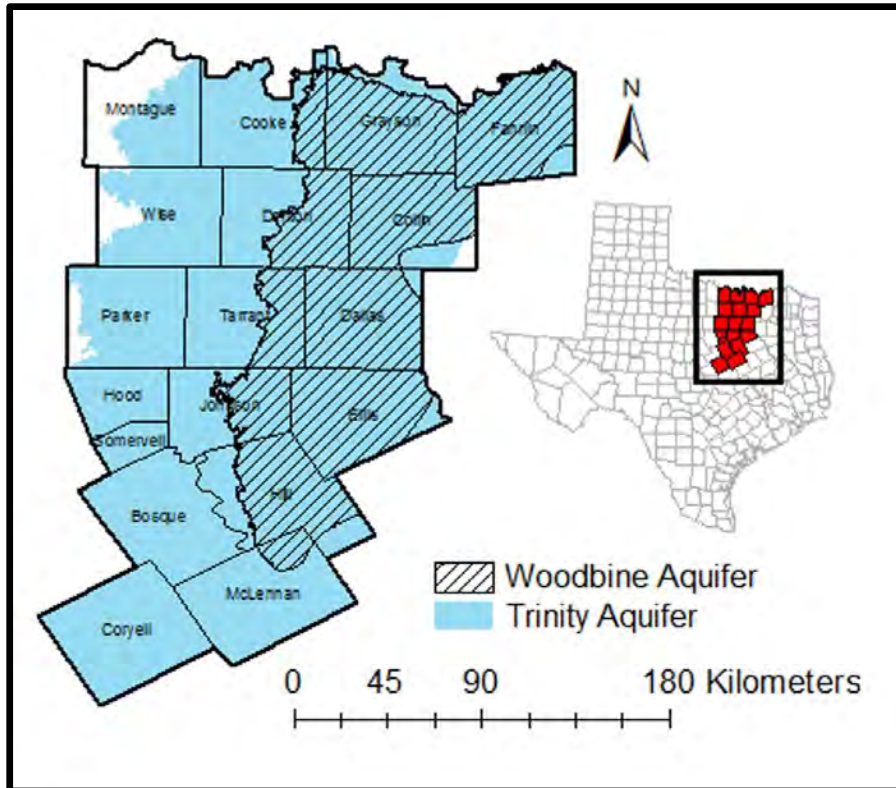


Figure 2.2 Zone of Historically Heavy Water Use – Trinity and Woodbine Aquifers

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2.1.6 Soils

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Six soil associations have been identified and mapped within Collin County. Soils of the Houston Black-Austin association occur primarily on rocks of the Austin group. These deep clayey soils are found on gently sloping to sloping uplands over argillaceous marl and chalk. The Houston Black-Houston soils are associated with the Ozan and Marlbrook formations. These deep clayey soils occur on gently sloping to sloping uplands over calcareous clays and minor limestone units. Soils formed on the Pleistocene fluvial terrace deposits belong to the Houston Black-Burleson association. These deep, clayey soils occur on nearly level to gently sloping stream terraces.

The deep clayey and loamy soils of the nearly level floodplains belong to the Trinity-Frio Association and are developed on recent alluvium. The eroded, deep, clayey soils of the Ferris-Houston Association occur on sloping to strongly sloping uplands. These soils were developed on Pecan Gap Chalk and Wolfe City Formation, consisting of fine grained calcareous sand, silt, and chalky limestone. The Wilson-Burleson soils are associated with the Eagle Ford formation. These deep, loamy and clayey soils occur on nearly level to gently sloping uplands and are underlain by gypsum bearing shale.

754 These soil types are representative of the Texas Blackland Prairie Ecoregion
755 tallgrass prairie community of soils associated with floodplains, stream terraces, and
756 uplands along this portion of the Trinity River floodplain. This community is
757 characterized by deeper soils underlain at rather shallow depths by dense, hard, clayey
758 material. This “claypan” restricts air and water movements, as well as root penetration.
759

760 The flood plain areas with slopes of less than one percent consist of Frio and
761 Trinity soils. These are deep, calcareous, and clayey with high fertility and water holding
762 capacity. These clayey soils have a high shrink/swell capacity and develop large cracks
763 during dry weather.
764

765 The upland areas are gently sloping to rolling and consist of Houston clay, Altoga
766 silt clay, Burleson clay, and Lewisville silt clay. These soils are deep and calcareous
767 with moderately high water holding capacity. Soil texture ranges from clay to silt clay
768 loam. The clayey soils shrink and crack during dry periods. Moderate to severe sheet
769 and gully erosion is present on areas where vegetation has been removed. Detailed
770 information and maps on all soil types surrounding Lavon Lake is available on websites
771 maintained by the NRCS.
772

773 **2.2 ECOREGION AND NATURAL RESOURCE ANALYSIS**

774 In preparation for revision of the Lavon Lake Master Plan, USACE requested the
775 assistance of the U.S. Fish & Wildlife Service (USFWS) to describe existing wildlife
776 habitat conditions on project lands. A team of USFWS and USACE biologists conducted
777 field work from July 12-28, 2010 and the report was completed later that year. The
778 fieldwork consisted of identifying major habitat types on project lands and collecting
779 data on 154 sample points randomly selected throughout the major habitat types.
780 Developed recreation areas and the main body of the lake were excluded from the
781 study. Data collection was done using the Habitat Evaluation Procedures (HEP)
782 developed by USFWS. Identified habitat types included bottomland hardwood (9,490
783 acres), herbaceous wetlands (526 acres) and grassland (6,771 acres). The report is
784 attached to this Plan as Appendix D.
785

786 The Texas Conservation Action Plan (TCAP) 2012 and the accompanying Texas
787 Blackland Prairies Ecoregion Handbook (Handbook), published by Texas Parks and
788 Wildlife Department (TPWD) in August 2012, were used extensively in the preparation
789 of this Plan. The TCAP and Handbook were invaluable in identifying Species of
790 Greatest Conservation Need (SGCN), rare plant communities, regional conservation
791 issues and a suite of conservation actions needed to reduce negative effects on SGCN
792 and rare plant communities. The 2011 TPWD list of SGCN is provided at Appendix F.
793 The TCAP and Handbook were especially valuable in preparing the Land Classifications
794 and Resource Objectives in this Plan. The following paragraphs provide a general
795 description of the natural and cultural resources located on Federal land at Lavon Lake.
796

797 2.2.1 Vegetation

798 The ecoregion that spans the entire vicinity of Lavon Lake is the TBPR. This
799 prairie community forms a belt across Texas and was dominated by tallgrass prairies on
800 uplands prior to the now established row crop agriculture and suburban development.
801 The intense suburban and agricultural development has almost completely annihilated
802 all vestiges of tallgrass prairie. As noted in the TCAP, less than 5,000 acres of scattered
803 patches of Texas Blackland Prairie remain out of the 12 million acres that once existed.
804 Intact Texas Blackland Prairie remains predominantly as a treeless rolling prairie of
805 bunch and short grasses; however, hardwoods such as elm species (*Ulmus spp.*),
806 hackberry (*Celtis occidentalis*), pecan (*Carya illinoensis*) and oak species (*Quercus*
807 *spp.*) occur along streams and bottomlands. Groundcover consists of such native
808 grasses as buffalograss (*Bouteloua dactyloides*), various bluestems and grama
809 combined with various forbs and vines.

810
811 The TBPR ecoregion is perhaps the most critically threatened in the state. It lies
812 along one of the most development-intensive and populated areas in Texas – the
813 Interstate Highway 35 corridor which stretches through Dallas, Waco, Temple, Austin
814 (eastern portions), San Marcos, New Braunfels, and San Antonio. Gently rolling to
815 mostly flat, this region is easily developed and has few barriers to development like the
816 adjacent ecoregions which require clearing, leveling, and geotechnical work.
817 Historically, the region was a vast tallgrass prairie of little bluestem, big bluestem, yellow
818 Indiangrass, tall dropseed, eastern gamagrass and many forbs, such as asters, clovers,
819 and black-eyed susan which supported wide-ranging abundant herds of bison and
820 pronghorn, greater prairie chickens, and even ocelot. Almost the entire prairie has now
821 been converted to other uses.

822
823 Collin County lies in the Texan biotic province, a transitional zone between the
824 forested Austroriparian province to the east and the grassland provinces (Kansan and
825 Balconian) to the west. While the region exhibits a combination of eastern forest and
826 western prairie flora and fauna, the bottomlands are primarily Austroriparian species.
827 Stream bottoms were often wooded with bur oak (*Quercus macrocarpa*), Shumard oak
828 (*Quercus shumardii*), hackberry, elm, ash (*Fraxinus spp.*), eastern cottonwood (*Populus*
829 *deltoides*), and pecan. There are, however, hardwoods such as elm, hackberry, pecan,
830 oak, and Bois d'Arc (*Maclura pomifera*) occurring along streams. Brushy species such
831 as honey mesquite (*Prosopis glandulosa*) and eastern redcedar (*Juniperus virginiana*)
832 have invaded many portions of the grasslands as a result of the minimization of natural
833 and manmade fires.

834
835 Within the TBPR, the TCAP lists several rare plant communities. Refer to Table
836 2.1 for a listing of these rare plant communities. Determining the presence or absence
837 and extent of these communities requires careful field investigations that will be
838 accomplished at Lavon Lake as time and funding permits. A few relic patches of
839 tallgrass prairie as well as a few acres of Southern Elm – Chinquapin Oak Forest and
840 Bur Oak – Shumard Oak Bottomland Forest are known to exist at Lavon Lake and
841 efforts to restore and expand these areas are included in the resource objectives
842 described in this Plan. Crosscutting this prairie were dense meandering bands of

843 riparian hardwoods (primarily bur oak, Shumard oak, sugar hackberry, elm, ash, eastern
 844 cottonwood, and pecan) along broad floodplains. A map depicting the Texas Blackland
 845 Prairies Ecoregion is provided at Figure 2.1. Photo 2.1, taken in July 2015 is provided
 846 as an example of the rare vertisol blackland prairie known to exist in small pockets at
 847 Lavon Lake.

848
 849

850 **Table 2.1** Texas Blackland Prairies Ecoregion Rare Plant Communities

Common Name	State Rank
Bur Oak - Shumard Oak <i>Mixed Bottomland Forest</i>	S3? - Vulnerable (“?” denotes Inexact Rank)
Eastern Gamagrass – Switchgrass <i>Floodplain Herbaceous Vegetation</i>	S1 - Critically Imperiled
Eastern Gamagrass – Switchgrass – Yellow Indiagrass - Michaelmas daisy <i>Herbaceous Vegetation</i>	S1 – Critically Imperiled
Silveus Dropseed – Longspike Tridens <i>Herbaceous Vegetation</i>	S1S2 – Critically Imperiled and Imperiled
Silveus Dropseed – Mead’s Sedge	S1 – Critically Imperiled
Southern Elm – Chinquapin Oak <i>Forest</i>	S1S2? – Critically Imperiled and Imperiled (Inexact Rank)
Upper West Gulf Coastal Plain Dry <i>Calcareous (Blackland) Prairie</i>	S1S2 – Critically Imperiled and Imperiled
<i>Vertisol Blackland Prairie</i>	S1S2 – Critically Imperiled and Imperiled



Photo 2.1 Native Vertisol Blackland Prairie, East Fork Park

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The current dominant canopy species along creeks in the project area include pecan, black willow (*Salix nigra*), cedar elm (*Ulmus crassifolia*), and eastern cottonwood. The dominant sapling/shrub species within both areas include young tree species, buttonbush (*Cephalanthus occidentalis*), flameleaf sumac (*Rhus lanceolata*), and roughleaf dogwood (*Cornus drummondii*). Finally, herbaceous species near the aquatic resources were dominated by wild rye (*Elymus spp.*), coralberry (*Symphoricarpos orbiculatus*), smartweed, (*Polygonum spp.*), cocklebur (*Xanthium strumarium*), inland sea oats (*Chasmanthium latifolium*), cattail (*Typha latifolia*), and sedge (*Carex spp.*). The herbaceous species within the upland areas are dominated by giant ragweed (*Ambrosia trifida*), Bermuda grass (*Cynodon dactylon*), and perennial ryegrass (*Lolium perenne*). However, there are still remnants of native prairie that support little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*), tall dropseed (*Sporobolus compositus*), goldenrod (*Solidago sp.*), and cut-leaf daisy (*Erigeron compositus*). Invasive species such as broomweed (*Sporobolus compositus*), King Ranch bluestem (*Bothriochloa ischaemum var. songarica*), and Johnsongrass (*Sorghum halepense*) are now common in many portions of the grasslands. A complete listing of vegetative species that occur or potentially occur at Lavon Lake is beyond the scope of this Plan but can be found in numerous reference books and websites.

875 2.2.2 Wetlands

876 In accordance with national USACE policy, wetlands at operational projects are
877 inventoried using the protocol established by USFWS in their *Classification of Wetlands*
878 *and Deepwater Habitats of the United States*. The current USACE inventory for Lavon
879 Lake indicates there are 526 acres of emergent wetlands located in shallow shoreline
880 areas in the upper reaches of the main tributaries. The National Wetland Inventory
881 (NWI) maps prepared by the USFWS and available in the Wetland Mapper tool on the
882 USFWS website, show these and more emergent wetlands, as well as a significant
883 acreage of forest/shrubland and freshwater pond wetlands in the upper reaches of the
884 main tributaries to Lavon Lake. However, as explained by the USFWS regarding use of
885 the NWI map data, the data represents reconnaissance level mapping using high
886 altitude imagery. The actual presence and boundaries of wetlands shown on NWI maps
887 requires verification through detailed, on-the-ground inspection. During preparation of
888 the 2010 Habitat Evaluation Report (See Appendix D), on-site inspection of USACE
889 lands indicated that most of the wetlands described using the Wetland Mapper tool do
890 not exist on the ground. Most of the “freshwater pond” and “forested” wetlands shown
891 by the Wetland Mapper tool are actually open water of the lake or tracts of bottomland
892 hardwood forest. USACE is aware that the acreage of NWI wetlands at Lavon Lake
893 exceeds, to some extent, the 526 acres of known wetlands, and as time and funding
894 permits, USACE intends to verify the NWI data to determine the full extent of wetlands
895 at Lavon Lake.
896

897 2.2.3 Fish and Wildlife Resources

898 A variety of mammals are known to inhabit the project area and/or surrounding
899 land. These include opossum (*Didelphis virginiana*), cave myotis (*Myotis velifer*), beaver
900 (*Castor canadensis*), nutria (*Myocastor coypus*), plains pocket gopher (*Geomys*
901 *bursarius*), eastern flying squirrel (*Glaucomys volans*), eastern gray squirrel (*Sciurus*
902 *carolinensis*), fox squirrel (*Sciurus niger*), California jackrabbit (*Lepus californicus*),
903 eastern cottontail (*Sylvilagus floridanus*), white-tailed deer (*Odocoileus virginianus*),
904 nine-banded armadillo (*Dasypus novemcinctus*), raccoon (*Procyon lotor*), mink (*Mustela*
905 *vison*), spotted skunk (*Spilogale putorius*), red fox (*Vulpes vulpes*), coyote (*Canis*
906 *latrans*), and bobcat (*Lynx rufus*). Many of these species have been able to tolerate
907 urbanization, while species that formerly inhabited the region such as black bear (*Ursus*
908 *americanus*), gray and red wolves (*Canis lupus* and *Canis rufus*, respectively), mountain
909 lion (*Felis concolor*), river otter (*Lutra canadensis*), and bison (*Bos bison*) were
910 extirpated from the area due to hunting, trapping, and/or behavioral intolerance to
911 human activity.
912

913 The situation is similar for birds, reptiles, and amphibians. The project area is
914 used by both resident and migratory wildlife species that are tolerant of human activity.
915 Resident passerines use the wooded areas along the forks, main stem and tributaries of
916 the East Fork of the Trinity River for nesting, foraging and as a dispersion corridor. The
917 more heavily impacted woodlands upstream and downstream of the project area are
918 most likely used by a variety of migratory and resident passerine, owl, and hawk
919 species which may disperse from the less impacted project area. Some common

920 resident bird species that may be observed in the study area are sparrows (various
921 species), northern mockingbird (*Mimus polyglottos*), American robin (*Turdus*
922 *migratorius*), northern cardinal (*Cardinalis cardinalis*), blue jay (*Cyanocitta cristata*),
923 common grackle (*Quiscalus quiscula*), scissor-tailed flycatcher (*Tyrannus forficatus*),
924 barred owl (*Strix varia*), common crow (*Corvus brachyrhynchos*), American kestrel
925 (*Falco sparverius*), Carolina chickadee (*Poecile carolinensis*), and red-tailed hawk
926 (*Buteo jamaicensis*). The species more intolerant to human activity have declined, while
927 the more tolerant species have flourished. Common reptile species documented near
928 the project area include lizards and various snakes, such as the copperhead
929 (*Agkistodon contortrix*), cottonmouth (*Agkistodon piscivorus*), bullsnake (*Pituophis*
930 *melanoleucus sayi*), and diamondback rattlesnake (*Crotalus atrox*) while amphibians
931 seen occasionally include turtles and frogs.

932
933 The common fish species known to be in Lavon Lake and its tributaries include
934 various species of bass (*Micropterus spp.*), bluegill (*Lepomis macrochirus*), gar
935 (*Atractosteus spatula*), sunfish (Family Centrarchidae), shad (*Dorsoma spp.*), white
936 crappie (*Pomoxis annularis*), channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus*
937 *furcatus*) as well as freshwater drum, carp and suckers. Freshwater mussels common to
938 the Upper Trinity drainage are giant floater (*Pyganodon grandis*), Texas liliput
939 (*Toxolasma texasiensis*), southern mapleleaf (*Quadrula apiculata*), and pink papershell
940 (*Potamilus ohioensis*). Comprehensive listings of fish and wildlife species that occur or
941 potentially occur in the region surrounding Lavon Lake can be found at websites
942 maintained by TPWD or USFWS.

944 2.2.4 Threatened and Endangered Species

945 In accordance with the Trust Resources Report generated by the U.S. Fish and
946 Wildlife Service (USFWS) web-based Information for Planning and Conservation tool,
947 there are two federally-listed endangered species and two threatened species that
948 potentially occur at Lavon Lake. The four species, all birds, are listed in Table 2.2. The
949 Trust Resources Report, attached in Appendix E, also lists several “Birds of
950 Conservation Concern”. The Bald Eagle has the potential to occur at Lavon Lake and
951 was formerly listed by the USFWS as an endangered or threatened species. Although
952 recently delisted, the Bald Eagle is provided specific protections under the Bald and
953 Golden Eagle Protection Act (16 U.S.C. 668-668c).

954
955 Designated critical habitat is not present for any of the federally-listed threatened
956 or endangered species within the project area. Additionally, none of the federally- listed
957 species have been observed during on-site investigations. The whooping crane and
958 interior least tern are known to migrate through, but not nest at Lavon Lake. However,
959 the bald eagle has been known to nest on the East Fork of the Trinity River downstream
960 of Lavon Lake and at nearby lakes in the region such as Bardwell Lake and Benbrook
961 Lake.

962
963 In addition to the federally-listed species for Lavon Lake, TPWD maintains lists
964 by Ecoregion for Species of Greatest Conservation Need. The list for the Texas

965 Blackland Prairie Ecoregion is available at Appendix F. The list also provides general
 966 habitat requirements for each of the species on the list. Included in the list, the white-
 967 faced ibis and wood stork are migratory birds that breed along the Texas coast, and
 968 there is a likelihood of both species being present at Lavon Lake during migration.
 969 Habitat preferred by other state listed species such as the Texas horned lizard and the
 970 timber/canebrake rattlesnake was not observed within the project area; therefore, the
 971 likelihood of observing these species within the project area is uncommon. Many of the
 972 other species on the list, particularly migratory songbirds, are known to utilize habitat at
 973 Lavon Lake on a regular basis and are considered in management plans.

974
 975 **Table 2.2** Federally-listed Endangered and Threatened Species with Potential to Occur at
 976 Lavon Lake.

Common Name	Scientific Name	Federal Status	State Status
Piping Plover	<i>Charadrius melodus</i>	LT	T
Whooping Crane	<i>Grus americana</i>	LE	E
Interior Least Tern	<i>Sterna antillarum athalassos</i>	LE	E
Red Knot*	<i>Calidris canufus rufa</i>	LT	NL

977 **Index**

978 LE, LT – Federally Listed Endangered/Threatened

979 E, T, NL - State Listed Endangered/Threatened/Not Listed

980 *Listed for Wind Projects Only

981
 982 **2.2.5 Invasive Species**

983 Several non-native invasive species have been documented at Lavon Lake.
 984 Zebra mussels (*Dreissena polymorpha*) have garnered the most visibility given Lavon
 985 Lake’s importance as a water supply and outdoor recreation asset. Zebra mussels can
 986 have a detrimental effect on water control structures, raw water facilities and the general
 987 health and productivity of the aquatic environment. A reproducing zebra mussel
 988 population has been documented in one of the tributaries (Sister Grove Creek) that feed
 989 into Lavon Lake and isolated adult individuals have been found on recreational vessels
 990 over the last few years. Control attempts to eradicate zebra mussels in Sister Grove
 991 Creek exhibited limited success as live but stressed individuals remained post
 992 treatment. No reproducing population has been documented within Lavon Lake but
 993 given the proximity of established zebra mussel populations and a robust recreation
 994 footprint facilitating boat traffic, the risk of establishment remains high for the
 995 foreseeable future.

996
 997 Feral hogs (*Sus scrofa*) continue to have a presence at differing levels
 998 throughout the year given food availability and the abundance of cover afforded by
 999 bottomland hardwoods around Lavon Lake. Signs of land degradation, conversion of
 1000 the understory plant community and accelerated soil instability have all been
 1001 documented and are assumed to continue in natural resource and park areas around

1002 the lake. Lavon Lake does have an active hunting program with feral hogs being one of
1003 the animals allowed for harvesting.

1004
1005 Other nuisance species that impact the health and productivity of the natural
1006 resources at Lavon Lake include exotic Johnsongrass (*Sorghum halapense*) and native
1007 eastern redcedar (*Juniperus virginiana*). Both species are prolific and can out-compete
1008 more desirable native species further degrading prairie components that were
1009 historically the dominant vegetation type in the Blackland prairies.

1010
1011 The Emerald Ash borer (EAB) (*Agilus planipennis*) is another invasive species of
1012 concern that has not been detected in the area, but has slowly moved east across North
1013 America and has been detected near the east Texas border. The EAB is native to Asia
1014 and was first recorded in North America in 2002. EAB specifically utilizes true ash
1015 species to complete its lifecycle. Female emerald ash borers lay their eggs on the
1016 surface of ash trees, and when the eggs hatch the larvae burrow into the tree, feeding
1017 and developing into adult beetles. At maturity, the beetle leaves the host tree and the
1018 cycle is repeated. This feeding activity kills the tree within a few years. Lavon Lake has
1019 considerable acreage where green ash (*Fraxinus pennsylvanica*) is a dominant or co-
1020 dominant species. All stands of green ash commonly found in the upper Trinity River
1021 watershed would be in jeopardy if EAB spreads to the area.

1022

1023 2.2.6 Visual and Open Space Qualities

1024 Lavon Lake proper and surrounding federal lands offer public, open space values
1025 and scenic vistas that are unique in Collin County. The aesthetic qualities inherent in
1026 Lavon Lake are recognized by the NCTCOG in their North Texas 2050 vision document
1027 and in the Collin County Parks and Open Space Program Strategic Plan. The NCTCOG
1028 vision document stresses that “business as usual” with regard to a rapidly expanding
1029 population and the continuation of low density housing developments within the 16-
1030 county NCTCOG area, which includes Collin County and adjacent Denton, Dallas,
1031 Rockwall and Hunt counties will result in a lower quality of life for the regions citizens.
1032 The “business as usual” future would result in the loss of approximately 900,000 acres
1033 of agricultural land as well as substantial acreage of natural habitat and would add
1034 significantly to traffic congestion. The NCTCOG vision document recommends the
1035 adoption of several policies that would work toward a better quality of life for the region.
1036 One of the policy areas that relates directly to Lavon Lake is focused on natural areas
1037 and includes the following statement:

1038
1039 *“The purpose of this policy area is to preserve and protect open spaces,*
1040 *public parks, greenways, lake shores, significant views, stands of trees,*
1041 *and floodplains. The development that occurs near these natural features*
1042 *is planned with these important environmental features in mind. Retaining*
1043 *and managing the natural assets that are at the heart of these areas is the*
1044 *goal.”*

1045

1046 The Collin County Parks and Open Space Strategic Plan stresses the importance
1047 of parks and open space and the need for more land dedicated to these purposes going
1048 into the future. The following is a quote from the Strategic Plan that relates directly to
1049 Lavon Lake:

1050
1051 *“...the parks and open space system should reflect sustainable financial,*
1052 *cultural, and environmental objectives that promote the conservation of*
1053 *natural and human resources for current and future citizens”*
1054

1055 Lavon Lake already plays a pivotal role in availability of parks and open space in
1056 Collin County. Protecting the public open space values afforded by the lake is strongly
1057 supported by public comment and is set forth as a key objective in Chapter 3 of this
1058 Plan.
1059

1060 2.2.7 Mineral and Timber Resources

1061 The Texas Railroad Commission database shows very little mineral extraction
1062 activity in Collin County and virtually no activity in the immediate area of Lavon Lake. A
1063 few dry holes are shown several miles north and east of the lake. This is in sharp
1064 contrast to the significant oil and gas drilling and production activity approximately 25
1065 miles west of Lavon Lake in the natural gas rich Barnett Shale area of Denton County.
1066 Most of the minerals underlying Federal land at Lavon Lake are privately owned with the
1067 exception of the immediate area underlying the Lavon Lake Dam and a few other
1068 isolated tracts. In general terms, during the land acquisition process for the Lavon Lake
1069 project, the mineral estate underlying the dam was purchased by the Federal
1070 government as a precautionary measure to protect the integrity of the dam structure.
1071 Should oil and gas exploration ever occur within this Federally-owned mineral estate,
1072 the leasing of the minerals would be administered by the Bureau of Land Management,
1073 U.S. Department of the Interior. Any leasing of the minerals would be subject to
1074 stipulations imposed by USACE.
1075

1076 Currently, with few exceptions, the stipulations used in the USACE, Fort Worth
1077 District, do not allow surface occupancy of Federal lands for the extraction of Federally-
1078 owned minerals. Exploration and extraction of privately owned minerals may, in some
1079 cases, be allowed to occur on Federal lands at Lavon Lake in so far as the integrity of
1080 the dam and related facilities are not at risk and every precaution is taken to reduce the
1081 risk of pollution and other environmental damage to the lands and waters of the lake.
1082

1083 The bottomland forests of the main tributaries of Lavon Lake have high value as
1084 wildlife habitat but do not have significant value as commercial timber. This is due in
1085 part to the location being approximately 100 miles west of any appreciable timber
1086 resources that support a viable forest products industry, and secondarily to the lack of
1087 tree species and sizes having commercial timber value.
1088

1089 2.2.8 Sedimentation and Shoreline Erosion

1090 During the planning of the original Lavon Dam the Department of Agriculture
1091 estimated that the annual rate of sediment deposition in the lake would be 1.23 acre-
1092 feet per square mile of drainage area. At this rate, the average annual deposition would
1093 be 956 acre-feet. Based on this estimate a total of 47,800 acre-feet of storage space
1094 was provided in Lavon Lake to accommodate sediment deposition for a period of 50
1095 years.

1096
1097 In November 1959, six years after the dam was completed, a sediment survey
1098 was completed revealing a deposition rate of 1.92 acre-feet per square mile of drainage
1099 area and an average annual deposition rate of about 1,415 acre-feet. In October 1965,
1100 a second sediment survey was completed at Lavon Lake. This survey revealed an even
1101 greater sediment deposition rate of 2.03 acre-feet per square mile of drainage area and
1102 an average annual deposition rate of about 1,496 acre-feet.

1103
1104 The 1959 and 1965 sediment surveys were conducted when the top of
1105 conservation pool was at elevation 472.0 feet NGVD and the top of flood control was at
1106 elevation 490.0 feet NGVD. The results of both surveys show that the rate of
1107 sedimentation is higher than initially estimated. The high rate of sedimentation may be
1108 due in part to the amount of clay in the watershed and the relatively high percentage of
1109 land in the watershed that is in agricultural production. The NRCS water retention
1110 structures in the watershed undoubtedly retained some sediment over the years but the
1111 tendency of colloidal suspended clay to stay in suspension for extended periods of time
1112 has probably contributed to the higher than anticipated accumulation of sediment in
1113 Lavon Lake.

1114
1115 In May 1970, the top of conservation pool at Lavon Dam was raised from
1116 elevation 472.0 feet to 492.0 feet NGVD. The estimated 100-year sediment load was
1117 increased to 92,600 acre-feet below elevation 492.0 feet NGVD. In July of 2011 the
1118 TWDB conducted a volumetric and sedimentation survey of Lake Lavon. Data gathered
1119 during this survey indicate that from the 1970 plan to the 2011 survey, the conservation
1120 storage capacity (492.0 feet NGVD) shrank from 456,500 acre feet to 409,360 acre feet,
1121 or a net storage capacity loss of 47,140 acre feet due to sedimentation.

1122
1123 Shoreline erosion at Lavon Lake can be severe during times of high pool
1124 elevations. During the record flood pool elevations of 1990-91 and 2015, significant
1125 shoreline erosion occurred in many of the designated recreation areas. Damage to park
1126 facilities and roads required extensive repair. Shorelines exposed to significant wind
1127 and wave action required protection in the form of riprap and other treatments.

1128
1129 2.2.9 Water Quality

1130 The USACE, U.S. Geological Survey (USGS), and NTMWD conduct water
1131 quality testing at Lavon Lake. The most routine testing is conducted by the NTMWD
1132 which takes monthly samples at approximately 17 locations. Table 2.3 provides the 17
1133 sample locations and notes those sites where fecal coliform (F) and taste and odor

1134 (T&O) are analyzed. Table 2.4 provides the chemical and biological parameters of the
 1135 testing. Table 2.5 provides an April 2012 water analysis report for raw and treated water
 1136 withdrawn from Lavon Lake by NTMWD. The April 2012 time period was selected
 1137 because the lake elevation was close to the conservation pool elevation during that
 1138 period.

1139
 1140

1141 **Table 2.3** Water Quality Sample Locations - NTMWD for Taste, Odor, and Fecal Coliform

Site No. & Location*	Finding	Site No. & Location*	Finding
1 – Highway 380		2 – Elm Creek Park	T&O
6 – Pilot Grove Arm	T&O	7 – Raw Water #1	T&O
8 - Raw Water #2	T&O	9 – Brockdale Park	F, T&O
10 – Highway 3286/546	F, T&O	11 – Wilson Creek Cove	F
12 – East Fork	F	13 – West Arm #1	F
14 – West Arm #2	F	15 – East Arm #1	-
16 – East Arm #2	-	17 – Raw Water #3	F, T&O
(T&O) – Taste and Odor ; (F) Fecal Coliform			

1142
 1143
 1144

Table 2.4 Chemical and Biological Parameters Sampled by NTMWD

Dissolved Oxygen (DO)	Total Dissolved Solids (TDS)
Water temperature	Cholorphyll-A
Conductivity	Chlorides
Secchi (Turbidity)	Ortho-Phosphate (OPO4)
pH	Total Phosphorus
Total Kjeldhal Nitrogen	Total Suspended Solids (TSS)
Ammonia (NH3)	Volatile Suspended Solids(VSS)
Nitrite (NO2)	Total Organic Carbon (TOC)
Nitrate (NO3)	Phyto count
Sulfate (SO4)	

1155
 1156

1157 In summary, water quality at Lavon Lake can be characterized as generally good.
 1158 Water quality is not static and can change over time as a result of changes in the
 1159 landscape and human activity within the watershed. Lavon Lake, with a drainage area
 1160 of approximately 770 square miles, receives significant runoff from agricultural row crop
 1161 production and suburban land. Water testing over the years has indicated elevated
 1162 levels of nitrate at times which may result in algal blooms in the lake. Common sources
 1163 of nitrate loading include runoff of applied fertilizer from agricultural fields. Having a well

1164 vegetated buffer along the shoreline of the lake can have a positive impact on nutrient
1165 loading by absorbing nutrients before they reach the water body. However, the primary
1166 source of nutrient loading is from activities taking place throughout the watershed in
1167 areas remote from USACE managed lands. Any attempt to reduce nutrient loading from
1168 the watershed would require the cooperation of many governmental entities and private
1169 landowners.

1170

1171 As with many reservoirs in Texas, warm summer temperatures can cause lake
1172 stratification resulting in very low levels of dissolved oxygen in deeper areas of the lake.
1173 This causes displacement of fish and other aquatic organisms to less deep parts of the
1174 lake where dissolved oxygen levels remain at sufficient levels.

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Table 2.5 Water Quality Analysis – Raw and Treated Water Withdrawn from Lavon Lake

North Texas Municipal Water District
Water Analysis
Apr-2012

<u>Mineral Analysis</u>	<u>Raw</u> (mg/L)	<u>Treated</u> (mg/L)	<u>Standards</u>			
			<u>EPA Primary</u> (mg/L)	<u>EPA Secondary</u> (mg/L)	<u>TCEQ Primary</u> (mg/L)	<u>TCEQ Secondary</u> (mg/L)
Residue on Evaporation	232	258		500		1000
Silica (SiO2)	3.11	2.90				
Iron (Fe)	0.685	<0.200		0.3		0.3
Calcium (Ca)	52.1	53.8				
Magnesium (Mg)	3.69	3.51				
Sodium (Na)	22.4	32.6				
Potassium (K)	5.23	5.16				
Bicarbonates (HCO3)	117	105				
Carbonates (CO3)	0	0				
Hydroxides (OH)	0	0				
Sulfate (SO4)	38.6	69.0		250		
Nitrite (NO2)	0.0509	<0.0200	1		1	
Nitrate (NO3)	0.999	1.06	10		10	
Chloride (Cl)	20.1	28.4		250		300
Fluoride (F)	0.284	0.608	4.0	2.0		2.0
Phosphates (PO4)	0.0720	0.0110				
	(mg/L as CaCO3)	(mg/L as CaCO3)	(mg/L as CaCO3)	(mg/L as CaCO3)	(mg/L as CaCO3)	(mg/L as CaCO3)
Total Alkalinity	117	105				
Phenolphthalein Alkalinity	0	0				
Noncarbonate Hardness	19.3	43.3				
Total Hardness	136	148				
Langelier Index	-	[+ 0.150]				
<u>Trace Element Analysis</u>						
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Arsenic (As)	<0.00500	<0.00500	0.01		0.01	
Barium (Ba)	0.0528	0.0432	2		2	
Cadmium (Cd)	<0.00100	<0.00100	0.005		0.005	
Chromium (Cr)	<0.00500	<0.00500	0.1		0.1	
Copper (Cu)	0.0267	0.186	1.3		1.3	1.0
Iron (Fe)	0.685	<0.200		0.3		
Lead (Pb)	<0.00100	<0.00100	0.15		0.15	
Manganese (Mn)	0.0232	<0.00100		0.05		0.05
Mercury (Hg)	<0.000100	<0.000100	0.002		0.002	
Nickel (Ni)	0.00399	0.00547				
Selenium (Se)	0.00106	<0.00100	0.05		0.05	
Silver (Ag)	<0.00100	<0.00100		0.10		0.1
Zinc (Zn)	0.00651	<0.00500		5		5
<u>Other Analysis</u>						
Chlorine Residual (mg/L)	-	3.23*	4.0		4.0	
Total coliform (Present / Absent)	-	A	A		A	
pH (Standard Units) @ 25°C	8.07*	7.75*		6.5 - 8.5		>7.0
Specific Conductance (Umhos)	369	443				
Turbidity (NTU)	15.0	0.0999*	0.3		0.3	
Threshold Odor Number	EARTHY	ND				3

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2.2.10 Air Quality

In 2012, the US Environmental Protection Agency (EPA) designated ten counties (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant and Wise Counties) in North Central Texas as nonattainment for the pollutant ozone in accordance with the 1997 eight-hour ozone National Ambient Air Quality Standards (NAAQS). These standards are designed to protect human and environmental health, and ground-level ozone is monitored and targeted for reductions due to its potentially harmful effects. Four main sources of ozone-causing emissions include on-road mobile sources like cars and trucks, Non-road mobile sources like construction equipment, point sources like electric generating utilities and industrial boilers, and area sources like solvent use and agriculture.

Development of an air quality plan, known as the State Implementation Plan (SIP), is required for all nonattainment areas in order to demonstrate how ozone will be reduced to levels compliant with the NAAQS. The SIP for the Dallas-Fort Worth nonattainment area includes programs to get older cars off the road, technologies to clean up vehicles already on the road, and education programs so that citizens can do their part in improving air quality in North Texas. For more information about what individuals and businesses can do to clean the air, visit <http://airnorthtexas.org>.

In conducting routine operations and maintenance activities at Lavon Lake, USACE will comply with all federal, state and local laws governing air quality and will implement best management practices to protect air quality. Prescribed fire is a useful land management tool for improving native prairie and certain forested areas and will be conducted in accordance with the Texas Administrative Code, Section 111.211(1). Statutory requirements governing prescribed fire and other types of outdoor burning are explained in the Texas Commission on Environmental Quality (TCEQ) publication “Outdoor Burning in Texas” available on the TCEQ website. USACE guidance for wildland fire management is set forth in Engineer Pamphlet, EP 1130-2-540.

2.3 SOCIAL AND CULTURAL RESOURCES AND ANALYSIS

2.3.1 Prehistoric

The earliest well-documented evidence of human occupation in North Central Texas dates to about 12,000 years before present (B.P.). Prehistory is divided generally into three broad time periods: Paleo-Indian (12,000-8,500 B.P.), Archaic (8,500-1,250 B.P.), and Late Prehistoric (1,250-300 B.P.).

Evidence for Paleo-Indian period occupation is relatively rare in the Lavon Lake area, and is known primarily from distinctive projectile point styles dating to this time period found in surface collections or in mixed multi-component sites. It is likely that intact Paleo-Indian camp sites may be buried deeply beneath Holocene floodplain alluvium, as was the case with the Aubrey Clovis site on the Elm Fork Trinity River.

1253 Evidence suggests that the region was occupied by small groups of highly mobile
1254 hunter-gatherers that traveled over very large territories. Traditionally thought of as big-
1255 game hunters of mammoth and bison, more recent evidence indicates Paleo-Indians
1256 exploited a much broader range of animal and plant resources.

1257
1258 The Archaic period is divided into Early (8,500-6,000 B.P.), Middle (6,000-3,500
1259 B.P.), and Late (3,500-1,250 B.P.) sub periods. During this long time period, a
1260 generalized hunting and gathering subsistence strategy is indicated. Trends through
1261 time suggest increasing population density and decreasing group mobility within smaller
1262 territories. Sites with Late Archaic components are well represented in the Lavon Lake
1263 area and in North Central Texas generally. The large circular depressions known as
1264 “Wylie pit features” were first identified at Lavon Lake and had long been attributed to
1265 the subsequent Late Prehistoric period. However, more recent investigations of two
1266 such features elsewhere in the Trinity River drainage showed that their original
1267 construction dated to the Late Archaic. A similar Late Archaic age is assumed for the
1268 initial construction of these features at Lavon Lake.

1269
1270 The Late Prehistoric Period (1,250-300 B.P.) is marked by the presence of the
1271 bow and arrow and pottery. During the early portion of this time span, subsistence
1272 strategies remained similar to those of the preceding Late Archaic. By around 800 B.P.,
1273 there is limited evidence for maize horticulture and more sedentary occupations in some
1274 North Central Texas sites. After around 600 B.P., there is widespread evidence for an
1275 increase in bison hunting. Pottery from Lavon Lake sites includes plain and decorated
1276 grog-tempered specimens in the Caddo ceramic tradition. It is unclear whether this
1277 pottery was made locally or represents trade with East Texas Caddo groups. Plain,
1278 shell-tempered pottery is also found at Lavon Lake sites and is thought to show
1279 connections with southern plains groups to the north and west. This shell-tempered
1280 pottery is generally thought to date to the late portion of the Late Prehistoric period
1281 (after ca. 600 B.P.) when bison hunting became more important.

1282

1283 2.3.2 Historic

1284 Local tradition holds that Native Americans of the Caddo Nation inhabited the
1285 Lavon Lake area prior to the arrival of the first white settlers in the early 1840s. The
1286 majority of these early settlers were farmers operating small family farms growing
1287 mainly wheat and corn. When Collin County was created out of Fannin County in 1846,
1288 the estimated population was only 150. The population grew slowly between the 1840s
1289 and 1870s. The arrival of the railroads in the early 1870s allowed farmers access to
1290 markets and led to a major increase in the number of farms. Cotton farming became an
1291 important agricultural activity in the Blackland Prairie region and tenant farming was a
1292 major social institution. No historic period resources were recorded by the surveys
1293 conducted prior to the initial construction or the subsequent pool raise of Lavon Lake.
1294 Most of the historic resources at Lavon Lake are expected to be the archeological
1295 remains of house sites and farmsteads dating from the late 19th century through the
1296 mid-20th century.

1297

1298 2.3.3 Previous Investigations at Lavon Lake

1299 The initial archeological investigations at Lavon Lake were conducted between
1300 1948 and 1950 by the River Basin Surveys. During that period, 25 sites were recorded,
1301 two sites were tested, and one site (the Hogge Bridge Site) was excavated extensively.
1302 Plans to enlarge the lake led to another survey in 1964 by the Texas Archeological
1303 Salvage Project, during which 12 new sites were recorded and 17 known sites were
1304 revisited. In 1969, four sites affected by the lake's enlargement were tested, one of
1305 which (the Sister Grove Creek Site) was excavated in 1974 by Southern Methodist
1306 University. Limited survey work since then has added to the number of known
1307 archeological sites.
1308

1309 2.3.4 Recorded Cultural Resources

1310 Currently, 47 archeological sites have been recorded at Lavon Lake. One of
1311 these sites (Sister Grove Creek) is listed on the National Register of Historic Places
1312 (NRHP). The remaining 46 sites have not yet been evaluated for NRHP eligibility. Only
1313 about 300 acres of Lavon Lake property have been inventoried to current survey
1314 standards. The surveys of the 1970s and earlier were not systematic and are not
1315 considered adequate by current standards.
1316

1317 2.3.5 Long-term Objectives for Cultural Resources

1318 As funding allows, a Cultural Resources Management Plan (CRMP) shall be
1319 developed and incorporated into the OMP in accordance with EP 1130-2-540. The
1320 purpose of the CRMP is to provide a comprehensive program to direct the historic
1321 preservation activities and objectives at Lavon Lake. Completion of a full inventory of
1322 cultural resources at Lavon Lake is a long-term objective that is needed for compliance
1323 with Section 110 of the National Historic Preservation Act (NHPA). All currently known
1324 and newly recorded sites must be evaluated to determine their eligibility for the NRHP.
1325 In accordance with Section 106 of the NHPA, any proposed ground-disturbing activities
1326 or projects, such as those described in this master plan or as may be proposed in the
1327 future by others for right-of-way easements, will require cultural resource surveys to
1328 locate and evaluate historic and prehistoric resources. Resources determined eligible
1329 for the NRHP must be protected from proposed project impacts, or the impacts must be
1330 mitigated. All future cultural resource investigations at Lavon Lake must be coordinated
1331 with the State Historic Preservation Officer and federally-recognized Tribes to insure
1332 compliance with the NHPA, the Archaeological Resources Protection Act, and the
1333 Native American Graves Protection and Repatriation Act.
1334

1335 2.3.6 Current Demographic and Economic Trends and Analysis

1336 The primary zone of interest for the socio-economic analysis of Lavon Lake
1337 consists of Collin, Dallas, Denton, Fannin, Grayson, Hunt, and Rockwall Counties in
1338 Texas. The reservoir lies completely within Collin County, which is a suburban city
1339 located north of Dallas, and at the far northeastern corner of the Dallas-Fort Worth
1340 metropolitan area. The remaining counties in the zone of interest are those that are
1341 adjacent to Collin County.

1342

1343 2.3.7 Population

1344 The total population for the zone of interest in 2014 was 4,490,830, as shown in
1345 Table 2.6. Of those 4.5 million people residing in the zone of interest, the majority
1346 (approximately 56%) of the population resides in Dallas County. Collin County is the
1347 second most populated county in the zone of interest with approximately 20% of the
1348 zone of interest’s population, followed by Denton County with 17%. Fannin, Grayson,
1349 Hunt, and Rockwall Counties comprise less than 3% each of the zone of interest’s
1350 population.

1351
1352 The population in the zone of interest makes up approximately 17% of the total
1353 population of Texas. From 2014 to 2040, the population in the zone of interest is
1354 expected to increase to approximately 6.3 million from 4.5 million, an annual growth rate
1355 of 1.3% per year. By comparison, the population of Texas is projected to increase at an
1356 annual rate of 1.2% per year, and the national growth rate is expected to be 0.7% per
1357 year between 2014 and 2040. During this timeframe, Collin County and Rockwall
1358 Counties are the only two in the zone of interest with a projected annual growth rate
1359 higher than the state of Texas, with a projected growth rate of 2% each.

1360

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Table 2.6 2000 and 2014 Population Estimates and 2040 Projections

Geographical Area	2000 Population Estimate	2014 Population Estimate	2040 Population Projection
Texas	20,851,820	26,956,958	36,550,595
Collin County	491,675	885,241	1,496,177
Dallas County	2,218,899	2,518,638	3,086,679
Denton County	432,976	753,363	1,242,750
Fannin County	31,242	33,752	39,458
Grayson County	110,595	123,534	142,177
Hunt County	76,596	88,493	119,853
Rockwall County	43,080	87,809	146,334
Zone of Interest Total	3,405,063	4,490,830	6,273,428

Source: U.S. Bureau of the Census, American Fact Finder (2000, 2014 Estimate); Texas State Data Center, The University of Texas at San Antonio (2040 Projections)

1363 The distribution of the population among gender, as shown in Table 2.7 is
1364 approximately 49.2% male and 50.8% female in the zone of interest, which is very
1365 similar to the overall gender distribution in Texas. The female population is slightly
1366 higher than the male population in all counties in the zone of interest with the exception
1367 of Fannin County, which is 53.0% male and 47.0% female.

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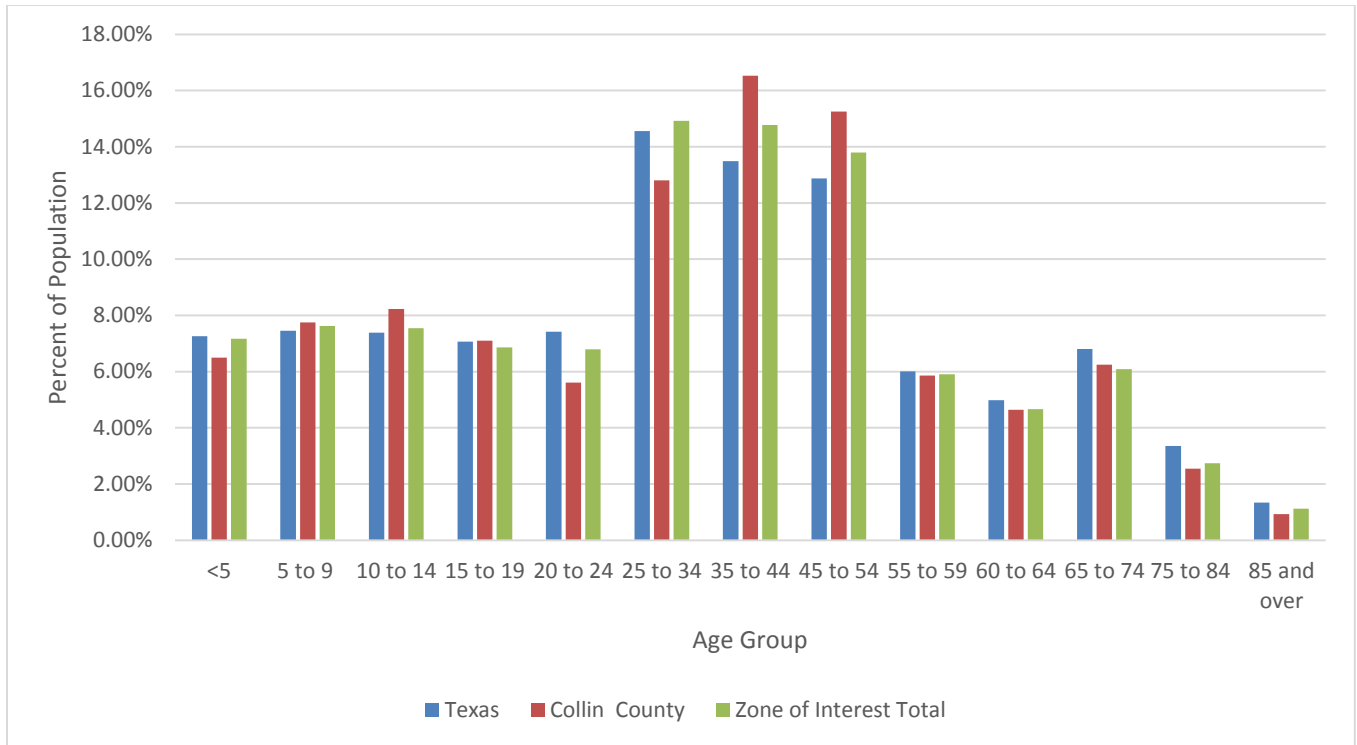
Table 2.7 2014 Percent of Population Estimate by Gender

Geographical Area	Male	Female
Texas	13,382,386	13,574,572
Collin County	434,591	450,650
Dallas County	1,241,277	1,277,361
Denton County	370,582	382,781
Fannin County	17,889	15,863
Grayson County	60,296	63,238
Hunt County	43,718	44,775
Rockwall County	43,019	44,790
Zone of Interest		
Total	2,211,372	2,279,458

Source: U.S. Bureau of the Census, Population Division (2014 Estimate)

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Figure 2.3 and Table 2.8 show the population by age group. As shown in the figure, the distribution by age group is similar among the counties, zone of interest, and the state overall in terms of percentage of the population. The largest age groups in the zone of interest are the 25 to 34 group and the 35 to 44 group, with each making up approximately 15% of the zone of interest population. Collin County, in which the lake lies, has a slightly larger population of residents ages 35 to 54 than both the zone of interest and the state of Texas, and a slighter smaller population of individuals ages 20 to 34.



1385

1386 **Figure 2.3** 2014 Percent of Population by Age Group

1387

1388 **Table 2.8** 2014 Population Estimate by Age Group

Age Group	Geographic Area								
	Texas	Collin County	Dallas County	Denton County	Fannin County	Grayson County	Hunt County	Rockwall County	Zone of Interest Total
<5	1,956,213	57,527	194,213	49,834	1,782	7,593	5,444	5,391	321,784
5 to 9	2,010,846	68,612	194,473	56,158	1,979	8,422	5,845	6,761	342,250
10 to 14	1,990,571	72,840	183,886	57,724	2,086	8,327	6,110	7,673	338,646
15 to 19	1,905,104	62,899	168,704	53,240	1,941	8,211	6,317	6,842	308,154
20 to 24	2,000,562	49,630	182,493	52,175	2,227	7,948	6,197	4,599	305,269
25 to 34	3,925,657	113,402	404,529	113,334	4,048	14,570	10,695	9,802	670,380
35 to 44	3,634,885	146,292	356,239	118,833	4,131	14,186	10,409	13,240	663,330
45 to 54	3,471,743	135,009	327,975	109,529	4,711	16,725	12,430	13,102	619,481
55 to 59	1,619,276	51,894	146,496	43,666	2,362	9,002	6,220	5,619	265,259
60 to 64	1,343,020	41,090	115,790	33,164	2,138	7,580	5,237	4,405	209,404
65 to 74	1,833,501	55,264	144,639	43,208	3,696	12,102	8,071	6,332	273,312
75 to 84	904,078	22,523	69,013	16,324	1,941	6,422	4,109	2,851	123,183
85+	361,502	8,259	30,188	6,174	710	2,446	1,409	1,192	50,378

1389

1390 Source: U.S. Bureau of the Census, American Fact Finder (2014 Estimate)

1391 Population by race and Hispanic origin is displayed in Table 2.9 The zone of interest
1392 population is 45% White, 16% Black, 29% Hispanic, 7% Asian, and 2% two or more
1393 races. The other race categories account for less than 2% each of the population. By
1394 comparison, the Hispanic population in Texas is nearly 10% higher than the zone of
1395 interest at 38%. When comparing Collin County to the zone of interest, the White
1396 population is 15% higher, the Black population is 7% lower, the Asian population is 6%
1397 higher, and the Hispanic population is 14% lower. These contrasts can be observed in

Figure 2.4.

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1400 **Table 2.9** 2014 Population Estimate by Race/Hispanic Origin
 1401

Area	White	Black	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Two or More Races	Hispanic
Texas	11,735,074	3,161,811	88,539	1,177,410	21,807	360,977	10,411,340
Collin County	534,565	81,151	3,668	112,930	554	18,735	133,638
Dallas County	782,674	560,538	7,406	145,333	1,045	32,166	989,476
Denton County	465,191	68,643	3,466	57,091	557	15,053	143,362
Fannin County	26,811	2,266	311	173	8	634	3,549
Grayson County	94,847	7,289	1,732	1,350	53	2,705	15,558
Hunt County	64,955	7,085	573	1,187	116	1,360	13,217
Rockwall County	63,710	5,049	389	2,355	61	1,353	14,892
Zone of Interest Total	2,032,753	732,021	17,545	320,419	2,394	72,006	1,313,692

Source: U.S. Bureau of the Census, Population Division (2014 Estimate)
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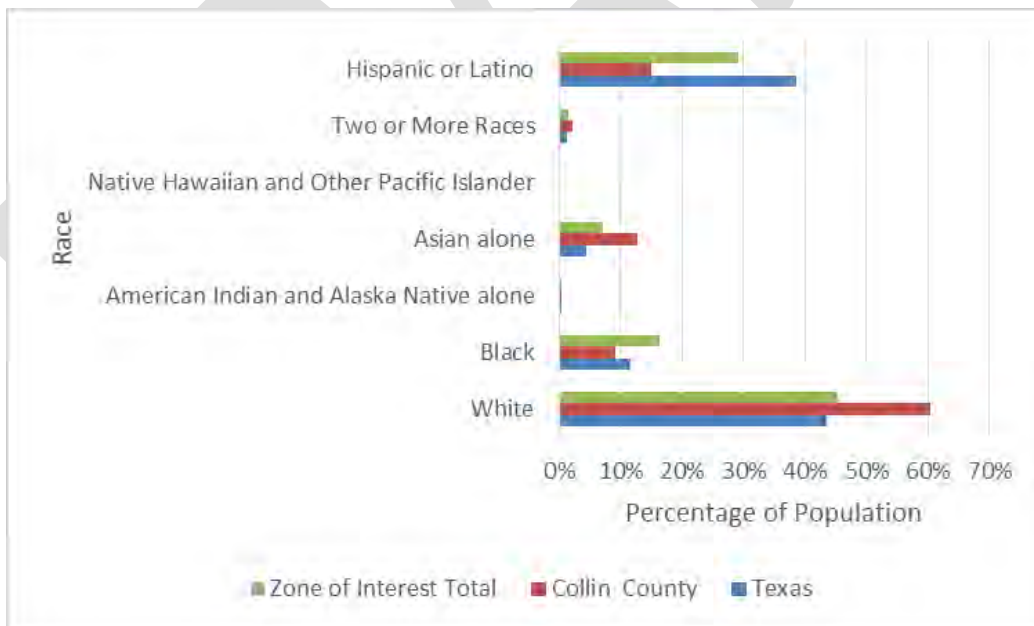


Figure 2.4 Population Estimate by Race/Hispanic Origin

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1407 2.3.8 Education and Employment

1408 Table 2.10 displays the highest level of education attained by the population
 1409 ages 25 and over in both Texas and the zone of interest. In the zone of interest, 8% of
 1410 the population has less than a 9th grade education; 8% has between a 9th and 12th
 1411 grade education; 22% has a high school diploma or equivalent; 21% has some college
 1412 and no degree; 6% has an Associate’s degree; 23% has a Bachelor’s degree; and 12%
 1413 has a graduate or professional degree. These percentages are similar to those for the
 1414 state of Texas, though the zone of interest has a slightly larger population that has
 1415 received a higher level education (i.e., Bachelor’s, graduate, or professional degree). In
 1416 Texas, 9% of the population has less than a 9th grade education; another 9% has
 1417 between a 9th and 12th grade education; 25% has at least a high school diploma or
 1418 equivalent; 23% has some college; 6% has an Associate’s degree; 18% has a
 1419 Bachelor’s degree; and 9% has a graduate or professional degree. Collin County has
 1420 the largest population of persons ages 25 and over that has received at least Bachelor’s
 1421 degree at 32%.

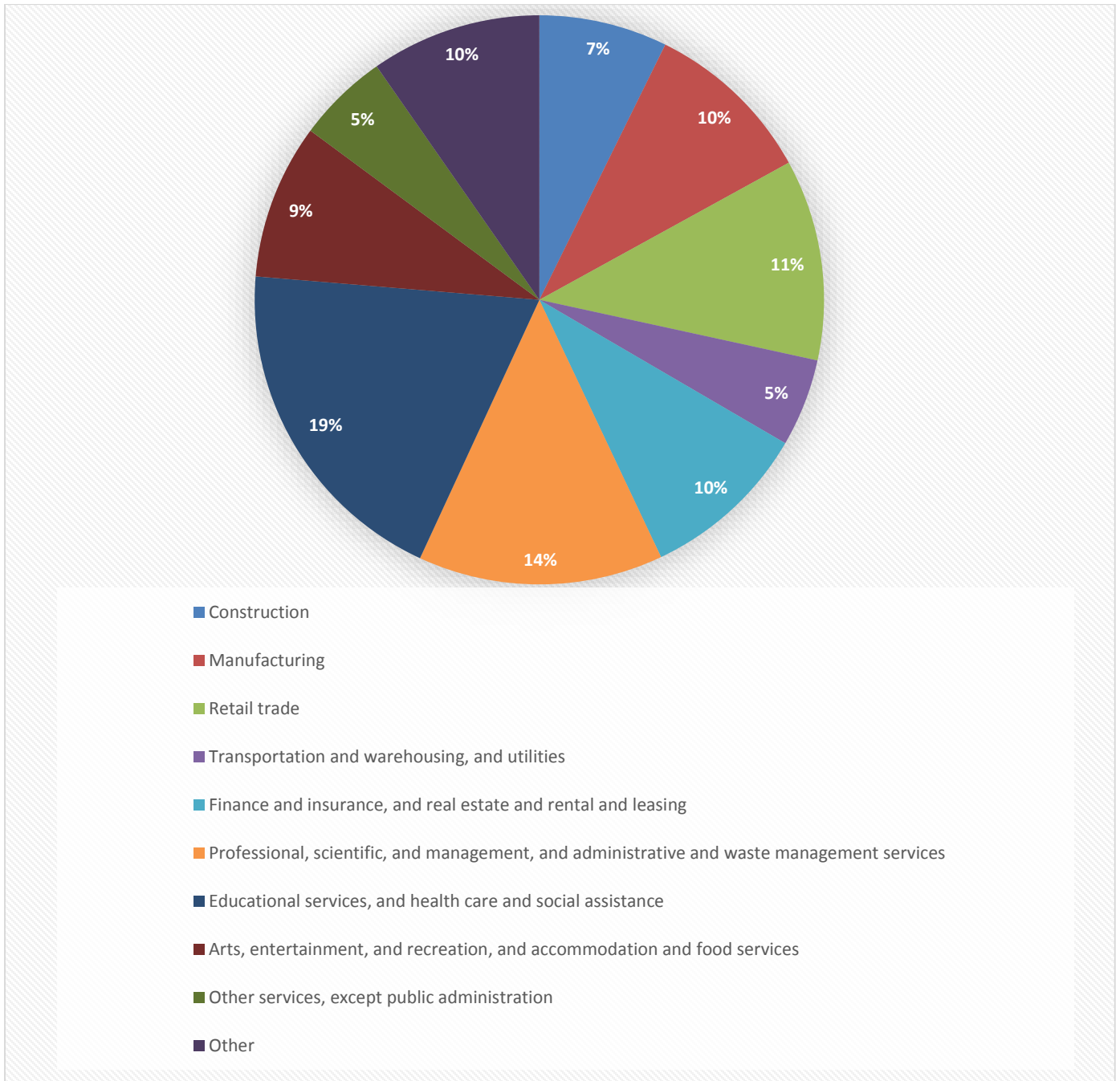
1422
 1423
 1424 **Table 2.10** 2014 Population Estimate by Highest Level of Educational Attainment, Population
 1425 25 Years of Age and Older

Area	Highest Level of Educational Attainment							
	Population 25 years and over	Less than 9th grade	9th to 12th grade, no diploma	High school graduate (includes equivalency)	Some college, no degree	Associate's degree	Bachelor's degree	Graduate or professional degree
Texas	16,426,730	1,519,482	1,505,854	4,145,289	3,726,610	1,079,891	2,948,330	1,501,274
Collin County	539,347	17,434	17,977	84,066	112,979	40,314	173,951	92,626
Dallas County	1,541,324	175,753	168,456	357,261	311,877	85,131	285,669	157,177
Denton County	448,049	16,588	19,475	85,093	108,036	35,347	126,892	56,618
Fannin County	23,574	1,510	2,761	8,179	5,897	1,551	2,416	1,260
Grayson County	81,569	3,879	6,965	25,524	22,025	6,717	10,821	5,638
Hunt County	57,178	3,364	6,358	19,714	14,064	3,708	6,498	3,472
Rockwall County	53,527	1,985	2,457	11,703	13,579	4,142	13,514	6,147
Zone of Interest Total	2,744,568	220,513	224,449	591,540	588,457	176,910	619,761	322,938

Source: U.S. Bureau of the Census, American Fact Finder (2014 Estimate)

1426
 1427 Employment by sector is presented in Figure 2.5. The largest percentage in the
 1428 zone of interest is employed in the Educational services, and health care and social
 1429 assistance sector, at 19%, followed by 14% in the Professional, scientific, and
 1430 management, and administrative and waste management services, 11% in Retail trade,
 1431 10% in both Manufacturing and in Finance and insurance, and real estate and rental
 1432 and leasing, 9% in Arts, entertainment, and recreation, and accommodation and food
 1433 services, 7% in Construction, 5% in Transportation and warehousing, and utilities, and

1434 5% in Other services, except public administration. The remainder of the employment
1435 sectors comprise less than 5% each of the zone of interest's labor force.
1436



1437
1438 **Figure 2.5 Annual Average Employment by Sector**

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1442 The civilian labor force in the zone of interest accounts for approximately 17.8%
1443 of the civilian labor force of the state of Texas. The 2014 unemployment rate for the
1444 zone of interest, at 7.6%, was comparable to the unemployment rate of the state of
1445 Texas, which was 7.7%, as shown in Table 2.11. The unemployment rates in Dallas,
1446 Fannin, Grayson, and Hunt Counties were higher than that of the state, while the
1447 unemployment rates in Collin, Denton, and Rockwall Counties were lower.

1448

1449 **Table 2.11** Labor Force, Employment and Unemployment Rates, 2014 Annual Averages

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
Texas	12,791,590	11,809,010	982,580	7.7%
Collin County	454,649	429,486	25,163	5.5%
Dallas County	1,269,810	1,161,634	108,176	8.5%
Denton County	398,807	373,978	24,829	6.2%
Fannin County	14,384	13,197	1,187	8.3%
Grayson County	58,610	53,283	5,327	9.1%
Hunt County	40,580	35,749	4,831	11.9%
Rockwall County	42,976	40,068	2,908	6.8%
Zone of Interest Total	2,279,816	2,107,395	172,421	7.6%

Source: U.S. Bureau of the Census, American Fact Finder (2014 Estimate)

1450

1451 2.3.9 Households, Income, and Poverty

1452 The number of households and average household sizes as of the 2010 census
1453 are displayed in Table 2.12. There were approximately 8.9 million households in the
1454 state of Texas, with an average household size of 2.75. There are approximately 1.5
1455 million households in the zone of interest with an average household size of 2.76
1456 persons.

1457

1458 As shown in Table 2.13, the median household income varies greatly within the
1459 zone of interest. The median household incomes in Dallas, Fannin, Grayson, and Hunt
1460 Counties are slightly lower than the median household income of the state, but
1461 substantially higher than the state in Collin, Denton, and Rockwall Counties. Collin
1462 County has the second highest median household income, at \$84,233, when compared
1463 with the other counties within the zone of interest. Per capita income in the zone of
1464 interest is \$30,605, which is greater than that of Texas at \$26,513. Per capita incomes
1465 in the zone of interest range from \$20,784 in Fannin County to \$38,575 in Collin County.

1466

1467

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Table 2.12 2010 Households and Household Size

Area	Total Households	Average Household Size
Texas	8,922,933	2.75
Collin County	283,759	2.74
Dallas County	855,960	2.73
Denton County	240,289	2.71
Fannin County	12,149	2.53
Grayson County	46,905	2.53
Hunt County	32,076	2.63
Rockwall County	26,448	2.94
Zone of Interest Total	1,497,586	2.76

Source: U.S. Bureau of the Census, American Fact Finder (2010 Estimate)

1469

1470

Table 2.13 2014 Median and Per Capita Income

Geographic Area	Median Household Income	Per Capita Income
Texas	\$52,576	\$26,513
Collin County	\$84,233	\$38,575
Dallas County	\$49,925	\$27,195
Denton County	\$74,662	\$34,528
Fannin County	\$44,432	\$20,784
Grayson County	\$47,631	\$24,614
Hunt County	\$44,898	\$22,446
Rockwall County	\$86,597	\$34,850
Zone of Interest Total	N/A	\$30,605

Source: U.S. Bureau of the Census, American Fact Finder (2014 Estimate)

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As shown in Table 2.14, there are less persons in the zone of interest whose incomes in 2014 were below the poverty level in the last 12 months (15.0%) as compared to the state of Texas (17.7%). Hunt County and Dallas Counties have the most persons below the poverty level at 19.6% and 19.3% respectively, followed by Fannin County (17.7%), Grayson County (15.8%), Denton County (8.9%), Collin County (7.9%), and Rockwall County (6.3%). The number of families whose incomes in 2014 were below the poverty level follows basically the same pattern as the number of

1479 persons below the poverty level; however, the number of families below the poverty
 1480 level is less overall than the number of persons.
 1481

1482 **Table 2.14** Percent of Families and People Whose Income in the Past 12
 1483 Months is Below the Poverty Level (2014)

Geographic Area	All Persons	All Families
Texas	17.7%	13.7%
Collin County	7.9%	5.8%
Dallas County	19.3%	15.9%
Denton County	8.9%	5.8%
Fannin County	17.7%	13.1%
Grayson County	15.8%	11.6%
Hunt County	19.6%	14.8%
Rockwall County	6.3%	5.3%
Zone of Interest Total	15.0%	N/A

Source: U.S. Bureau of the Census, American Fact Finder (2014 Estimate)

1484
 1485

1486 **2.4 RECREATION FACILITIES, ACTIVITIES AND NEEDS**

1487 2.4.1 Zones of Influence

1488 The primary area having a significant influence on the public use and management
 1489 of Lavon Lake includes all of Collin County and portions of the adjoining counties of Dallas,
 1490 Denton, Grayson, Fannin, Hunt and Rockwall.

1491 2.4.2 Visitation Profile

1492 The majority of visitors to Lavon Lake come from within a 100-mile radius of the
 1493 lake area. Lavon Lake visitors are a diverse group ranging from campers who utilize the
 1494 campgrounds around the lake, full time and part time residents of housing
 1495 developments that border the lake, hunters who utilize the lands managed for wildlife,
 1496 day users who picnic in the private and federally operated parks, fisherman, recreational
 1497 boaters, marina customers, pedestrian and bicycle trail users, and many other user
 1498 groups.
 1499

1500 The peak visitation months on Lavon Lake are April through September, when
 1501 88% of visits occur. July is the highest visitation month and accounts for 18 to 20% of
 1502 the annual total. Approximately 90% of visits to recreation areas occur in USACE-
 1503 managed recreation areas. The remaining visitation takes place on USACE lands that
 1504 have been leased to marina operators and to Collin County. Lavon Lake experiences an
 1505 unknown amount of dispersed recreation visits from adjacent landowners walking on to
 1506 USACE lands, hunters and fisherman parking at undesignated/unmonitored access

1507 points, and trail users parking at trailheads that are not monitored. One indication of
 1508 dispersed use is the number of USACE-issued hunting permits for Lavon Lake. In the
 1509 hunting seasons of 2012-2014 annual hunting permits issued by USACE ranged from
 1510 1,700 to 2,000. Permits are valid for the entire hunting season and many hunters make
 1511 several trips during the season. At the national level, USACE is currently preparing
 1512 computerized visitation models/programs that will estimate the level of dispersed
 1513 visitation at all USACE lakes. Table 2.15 provides the Fiscal Year 2012 report on the
 1514 number of total recreation visits to each designated high density use recreation area at
 1515 Lavon Lake. More recent data is unavailable as a result of a nationwide revision of the
 1516 procedures for collecting and reporting visitation data.

1517
 1518 **Table 2.15** Fiscal Year 2012 Visitation (total number of visits) for the 16 Designated Recreation
 1519 Areas and Stilling Basin Access Point at Lavon Lake

Recreation Area	Total Visits
Avalon Park	30,113
Bratonia Park	8,741
Brockdale Park	29,606
Caddo Park (temp closed)	0
Clear Lake Park	38,065
Collin Park	168,149
East Fork Park	124,456
Elm Creek Park	11,239
Highland Park	21,029
Lakeland Park	13,259
Lavonia Park	50,155
Little Ridge Park	15,971
Mallard Park	52,511
Pebble Beach Park	9,937
Stilling Basin Access	102,641
Tickey Creek Park	27,788
Twin Groves Park	5,986
Total Visits	709,646

1520

1521 2.4.3 Recreation Analysis

1522 Recreational use at Lavon Lake continues to evolve, but day use activities
 1523 including primarily swimming, picnicking, fishing, and boating, as well as overnight
 1524 camping, are the principal activities pursued by most visitors. As of the date of this Plan,
 1525 the most recent summer where the lake elevation was close to the normal or conservation
 1526 pool elevation was 2012. Using 2012 data generated by the National Recreation
 1527 Reservation Service (NRRS), there were 11,346 camping permits issued at Lavon Lake

1528 that year. For the three campgrounds participating in the NRRS (Clear Lake Park, East
 1529 Fork Park, and Lavonia Park), the campers making those reservations originated from
 1530 nearby counties as shown in Table 2.16. For Lavonia and East Fork Parks, campers are
 1531 originating primarily from cities to the south and west including Wylie, Plano, Richardson,
 1532 McKinney, Garland and Dallas (not in order). For Clear Lake Park campers originate
 1533 primarily from Princeton and McKinney. No data is available that would show where day
 1534 use visitation is coming from but USACE believes it is safe to assume that, like campers,
 1535 more than 90% of day users at Lavon Lake are originating from the cities listed above.

1536
 1537
 1538 **Table 2.16** County of Origin for Registered Campers in 2012 (Percent of total registered campers
 1539 within each listed park)

	Collin County	Dallas County	Rockwall County
Clear Lake Park	71%	20%	2%
East Fork Park	47%	35%	9%
Lavonia Park	49%	26%	10%

1540
 1541
 1542 While visitation in designated recreation areas remains strong, there is an
 1543 unknown, but considerably high level of recreation use originating from the many
 1544 subdivisions that share a common boundary with USACE lands. Adjacent landowners
 1545 are allowed pedestrian access to the shoreline throughout most of the lake area with the
 1546 exception of developed parks and prohibited access areas, such as near the dam or
 1547 water intake structures. This easy access to the shoreline results in dispersed
 1548 recreation use, such as bank fishing, hiking and nature study.

1549
 1550 The Texas Outdoor Recreation Plan – 2012 (TORP), published by the TPWD,
 1551 was referred to extensively in the preparation of the Plan. The TORP was developed
 1552 using results from web surveys to garner public input on the outdoor recreational needs
 1553 of Texans. The surveys resulted in more than 4,000 public comments. Additionally,
 1554 TPWD utilized the results from a Hispanic Focus Group for State Parks as well as
 1555 survey results from the 2009 National Survey on Recreation and the Environment
 1556 (NSRE) conducted by the U.S. Forest Service (USFS). The TORP, coupled with the
 1557 results of public meetings and recreation area surveys conducted by USACE, were
 1558 especially useful in identifying outdoor recreation trends and in setting management
 1559 objectives for the recreation management program at Lavon Lake. The TORP clearly
 1560 shows that Lavon Lake is the largest and most important outdoor recreation venue in
 1561 Collin County, Texas. Table 2.17, taken from the TORP, shows the number of
 1562 conservation- recreation acres available in the ten most populated counties in Texas. Of
 1563 the 27,309 acres shown for Collin County, approximately 16,000 of those acres are
 1564 USACE lands at Lavon Lake that lie above the normal pool of the lake.

1568 **Table 2.17** Available Public Outdoor Recreation Acres Per Capita for the Ten Most Populated
 1569 Counties in Texas.

Ten Most Populace Counties by Recreation-Conservation Acres Per Capita					
County Name	County Acres	County Populatio	Recreation-Conservation Acres	Per Capita Acres	2010 Population Rank
Harris	1,133,239	4,092,45	66,646	0.02	1
Dallas	578,268	2,368,13	33,420	0.01	2
Tarrant	573,242	1,809,03	28,008	0.02	3
Bexar	801,952	1,714,77	27,960	0.02	4
Travis	653,260	1,024,26	66,083	0.06	5
El Paso	646,607	800,647	30,585	0.04	6
Collin	565,441	782,341	27,309	0.03	7
Hidalgo	1,015,707	774,769	32,136	0.04	8
Denton	611,467	662,614	39,156	0.06	9
Fort Bend	564,888	585,375	14,102	0.02	10

1570 Source: 2012 Texas Outdoor Recreation Plan

1571
 1572
 1573 While traditional camping, picnicking and power boating at Lavon Lake continue
 1574 to be very popular, the TORP reveals that Texas residents have a strong desire for a
 1575 broad array of passive use recreation activities that have potential for expansion on
 1576 federal lands at Lavon Lake. Public comment received on the preparation of this Plan
 1577 indicates a strong interest in equestrian, biking, and hiking trails. Information from the
 1578 TORP provided in Table 2.18 verifies that hiking and biking trails are in the top five
 1579 recreation facilities that Texas citizens stated they need now in local parks. Although
 1580 equestrian trails are not in the top five facilities, the interest in equestrian trails at Lavon
 1581 Lake is high and has been growing since 1995 when construction was initiated on the
 1582 25.5-mile Trinity Trail. A copy of the TORP is available on the TPWD website at
 1583 <http://tpwd.texas.gov>.

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1593 **Table 2.18** Top Five Recreation Facilities Needed by Texas Citizens – TORP 2012

Top 5 Facilities Needed Now In Local Parks by Texas Citizens	
Unpaved trails for walking and hiking	43.6%
Natural park area/open space	31.8%
Mountain bike trails	31.4%
Paved trails for walking, hiking, biking, skating	30.1%
Wildlife/nature observation sites	27.8%

1594
 1595 Outdoor recreation at Lavon Lake generally falls within two broad categories of
 1596 land or water-based recreation. Management objectives for each type vary depending
 1597 on the location and the intensity of use. Recreation management objectives are provided
 1598 in this Plan which project future direction and actions necessary to meet the public's
 1599 needs for land and/or water based recreation.

1600
 1601 Land-based recreation opportunities, activities, areas and facilities that typically
 1602 occur on, or adjacent to, USACE land and water include, but are not limited to, camping,
 1603 hiking, swimming, hunting, fishing, horseback riding, picnicking, geocaching, wildlife/bird
 1604 viewing, and sightseeing. Land-based recreation areas include campgrounds, day-use
 1605 areas, overlooks, trails and wildlife management areas. Facility types typically found
 1606 within these recreation areas include campsites, picnic sites, restrooms, shower facilities,
 1607 boat ramps and courtesy docks. These recreation areas are managed by several entities
 1608 including USACE, county government, and private/commercial concessionaires. Refer to
 1609 Table 2.19 for a listing of designated recreation areas located on USACE lands at Lavon
 1610 Lake.

1611
 1612 **Table 2.19** Designated High Density Recreation Areas at Lavon Lake

Park Name	Acres Above Normal Pool	Type of Use	Boat Ramp	Operator	Number of Campsites Or Picnic Sites
Avalon	60	Day Use	Yes-4 Lane	USACE	56 Picnic Sites
Bratonia	138	Day Use	Yes-2 Lane	USACE & Lessee	NA
Brockdale	114	Day Use	Yes-4 Lane	USACE & Lessee	NA
Caddo	515	Day Use	Yes-4 Lane	USACE	13 Picnic Sites
Clear Lake	88	Camping	Yes-8 Lane	USACE	23 Camp Sites; 18 Picnic Sites
Collin	160	Camping	Yes	Lessee	61 Camp Sites
East Fork	106	Camping and Day Use	Yes- 8 Lane	USACE & Lessee	62 Camp Sites; 27 Picnic Sites

Park Name	Acres Above Normal Pool	Type of Use	Boat Ramp	Operator	Number of Campsites Or Picnic Sites
Elm Creek	189	Day Use	Yes- 2 Lane	USACE	NA
Highland	131	Day Use	Yes- 4 Lane	USACE	NA
Lakeland	105	Camping	Yes- 4 Lane	USACE	32 Camp Sites (Tent)
Lavonia	126	Camping and Day Use	Yes- 8 Lane	USACE	53 Camp Sites; 51 Picnic Sites
Little Ridge	45	Day Use	Yes- 4 Lane	USACE	28 Picnic Sites
Mallard	81	Day Use	Yes- 4 Lane	USACE	10 Picnic Sites
Pebble Beach	35	Day Use	Yes- 4 Lane	USACE	21 Picnic Sites
Ticky Creek	38	Day Use	Yes- 4 Lane	USACE	16 Picnic Sites
Twin Groves	115	Day Use	Yes- 4 Lane	USACE	NA

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In accordance with the NSRE, some of the popular recreation activities at Lavon Lake are, on a national basis, either static or declining in participation. For example, camping activity, power boating, hunting and fishing have experienced small to moderate declines in recent years. In contrast to these declines, significant increases in hiking, walking, sightseeing, wildlife viewing and canoeing/kayaking have occurred in recent years. The USACE *Visitation Estimation and Reporting System* (VERS) is currently being updated and until the update is complete, data that could be compared to the trend information reported in the TORP will not be available. Refer to Table 2.20 and Table 2.21 for the percent of U.S. population participating in several recreation activities that are common at Lavon Lake.

Table 2.20 Percent of Population Participating in Recreational Boating in the U.S.

Percent of Population Participating in Recreational Boating in the U.S.				
	1982-1983	1994-1995	1999-2001	2005-2009
Boating	28.0%	37.8%	36.3%	35.6%
Canoeing/Kayaking	8.0%	9.5%	11.5%	12.4%

Source: (Cordell & Green, National Survey on Recreation and the Environment, Texas Reports 1994-95, 2000-01 and 2006-09, 2009; TORP - 2012

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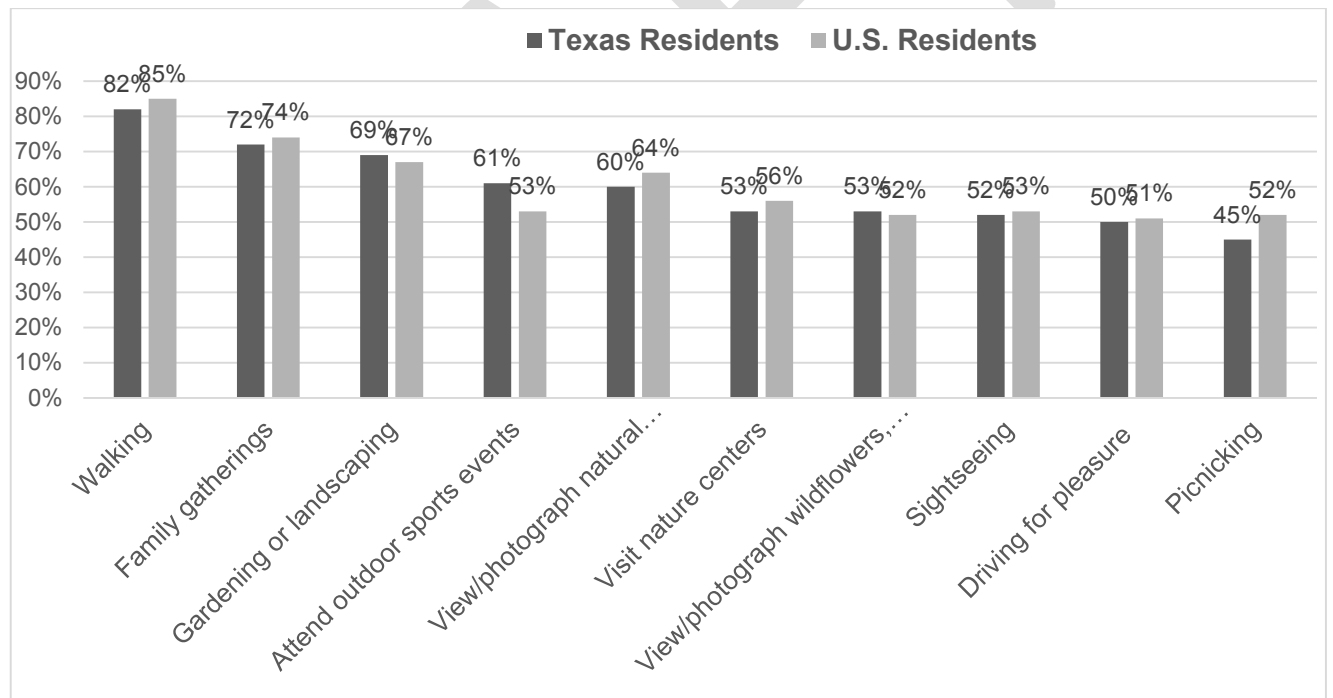
1635 **Table 2.21** Participation in Hunting, Fishing, and Wildlife Watching in Texas.
 1636

Participation in Hunting, Fishing and Wildlife Watching in Texas (Residents and Non-Residents, 16 years and older)				
Texas	Fishing	Hunting	Wildlife Watching	Total Participants (Fishing + Hunting + Wildlife Watching)
1996 Survey	2.5 million	829 thousand	3.6 million	4.7 million
2001 Survey	2.4 million	1.2 million	3.2 million	4.9 million
2006 Survey	2.5 million	1.1 million	4.2 million	6.0 million

1637 Source: 1996, 2001, 2006 National Survey of Fishing, Hunting and Wildlife-Associated Recreation for
 1638 Texas, USFWS; TORP 2012

1639 Refer to Figure 2.6 for a depiction of participation rates in the top 10 outdoor
 1640 recreation activities by Texas citizens compared to the nation at large.
 1641

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1644 **Figure 2.6** Participation Rates of Texas Residents (2006-2009) versus U.S. Residents (2005-
 1645 2009) in the Top 10 Outdoor Recreation Activities (Source: NSRE; TORP 2012)
 1646
 1647

1648 Given the growing Hispanic population in Texas and other states, outdoor
 1649 recreation providers have conducted surveys to determine the level of participation by
 1650 Hispanic citizens in various outdoor recreation activities. Although the Hispanic
 1651 population in Collin County is smaller on a percentage basis compared to other Texas

1652 counties, USACE is aware that use of recreation facilities at Lavon Lake by Hispanic
 1653 families is a significant factor to be considered in setting recreation management
 1654 objectives. Refer to Table 2.22 for a comparison of the participation rates of White/Non
 1655 Hispanics versus Hispanics in 10 outdoor recreation activities in Texas.

1656
 1657 **Table 2.22** Comparison of Participation Rates of White/Non Hispanics Versus Hispanics in the
 1658 Top 10 Outdoor Recreation Activities in Texas
 1659

Comparison of Top 10 Outdoor Recreation Activities, White/Non-Hispanics and Hispanics in Texas, 2006-2009		
	% Texans Participating 2006-2009	
	White/Non-Hispanics	Hispanics
Walking for Pleasure	81.1%	83.4%
Family Gatherings	66.6%	75.8%
Gardening or Landscaping	66.3%	76.3%
Attend Outdoor Sports Events Outdoors	57.3%	68.4%
View/Photograph Natural Scenery	63.3%	57.2%
Visit Outdoor Nature Centers	49.8%	58.4%
View/Photograph Wildflowers	59.3%	49.0%
Sightseeing	54.1%	49.6%
Driving for Pleasure	53.6%	49.4%
Picnicking	43.4%	47.7%

1660 Source: TORP 2012

1661
 1662 Management of the water surface for recreational purposes rests primarily with
 1663 USACE, but close coordination is maintained with TPWD and Collin County Sheriff's
 1664 office with respect to enforcement of rules and regulations that apply to boating. Marina
 1665 concessionaires are also important stakeholders in water-based recreation
 1666 management. Water-based outdoor recreation includes, but is not limited to fishing,
 1667 boating, swimming, water skiing, scuba diving, seaplane operations, and kayaking. This
 1668 Plan includes a Water Surface Classification Plan that establishes areas where boating
 1669 may be restricted or prohibited. The objective of the water surface classification plan is
 1670 to ensure public safety and protect natural resources while providing recreational
 1671 opportunities on the water.

1672
 1673 Recreational carrying capacity is considered by USACE to ensure that visitors
 1674 have a high quality and safe recreational experience, and that natural resources are not

1675 irreparably damaged. An example of a carrying capacity consideration at Lavon Lake is
1676 the management of public hunting on USACE lands wherein hunting activity may be
1677 restricted by species or by area, depending on population and/or habitat conditions.
1678

1679 2.4.4. Recreational Boating Capacity Study

1680 In 2002, the Fort Worth District adopted a policy governing water-related
1681 recreation development that has the potential to affect the degree of boating traffic on
1682 the water surface of all Fort Worth District lakes. In brief terms, the policy established a
1683 target capacity of 22 surface acres of boatable water surface for each boat on the water
1684 during peak use periods. Using the number of boat ramp parking spaces, wet storage
1685 slips and dry stacked storage slips as a basis for calculating potential boating activity,
1686 USACE can determine whether any proposed additions of parking spaces or storage
1687 slips has the potential to exceed the target capacity. USACE has determined that the
1688 number of existing parking spaces and slips at Lavon Lake as of the date of this Plan
1689 has the potential to exceed the target capacity and may have already exceeded the
1690 target. In view of this potential, USACE would require a comprehensive water-related
1691 recreation use study prior to making a decision to approve or deny a proposal for
1692 additional slips or boat ramp parking spaces at Lavon Lake. The policy allows limited
1693 flexibility in decision making.
1694

1695 **2.5 REAL ESTATE**

1696 Land acquisition for Lavon Lake took place under two acquisition policies, the
1697 pre-1953 policy for the original construction, and the post 1971 policy for the Lavon
1698 Lake modification. Prior to 1953 land acquisition by USACE was largely determined on
1699 a case-by-case basis. However, in general terms the policy was to obtain fee title to
1700 lands up to the full flood pool elevation level of the reservoir. Additional lands needed for
1701 operations or for other authorized purposes, such as recreation or fish and wildlife were
1702 also acquired in fee. In 1971 the implementation of the joint policy (applied to both
1703 USACE and the Department of Interior) was revised so that the guidelines for taking
1704 lands for fee acquisition would be a 300 foot block-out of the conservation pool or 3 to 5
1705 feet of freeboard above the full pool level, whichever resulted in the acquisition of more
1706 land.
1707

1708 The area acquired in fee simple title at Lavon Lake was 37,387 acres, which
1709 includes land for construction of the dam and for the operation and maintenance of the
1710 project and public use areas. Land for the operation of Lavon Lake was acquired in fee
1711 simple to contour elevation 508.0 feet NGVD or to a point 300 feet horizontally from the
1712 top of the flood control pool, elevation 503.5 feet, whichever was greater. However,
1713 within residential subdivided areas the fee simple acquisition line was generally based
1714 on lot lines encompassing the upper guide contour of elevation 508.0 feet without
1715 regard to the 300-foot criteria.
1716

1717 Significant suburban expansion near Lavon Lake, coupled with the road and
1718 utility network that was relocated and/or constructed at the time of project construction

1719 has resulted in the following active real estate outgrants at Lavon Lake: 52 easements,
1720 6 licenses, and 12 consents to easement. There also exists a small number of utility
1721 lines that cross USACE land and that existed prior to Federal land acquisition. In those
1722 cases, the lands were acquired subject to existing easements and are therefore not
1723 listed in the totals given above.

1724
1725 Flowage easements were acquired from properties located in the upper reaches
1726 of the reservoir that would be subject to induced backwater flooding. Backwater curves
1727 that show the location of inundation can be found in the Design Memorandum No. 1A
1728 (Hydrology), dated June 1965. The total area on which flowage easement was acquired
1729 is 849 acres.

1730

1731 **2.6 PERTINENT PUBLIC LAWS**

1732 Numerous public laws apply directly or indirectly to the management of Federal
1733 land at Lavon Lake. Listed below are several key public laws that are most frequently
1734 referenced in planning and operational documents. Refer to Appendix J for a more
1735 comprehensive listing.

1736

- 1737 • Public Law 78-534, Flood Control Act of 1944. - Section 4 of the act as last
1738 amended in 1962 by Section 207 of Public Law 87-874 authorizes USACE to
1739 construct, maintain, and operate public parks and recreational facilities in
1740 reservoir areas and to grant leases and licenses for lands, including facilities,
1741 preferably to Federal, State or local governmental agencies.
- 1742
1743 • Public Law 85-624, Fish and Wildlife Coordination Act 1958. - This act as
1744 amended in 1965 sets down the general policy that fish and wildlife conservation
1745 shall receive equal consideration with other project purposes and be coordinated
1746 with other features of water resource development programs. Opportunities for
1747 improving fish and wildlife resources and adverse effects on these resources
1748 shall be examined along with other purposes which might be served by water
1749 resources development.
- 1750
1751 • Public Law 86-717, Forest Conservation. - This act provides for the protection of
1752 forest and other vegetative cover for reservoir areas under this jurisdiction of the
1753 Secretary of the Army and the Chief of Engineers.
- 1754
1755 • Public Law 89-72, Federal Water Project Recreation Act of 1965. - This act
1756 requires that not less than one-half the separable costs of developing
1757 recreational facilities and all operation and maintenance costs at Federal
1758 reservoir projects shall be borne by a non-Federal public body. A
1759 HQUSACE/OMB implementation policy made these provisions applicable to
1760 projects completed prior to 1965.

1761

1762 • Public Law 91-190, National Environmental Policy Act of 1969 (NEPA). – NEPA
1763 declared it a national policy to encourage productive and enjoyable harmony
1764 between man and his environment, and for other purposes. Specifically, it
1765 declared a “continuing policy of the Federal Government... to use all practicable
1766 means and measures...to foster and promote the general welfare, to create
1767 conditions under which man and nature can exist in productive harmony, and
1768 fulfill the social, economic, and other requirements of present and future
1769 generations of Americans.” Section 102 authorized and directed that, to the
1770 fullest extent possible, the policies, regulations and public law of the United
1771 States shall be interpreted and administered in accordance with the policies of
1772 the Act. It is Section 102 that requires consideration of environmental impacts
1773 associated with Federal actions. Section 101 of NEPA requires the federal
1774 government to use all practicable means to create and maintain conditions under
1775 which man and nature can exist in productive harmony.
1776

1777 Specifically, Section 101 of the National Environmental Policy Act declares:

- 1778 ○ Fulfill the responsibilities of each generation as trustee of the
1779 environment for succeeding generations;
- 1780 ○ Assure for all Americans safe, healthful, productive, and aesthetically
1781 and culturally pleasing surroundings;
- 1782 ○ Attain the widest range of beneficial uses of the environment without
1783 degradation risk to health or safety or other undesirable and
1784 unintended consequences;
- 1785 ○ Preserve important historic, cultural, and natural aspects of our
1786 national heritage and maintain wherever possible an environment
1787 which supports diversity and variety of individual choice;
- 1788 ○ Achieve a balance between population and resource use which will
1789 permit high standards of living and a wide sharing of life's amenities:
1790 and
- 1791 ○ Enhance the quality of renewable resources and approach the
1792 maximum attainable recycling of depletable resources.

1793
1794
1795 • PL 89-665, National Historic Preservation Act of 1966 (NHPA) (15 October
1796 1966), establishes a national policy of preserving, restoring, and maintaining
1797 cultural resources. It requires Federal agencies to take into account the effect an
1798 action may have on sites that may be eligible for inclusion on the National
1799 Register of Historic Places.

1800
1801 • PL 101-601, Native American Graves Protection and Repatriation Act (16
1802 November 1990), requires Federal agencies to return Native American human
1803 remains and cultural items, including funerary objects and sacred objects, to their
1804 respective peoples.
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1808 **CHAPTER 3 – MANAGEMENT GOALS AND RESOURCE OBJECTIVES**
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1810 **3.1 INTRODUCTION**

1811 This chapter sets forth goals and objectives necessary to achieve the USACE
1812 vision for the future of Lavon Lake. The terms “goals” and “objectives” are often defined
1813 as synonymous, but in the context of this Plan, goals express the overall desired end
1814 state of the cumulative land and recreation management programs at Lavon Lake.
1815 Resource objectives specify task-oriented actions necessary to achieve the master plan
1816 goals.
1817

1818 **3.2 MANAGEMENT GOALS**

- 1819 • **GOAL A.** Provide the best management practices to respond to regional needs,
1820 resource capabilities and capacities, and expressed public interests consistent
1821 with authorized project purposes.
1822
- 1823 • **GOAL B.** Protect and manage project natural and cultural resources through
1824 sustainable environmental stewardship programs.
1825
- 1826 • **GOAL C.** Provide public outdoor recreation opportunities that support project
1827 purposes and public interests while sustaining project natural resources.
1828
- 1829 • **GOAL D.** Recognize the unique qualities, characteristics, and potentials of the
1830 project.
1831
- 1832 • **GOAL E.** Provide consistency and compatibility with national objectives and
1833 other State and regional goals and programs.
1834

1835 In addition to the above goals, USACE management activities are guided by USACE-
1836 wide Environmental Operating Principles as follows:
1837

- 1838 • Strive to achieve environmental sustainability. An environment maintained in a
1839 healthy, diverse and sustainable condition is necessary to support life.
- 1840 • Recognize the interdependence of life and the physical environment. Proactively
1841 consider environmental consequences of USACE programs and act accordingly
1842 in all appropriate circumstances.
- 1843 • Seek balance and synergy among human development activities and natural
1844 systems by designing economic and environmental solutions that support and
1845 reinforce one another.

- 1846 • Continue to accept corporate responsibility and accountability under the law for
1847 activities and decisions under our control that impact human health and welfare
1848 and the continued viability of natural systems.
- 1849 • Seek ways and means to assess and mitigate cumulative impacts to the
1850 environment; bring systems approaches to the full life cycle of our processes and
1851 work.
- 1852 • Build and share an integrated scientific, economic and social knowledge base
1853 that supports a greater understanding of the environment and impacts of our
1854 work.
- 1855 • Respect the views of individuals and groups interested in USACE activities; listen
1856 to them actively, and learn from their perspective in the search to find innovative
1857 win-win solutions to the nation's problems that also protect and enhance the
1858 environment.
1859

1860 **3.3 RESOURCE OBJECTIVES**

1861 Resource objectives are defined as clearly written statements that respond to
1862 identified issues and that specify measurable and attainable activities for resource
1863 development and/or management of the lands and waters under USACE jurisdiction.
1864 The objectives stated in this master plan support the Plan's goals, USACE
1865 Environmental Operating Principles, and applicable national performance measures.
1866 They are consistent with authorized project purposes, Federal laws and directives,
1867 regional needs, resource capabilities, and they take public input into consideration.
1868 Recreational and natural resources carrying capacities are also addressed in the
1869 Resource Objectives. Regional and State planning documents including TPWD's TCAP
1870 and TORP, NCTCOG's North Texas – 2050 publication; and the Collin County Parks
1871 and Open Space Strategic Plan were considered in developing these objectives.
1872 Planning documents from adjacent municipalities were also reviewed.
1873

1874 The objectives in this Plan are intended to provide project benefits, meet public
1875 needs, and foster environmental sustainability for Lavon Lake to the greatest extent
1876 possible. They include recreational objectives; natural resource management
1877 objectives; visitor information; education, and outreach objectives; general management
1878 objectives; and cultural objectives.
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1888 **Table 3.1** Recreational Objectives

Recreational Objectives	Goals				
	A	B	C	D	E
Evaluate the demand for improved recreation facilities and increased public access on USACE-managed public lands and water for recreational activities (i.e. camping, walking, hiking, biking, boating, hunting, fishing, wildlife viewing, etc.) and facilities (i.e. campsites, picnic facilities, overlooks, all types of trails, boat ramps, courtesy docks, interpretive signs/exhibits, and parking lots).	*		*		
Improve and modernize day use and campground facilities through addition and repair of amenities, including, but not limited to: road improvements, sewer hook ups, increased electrical service, concrete or asphalt recreational vehicle pads, wireless internet access, amphitheaters, restrooms, trails, pavilions, and improved park entrances.	*		*		
Monitor public use levels (with a special focus on boating congestion and marina capacity) and evaluate potential impacts from overuse and crowding. Take action to prevent/remediate overuse, conflict, and public safety concerns.	*		*		
Evaluate recreational use zoning and regulations for designated quiet water or no-wake areas with emphasis on natural resource protection, quality recreational opportunities, and public safety concerns.	*				
Follow the Environmental Operating Principles associated with recreational use of waterways for all water-based management activities and plans.		*	*		*
Increase universally accessible facilities on Lavon Lake.	*		*		*
Evaluate established permits/outgrants to determine impacts on public lands and waters. Sustain the Shoreline Management Program in order to balance private shoreline uses (such as mowing or vegetation removal requests along the Federal property boundary, or paths to the shoreline) with habitat management and impacts to the general public.	*		*		
Consider flood/conservation pool to address potential impact to recreational facilities (i.e. campsites, boat ramps, courtesy docks, etc.).	*	*	*	*	
Ensure consistency with USACE Recreation Strategic Plan.					*

Recreational Objectives	Goals				
	A	B	C	D	E
Monitor the TCAP, the TORP, Collin County Parks and Open Space Strategic Plan, relevant NCTCOG plans, and adjacent municipality plans to insure that USACE is responsive to outdoor recreation trends, public needs and resource protection within a regional framework. All plans by others will be evaluated in light of USACE policy and operational aspects of Lavon Lake.					*

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*Denotes that the objective helps to meet the specified goal.



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Photo 3.1 Resource Objectives include evaluation of recreational use of the water surface to increase visitor enjoyment and safety (USACE)



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Photo 3.2 Increased trail opportunities is a Resource Objective at Lavon Lake (USACE)

Table 3.2 Natural Resource Management Objectives

Natural Resource Management Objectives	GOALS:				
	A	B	C	D	E
Consider flood/conservation pool levels to ensure that natural resources are managed in ways that are compatible with primary project purposes of flood risk management and water supply.	*	*		*	
Ensure project lands are managed with preservation and conservation of natural habitat and open space as primary objectives in order to maintain the largest contiguous tract of public open space in Collin County with natural connectivity to Lake Ray Hubbard immediately to the south.	*			*	
Actively manage and conserve fish and wildlife resources, especially special status species, by implementing ecosystem management principles. Key among these principles is the use of native species adapted to the Texas Blackland Prairie Ecological Region in restoration and mitigation plans.	*	*		*	*
Consider watershed approach during decision-making process.					*
Optimize resources, labor, funds, and partnerships for protection and restoration of fish and wildlife habitats.		*			*
Minimize activities which disturb the scenic beauty and aesthetics of the lake.	*	*	*	*	
Continually evaluate erosion control and sedimentation issues at Lavon Lake and develop alternatives to resolve the issues.	*	*			*
Stop unauthorized uses of public lands such as off-road vehicle use, trash dumping, unauthorized fires, fireworks, poaching, clearing of vegetation, agricultural trespass, timber theft, unauthorized trails and paths, and placement of advertising signs that create negative environmental impacts.	*	*	*	*	*
Monitor lands and waters for invasive, non-native and aggressively spreading native species and take action to prevent and/or reduce the spread of these species. The most prevalent aggressively spreading native species at Lavon is eastern redcedar. The most prevalent invasive plant species are Johnsongrass and King Ranch bluestem. Potential invasive	*	*		*	*

Natural Resource Management Objectives	GOALS:				
	A	B	C	D	E
species of great concern are the zebra mussel and Emerald Ash borer. Implement prescribed fire as a management tool to control the spread of eastern redcedar and other noxious plants including Johnsongrass and King Ranch bluestem and to promote the vigor of native prairie grasses and forbs.					
Sustain the Lavon Lake public hunting program as a habitat and species management tool that maintains sustainable game populations, reduces invasive species such as feral hogs, improves habitat conditions and carrying capacity, maintains project lands and waters as a wildlife travel corridor and resting location, and considers proximity and density of adjacent development.	*	*	*	*	*
Designate utility corridors to address the increased residential development around the lake and interconnection to utilities in Collin County and the surrounding counties. The intent of the utility corridors is to limit natural habitat fragmentation by creating corridors for use by multiple utilities.	*	*		*	*
Protect and/or restore important native habitats such as Texas Blackland Prairies, bottomland hardwoods, riparian zones, and wetlands, where they occur, or historically occurred on project lands. Special emphasis should be taken to protect and/or restore special or rare plant communities, to include actions that promote butterfly and/or pollinator habitat, migratory bird habitat, and habitat for birds listed by USFWS as Birds of Conservation Concerns. Some of these habitats may be designated as Environmentally Sensitive Areas.	*	*	*	*	*

*Denotes that the objective helps to meet the specified goal.

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Photo 3.3 The Loggerhead Shrike is listed by TPWD as a Species of Greatest Conservation Need. Resource Objectives call for actions that promote habitat for species like the loggerhead shrike at Lavon Lake. (Photo courtesy of Dan Tallman's Bird Blog)

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Photo 3.4 Eradicating large fields of invasive Johnsongrass is a Resource Objective for Lavon Lake. (USACE photo)

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Photo 3.5 Mature Shumard oak – bur oak forest in the floodplain of the East Fork of the Trinity River. A Resource Objective calls for protection of this habitat at Lavon Lake. (USACE photo)

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Table 3.3 Visitor Information, Education, and Outreach Objectives

Visitor Information, Education and Outreach Objectives	Goal				
	A	B	C	D	E
Provide more opportunities for communication with agencies, special interest groups, and the general public (i.e. comment cards, updates to City Managers, web page).	*			*	*
Implement more educational, interpretive, and outreach programs at the lake office and around the lake. Topics to include: history, lake operations (flood risk management and water supply), water safety, recreation, nature, cultural resources, ecology, and USACE missions.	*	*	*	*	*
Establish a network among local, state, and federal agencies in order to exchange lake-related information for public education and management purposes.	*			*	*

Visitor Information, Education and Outreach Objectives	Goal				
	A	B	C	D	E
Increase public awareness of special use permits or other authorizations required for special activities, organized special events, and commercial activities on public lands and waters of the lake.	*	*	*		
Capture trends concerning boating accidents and other incidents on public lands and waters and coordinate data collection with other public safety officials.	*		*	*	*
Promote USACE Water Safety message.	*		*	*	*
Educate adjacent landowners on shoreline management policies and permit processes in order to reduce encroachment actions.	*	*	*	*	*

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*Denotes that the objective helps to meet the specified goal.



Photo 3.6 Increased water safety outreach programs is a Resource Objective for Lavon Lake.

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1926 **Table 3.4** General Management Objectives

General Management Objectives	Goal				
	A	B	C	D	E
Resurvey and maintain the public lands boundary line to ensure it is clearly marked and recognizable in all areas to reduce habitat degradation and encroachment actions.	*	*		*	
Secure sustainable funding for the shoreline management program.	*	*	*	*	*
Ensure consistency with USACE Campaign Plan (national level), IPlan (regional level), OPlan (District level).					*
Reference Recreation Infrastructure Investment Strategy (RIIS) if funding levels change in future years.					*
Ensure green design, construction, and operation practices, such as the Leadership in Energy and Environmental Design (LEED) criteria for government facilities, are considered as well as applicable Executive orders.					*
Carefully manage non-recreation outgrants such as utility and road easements in accordance with national guidance set forth in ER-1130-2-550 and applicable chapters in ER 405-1-12. Designate and manage utility corridors as a management tool to reduce habitat fragmentation.	*	*			*
Manage project lands and recreational programs to advance broad national climate change mitigation goals, including but not limited to climate change resilience and carbon sequestration, as set forth in Executive Order 13653, Executive Order 13693 and related USACE policy.					*

1927 *Denotes that the objective helps to meet the specified goal.



Photo 3.7 Establishment of strategic utility corridors is a Resource Objective for Lavon Lake (USACE Photo)

1928
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1932

Table 3.5 Cultural Resources Management Objectives

Cultural Resources Management Objectives	Goal				
	A	B	C	D	E
Monitor and better coordinate lake development and the protection of cultural resources with State Historic Preservation Offices and federally recognized Tribes.	*	*		*	*
Complete an inventory of cultural resources.	*	*		*	*
Increase public awareness and education of regional history.		*		*	*
Ensure historical preservation is fully integrated into the Lavon Lake Master Plan and future planning decision making process (Section 106 and 110 of the National Historic Preservation Act; the Archeological Resources Protection Act; and the Native American Graves Protection and Repatriation Act on public lands surrounding the lake).		*		*	*
Stop unauthorized use of public lands as it pertains to the illegal excavation and removal of cultural resources.		*		*	*

1933

*Denotes that the objective helps to meet the specified goal.

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1954 **CHAPTER 4 - LAND ALLOCATION, LAND CLASSIFICATION, WATER**
1955 **SURFACE, AND PROJECT EASEMENT LANDS**
1956

1957 **4.1 LAND ALLOCATION**

1958 All project lands at USACE water resource development projects are allocated by
1959 USACE into one of four categories in accordance with the congressionally authorized
1960 purpose for which the project lands were acquired. There are four possible categories of
1961 allocation identified in USACE regulations including Operations, Recreation, Fish and
1962 Wildlife, and Mitigation. At Lavon Lake, the only land allocation category that applies is
1963 Operations, which is defined as those lands that are required to operate the project for
1964 the primary authorized purpose of flood control. The remaining allocations of
1965 Recreation, Fish and Wildlife, and Mitigation would apply only if lands had been
1966 acquired specifically for these purposes.
1967

1968 USACE recognizes that some lands were acquired that lie above the elevation
1969 required for operation of the project for flood control. These lands are located in
1970 recreation areas, but under the rules in place at the time of acquisition, these lands are
1971 not considered “separable” lands in that the acquisition of separable lands normally
1972 requires a cost sharing sponsor, a non-federal operator, or were acquired by separate
1973 congressional authorization. The entire fee simple federal estate at Lavon Lake is
1974 37,515 acres, all of which is allocated to Operations.
1975

1976 **4.2 LAND CLASSIFICATION**

1977 4.2.1 General

1978 The objective of classifying project lands is to identify how a given parcel of land
1979 shall be used now and in the foreseeable future. Land classification is a central
1980 component of this plan, and once a particular classification is established any significant
1981 change to that classification would require a formal process including public review and
1982 comment.

1983 4.2.2 Prior Land Classifications

1984 Previous versions of the Lavon Lake Master Plan included land classification
1985 criteria that were similar to the current criteria. These prior land classifications were
1986 based more on projected need than on actual experience which resulted in some areas
1987 being classified for a type of use that has not, or is not likely to occur. Additionally, in the
1988 40+ years since the previous Master Plan was published, wildlife habitat values,
1989 surrounding land use, and regional recreation trends have changed significantly giving
1990 rise to the need for revised classifications. Refer to Table 8.1 in Chapter 8 for a
1991 summary of land classification changes from the prior classifications to the current
1992 classifications.

1993

1994 4.2.3 Current Land Classifications

1995 USACE regulations require project lands to be classified in accordance with the
1996 primary use for which project lands are managed. There are six categories of
1997 classification identified in USACE regulations including:

- 1998 • Project Operations
- 1999 • High Density Recreation
- 2000 • Mitigation
- 2001 • Environmentally Sensitive Areas
- 2002 • Multiple Resource Management Lands
- 2003 • Water Surface

2004

2005 The land and water surface classifications for Lavon Lake were established after
2006 taking into account public comments, input from key stakeholders including elected
2007 officials, city and county governments, and lessees operating on USACE land.
2008 Additionally, public comment, wildlife habitat values, and the trends analysis provided in
2009 TPWD's TORP and TCAP were also used in decision making. Maps showing the
2010 various land classifications can be found in Appendix A. Each of the land classifications,
2011 including the acreage and description of allowable uses is described in the following
2012 paragraphs.

2013

2014 4.2.4 Project Operations

2015 This classification includes the lands managed for operation of the dam, project
2016 office, and maintenance yards, all of which must be maintained to carry out the
2017 authorized purpose of flood control. In addition to the operational activities taking place
2018 on these lands, limited recreational use may be allowed for activities such as public
2019 fishing access in the stilling basin area. Regardless of any limited recreation use
2020 allowed on these lands, the primary classification of Project Operations will take
2021 precedent over other uses. There are 508 acres of Project Operations land specifically
2022 managed for this purpose.

2023

2024 4.2.5 High Density Recreation

2025 These are lands developed for intensive recreational activities for the visiting
2026 public including day use areas, campgrounds, marinas and related concession areas.
2027 Recreation development by lessees operating on USACE lands must follow policy
2028 guidance contained in USACE regulations at ER 1130-2-550, Chapter 16. That policy
2029 includes the following statement:

2030

2031 *“The primary rationale for any future recreation development must be*
2032 *dependent on the project’s natural or other resources. This dependency is*
2033 *typically reflected in facilities that accommodate or support water-based*
2034 *activities, overnight use, and day use such as marinas, campgrounds, picnic*
2035 *areas, trails, swimming beaches, boat launching ramps, and comprehensive*

2036 *resort facilities. Examples that do not rely on the project’s natural or other*
2037 *resources include theme parks or ride-type attractions, sports or concert*
2038 *stadiums, and standalone facilities such as restaurants, bars, motels, hotels,*
2039 *non-transient trailers, and golf courses. Normally, the recreation facilities that are*
2040 *dependent on the project’s natural or other resources, and accommodate or*
2041 *support water-based activities, overnight use, and day use, are approved first as*
2042 *primary facilities followed by those facilities that support them. Any support*
2043 *facilities (e.g., playgrounds, multipurpose sports fields, overnight facilities,*
2044 *restaurants, camp stores, bait shops, comfort stations, boat repair facilities) must*
2045 *also enhance the recreation experience, be dependent on the resource-based*
2046 *facilities, be secondary to the original intent of the recreation development...”*

2047
2048 Lands classified for High Density Recreation are suitable for the development of
2049 comprehensive resorts. The regulation cited above defines Comprehensive Resort as
2050 follows:

2051
2052 *“Typically, multi-faceted developments with facilities such as marinas,*
2053 *lodging, conference centers, golf courses, tennis courts, restaurants, and other*
2054 *similar facilities.”*

2055
2056 At Lavon Lake, prior land classifications included an excessive number of areas
2057 under the high density recreation classification. Several of these areas were never
2058 developed and/or were determined by the study team to be unsuitable for development
2059 resulting in a change to another, more suitable land classification. At Lavon Lake there
2060 are 2,011 acres classified as High Density Recreation land. Refer to Table 2.19 for a
2061 listing of the current High Density Recreation Areas at Lavon Lake. Each of the High
2062 Density Recreation areas is described briefly in Chapter 5 of this Plan.

2063 4.2.6 Mitigation

2064 This classification is used only for lands allocated for mitigation for the purpose of
2065 offsetting losses associated with the development of the project. No Mitigation lands are
2066 allocated for Lavon Lake, therefore no lands are classified as Mitigation lands.

2067 4.2.7 Environmentally Sensitive Areas

2068 These are areas where scientific, ecological, cultural, and aesthetic features
2069 have been identified. Ten distinct parcels have been classified as Environmentally
2070 Sensitive Areas (ESA) at Lavon Lake primarily for the protection of sensitive habitats.
2071 The habitats were evaluated in the 2010 habitat study conducted jointly by USACE and
2072 USFWS and some are listed as “Rare Communities” in the TPWD TCAP for the Texas
2073 Blackland Prairies Ecoregion. Each of these areas is discussed in Chapter 5 of this
2074 Plan. There are 4,319 acres classified as ESA at Lavon Lake.

2075 4.2.8 Multiple Resource Management Lands

2076 This classification is divided into four sub-classifications identified as: Low
2077 Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive
2078 Recreation Areas. A given tract of land may be classified using one or more of these

2079 sub-classifications but the primary sub classification should reflect the dominant use of
2080 the land. Typically, Multiple Resource Management Lands support only passive, non-
2081 intrusive uses with very limited facilities or infrastructure. Where needed, some areas
2082 may require basic facilities that include, but are not limited to minimal parking space, a
2083 small boat ramp, and/or primitive sanitary facilities. There are 9,768 acres of land under
2084 this classification at Lavon Lake. The following paragraphs list each of the sub-
2085 classifications, and the number of acres and primary uses of each.
2086

- 2087 • Low Density Recreation: These are lands that may support passive public
2088 recreational use (e.g., fishing, hunting, wildlife viewing, natural surface trails,
2089 hiking, etc). Under prior land classifications, several relatively large tracts
2090 were classified for low density recreation, but during the study process to
2091 develop this Plan, these larger tracts were reclassified under the sub-
2092 classification of Wildlife Management. Low Density Recreation lands are
2093 typically narrow strips of land lying between the shoreline at the conservation
2094 pool elevation and the USACE property boundary line, and are often located
2095 adjacent to private residential areas. The narrow configuration and location
2096 next to residential areas make these areas unsuitable for other uses such as
2097 High Density Recreation, Vegetation or Wildlife Management. These areas
2098 are often used by adjacent landowners for the passive recreation activities
2099 listed above. There are 2,468 acres under this classification at Lavon Lake.
2100
- 2101 • Wildlife Management: This land classification applies to those lands managed
2102 primarily for the conservation of fish and wildlife habitat. These lands
2103 generally include comparatively large contiguous parcels, most of which are
2104 located within the flood pool of the lake. Passive recreation uses such as
2105 natural surface trails, fishing, hunting, and wildlife observation are compatible
2106 with this classification unless restrictions are necessary to protect sensitive
2107 species or to promote public safety. There are 6,476 acres of land included in
2108 this classification at Lavon Lake.
2109
- 2110 • Vegetative Management: These are lands designated for stewardship of
2111 forest, prairie, and other native vegetative cover. At Lavon Lake, several
2112 parcels of native prairie grassland, or that have high potential to be restored
2113 to native prairie, are included in this classification. Passive recreation
2114 activities previously described may be allowed in these areas. There are 824
2115 acres included in this classification at Lavon Lake.
2116
- 2117 • Future/Inactive Recreation Areas: By definition, these are areas with site
2118 characteristics compatible with potential future high density recreation
2119 development, or existing HDR areas that are currently closed. No such areas
2120 are designated at Lavon Lake.
2121
2122
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2128 4.2.9 Water Surface

2129 USACE regulations specify four possible sub-categories of water surface
2130 classification. These classifications are intended to promote public safety, protect
2131 resources, or protect project operational features such as the dam and spillway. These
2132 areas are typically marked by USACE or lessees with navigational or informational
2133 buoys or signs, or are denoted on public maps and brochures. The four sub-categories
2134 of water surface classification include:

2135

2136 • Restricted: These areas are restricted to the extent that public access is not
2137 allowed for reasons of public safety, and for project operations and security
2138 purposes. The areas include water surface in front of the tainter gates, major
2139 water supply intakes, swimming beaches and the water release area
2140 associated with the City of Garland power plant. Approximately 63 acres of
2141 water surface are classified as Restricted at Lavon Lake. These areas are
2142 depicted on the land classification maps in Appendix A.

2143

2144 • Designated No-Wake: There are 16 boat ramps and 2 marina areas totaling
2145 42 acres at Lavon Lake where no-wake restrictions are in place for reasons of
2146 public safety and protection of property.

2147

2148 • Fish and Wildlife Sanctuary: These areas are managed with annual or
2149 seasonal boating access restrictions to protect fish and wildlife species during
2150 periods of migration, resting, feeding, nesting, and/or spawning. Coordination
2151 with TPWD during preparation of the Master Plan resulted in a determination
2152 that no permanent fish and wildlife sanctuary is needed at Lavon Lake. See
2153 Chapter 5 for additional discussion on this topic.

2154

2155 • Open Recreation: This classification encompasses the majority of the lake
2156 water surface and is open to general recreational boating. Boaters are
2157 advised through maps and brochures, or signs at boat ramps and marinas,
2158 that navigational hazards may be present at any time and at any location in
2159 these areas. Operation of a boat in these areas is at the owner's risk. Specific
2160 navigational hazards may or may not be marked with a buoy. Approximately
2161 21,295 acres of water surface at Lavon Lake are classified as Open
2162 Recreation.

2163

2164 Table 4.1 provides a summary of land classifications at Lavon Lake. Acreages were
2165 calculated using historical and GIS data. A map representing these areas can be found
2166 in Appendix A.

2167

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Table 4.1 Acreage by Land Use Classification

Classification	Acres
Project Operations	508
High Density Recreation	2,011
Environmentally Sensitive Areas	4,319
Multiple Resource Managed Lands: Low Density Recreation	2,468
Multiple Resource Managed Lands: Wildlife Management	6,476
Multiple Resource Managed Lands: Vegetative Management	824
Multiple Resource Managed Lands: Future/Inactive Recreation Areas	0
Water Surface: Restricted	63
Water Surface: Designated No-wake	42
Water Surface: Open Recreation	21,295

2174 * **Note:** These acreage figures were measured using GIS technology and may vary slightly from
2175 official land acquisition records.
2176

2177 **4.3 PROJECT EASEMENT LANDS**

2178 These are lands on which easement interests were acquired. Fee title was not
2179 acquired on these lands but the easement interests convey to the Federal government
2180 certain rights to use and/or restrict the use of the land for specific purposes. Easement
2181 lands are typically classified as Operations Easement, Flowage Easement, and/or
2182 Conservation Easement. At Lavon Lake the only easement lands are those lands where
2183 a flowage easement was acquired. A flowage easement, in general, grants to the
2184 government the perpetual right to temporarily flood/inundate private land during flood
2185 risk management operations and to prohibit activities on the flowage easement that
2186 would interfere with flood risk management operations such as placement of fill material
2187 or construction of habitable structures. There are 849 acres of Flowage Easement lands
2188 at Lavon Lake.
2189
2190

CHAPTER 5 – RESOURCE PLAN

2191
2192

2193 5.1 RESOURCE PLAN OVERVIEW

2194 This chapter sets forth a Resource Plan describing in broad terms how each land
2195 classification within the Master Plan will be managed. All management goals described
2196 in Section 3.2 apply to each land classification but the primary goal(s) for each
2197 classification is listed below for emphasis. Refer to Section 3.3 for a listing of resource
2198 objectives applicable to each management goal. Refer to Appendix A for maps showing
2199 the various land classifications.

2200

2201 Management of all lands, recreation facilities and related infrastructure must take
2202 into consideration the effects of pool fluctuations associated with authorized flood risk
2203 management and water conservation purposes. Management actions are dependent on
2204 congressional appropriations, the financial capability of lessees and other key
2205 stakeholders, and the contributions of labor and other resources by volunteers. The land
2206 classifications and applicable management goals for each classification for Lavon Lake
2207 include the following:

2208

- 2209 • Project Operations.....Goal A
- 2210 • High Density Recreation.....Goal C
- 2211 • Environmentally Sensitive Areas.....Goal B, D, E
- 2212 • Multiple Resource Management Lands for:
 - 2213 ○ Low Density Recreation.....Goal C
 - 2214 ○ Wildlife Management.....Goal B, E
 - 2215 ○ Vegetation Management.....Goal B, E

2216

2217 A more descriptive and detailed plan for managing project lands can be found in
2218 the Lavon Lake OMP. The OMP is an annually-updated, task-and-budget-oriented plan
2219 identifying tasks necessary to implement the Resource Plan and achieve the goals and
2220 objectives of the Master Plan.

2221 5.2 PROJECT OPERATIONS.

2222 This land is associated with the dam and spillway structures that are operated
2223 and maintained for the purpose of fulfilling the flood risk management mission of Lavon
2224 Lake. There are 508 acres of lands under this classification all of which are managed by
2225 USACE. Lands in these areas will be managed to ensure continued operation of the
2226 lake and structures. Recreation, Environmental Stewardship, and other missions will be
2227 secondary to continued security and operation of the facilities. Public access to this land
2228 is restricted with the exception of the public fishing platform and parking area located on
2229 the west side of the spillway.

2230

2231 The public comment period for the Plan resulted in requests to allow pedestrian
2232 and bicycle traffic on the road that traverses the top of the dam. This concept is also

2233 presented in the Collin County Regional Trails Master Plan (CCRTMP) where a trail
2234 route across the dam is identified as a “spine” trail corridor. This crossing is viewed by
2235 some as a critical link connecting various trails in the northeast Dallas metropolitan area
2236 to the Northeast Texas Trail, which currently spans 130 miles from Farmersville, Texas
2237 to New Boston, Texas. While such use is allowed on dams at some lakes, public safety
2238 and security concerns indicate that major modifications to Lavon Dam would be needed
2239 for such use to be accommodated. Pedestrian access across the tainter gate structure
2240 is currently prohibited by USACE for security reasons. This dictates that some other
2241 means of access would be needed for pedestrian traffic to cross the downstream
2242 channel below the spillway, then traverse north toward the dam where a ramp on the
2243 downstream slope of the dam would be required to provide pedestrian access to the top
2244 of the dam. USACE currently has no plans to pursue the creation of such public access.
2245

2246 A possible alternative to pedestrian access along the top of the dam would be
2247 construction of a trail originating in Little Avalon Park, the small day use area off of
2248 County Road 384 due south of the USACE project office, then following the path of an
2249 abandoned railroad until it crosses the East Fork of the Trinity River a short distance
2250 north of Highway 78. The abandoned railroad bridge crossing of the East Fork would
2251 require major repair to make it safe for pedestrian traffic. From the abandoned railroad
2252 bridge the trail could follow one of several optional routes in an easterly direction until it
2253 reaches the east end of Lavon Dam where it could connect to other trails that may or
2254 may not be located on USACE land. This route is also identified in the CCRTMP as a
2255 major spine corridor. Pursuing this option will almost certainly require multiple
2256 partners/sponsors.
2257

2258 In addition to the hike/bike trail, public and agency comment during preparation
2259 of this Plan, recommended a kayak/canoe launching location in the area below Lavon
2260 Dam. Having a convenient launching facility at this location would facilitate creation of a
2261 paddle trail on the East Fork of the Trinity River leading from Lavon Dam to the upper
2262 end of Lake Ray Hubbard only a few mile downstream from Lavon Dam. USACE
2263 supports this recommendation and is prepared to work with interested partners to create
2264 this kayak/canoe access point.
2265

2266 Regardless of any authorized public recreational use of lands that are classified
2267 as Project Operations, these uses are subservient to the operation and maintenance
2268 requirements of Lavon Dam, spillway and associated lands and infrastructure.



2269
2270 **Photo 5.1** Lavon Dam Tainter Gates during a Major Release of Stored Floodwater
2271 (USACE photo)

2272 **5.3 HIGH DENSITY RECREATION**

2273 Lands classified for High Density Recreation (HDR) are currently developed for
2274 intensive recreational activities. Lavon Lake has 16 distinct parcels included in this
2275 classification with each area having a unique name. A summary table of these 16 areas
2276 is provided at Table 2.19 in Chapter 2. These areas are generally referred to as “Parks”.
2277 The off-road bicycle trails area that is leased to Collin County is referred to by Collin
2278 County as Sister Grove Park, but under the USACE land classification system this area
2279 is classified as a Low Density Recreation area. Depending on available space, funding,
2280 and public demand, lands classified for HDR may support additional outdoor recreation
2281 development in the future. These areas include access points, day use areas, and
2282 campgrounds. Commercial concession areas such as marinas and comprehensive
2283 resorts also fall into this classification. These areas have been developed to support
2284 concentrated visitation to the extent that an atmosphere of open space compatible with
2285 the natural resources of Lavon Lake is maintained.

2286
2287 Four areas are partially or fully leased to non-federal partners referred to as
2288 grantees; the USACE operates and manages all park areas that are not leased to
2289 others. Each grantee is responsible for the operation and maintenance of their leased
2290 area; USACE does not provide direct maintenance within any of the leased locations,
2291 but may occasionally lend support where appropriate. The USACE reviews requests
2292 and ensures compliance with applicable laws and regulations for proposed activities in
2293 all leased and USACE-operated HDR areas. USACE works with partners to ensure that
2294 recreation areas are managed and operated in accordance with the objectives

2295 prescribed in Chapter 3. A description of each HDR area, including existing and
2296 proposed facilities, is provided below:

2297

2298 5.3.1 Avalon Park

2299 Operated by USACE, Avalon Park encompasses 60 acres and is the largest day
2300 use facility on Lavon Lake. The park currently provides 56 day use sites, a swim beach,
2301 two group pavilions, two restrooms, and a four-lane boat ramp with a courtesy dock.
2302 Use fees for boat launching, day use, and pavilion rentals are collected at the park
2303 entrance station. This day use area is heavily utilized during the summer season, but is
2304 currently closed from October through March each year. Avalon Park is heavily visited
2305 by fishermen, both from shore and by boat. Objectives for this park include extending
2306 the boat ramp, replacement and maintenance of existing roads, expansion of available
2307 parking areas alongside the roads in the picnic area, replacement of existing restrooms,
2308 and providing better access to the swim beach from the east. Additionally, an
2309 automated pay station should be considered for this park and the gate attendant pad
2310 should be covered and converted to a volunteer site. The CCRTMP proposes a
2311 hardened surface trail that would traverse through Avalon Park and East Fork Park.
2312 This trail would connect neighborhoods but would require careful planning to ensure
2313 compatibility with existing park operations.

2314

2315 Little Avalon Park is a small, seven-acre extension of Avalon Park and serves as
2316 a small day use park. The park has 12 picnic sites, a restroom and a small group
2317 pavilion. The area is tightly bounded by a creek and Lavon dam to the north and by a
2318 road to the south, distinctly limiting expansion opportunities, but the eastern end of the
2319 park could be converted to a trailhead to support hiking and biking to the east.
2320 Improvements in the park should focus on development of the trailhead, repair and
2321 maintenance of existing roads, installation of a group fire ring at the pavilion, and repair
2322 or replacement of the existing restroom.

2323

2324 5.3.2 East Fork Park

2325 Operated by USACE & a lessee, East Fork Park encompasses 106 acres and is
2326 a heavily used combination day use and camping park. The campground is split into
2327 three areas – a tent loop, recreation vehicle (RV) equestrian loop, and the primary RV
2328 loop. Twelve primitive tent sites complete the tent loop. The RV equestrian loop
2329 contains 11 equestrian sites with water, electricity, and a small corral at each site. The
2330 equestrian sites are directly linked to the southernmost end of the Trinity Trail which
2331 traverses the western reaches of the lake from East Fork Park to just north of Highland
2332 Park. The primary RV loop currently provides 50 RV campsites with water and
2333 electricity. The park also contains a group pavilion shelter which includes seven
2334 additional RV sites with water and electricity; these sites are rented as part of the
2335 pavilion and cannot be reserved separately. Day use facilities include a playground,
2336 swim beach, 34 picnic sites, and two boat ramps. Use fees for boat launching, day use,
2337 camping, and pavilion rentals are collected at the entrance station. East Fork Harbor
2338 Marina currently leases a portion of East Fork Park and offers approximately 135 boat
2339 slips. Future improvements envisioned for East Fork Park include repair of the retaining
2340 wall, replacement of the sewage system and restrooms, replacement of aging

2341 roadways, replacement of the playground, construction of additional parking for the
2342 playground, and installation of Wi-Fi.

2343

2344 5.3.3 Collin Park

2345 Operated by a lessee, Collin Park encompasses 160 acres and is leased to a
2346 private entity for operation as a commercial concession providing services to the public.
2347 The park serves as a combination day use and camping park and offers two full service
2348 marinas with approximately 700 boat slips. Collin Park provides 56 full service RV
2349 campsites with sewer hookups and five campsites with only water and electricity. Day
2350 use amenities include 13 picnic sites, a playground, two sand volleyball courts, a swim
2351 beach, and two boat ramps. Use fees for boat launching, day use, camping, and
2352 pavilion rentals are collected at the entrance station. Collin Park Marina offers a
2353 concessionaire-operated restaurant, store, gas dock, dry dock, and boat rental facility.
2354 The Trinity Trail crosses through the park, making the park an unofficial trailhead, but
2355 the lack of dedicated facilities for parking equestrian trailers limits use as a trailhead.
2356 The addition of hardened abutments for the boat ramp courtesy docks is proposed to
2357 better protect the ramp during prolonged weather events. Future development within
2358 Collin Park includes removing or replacing the playground equipment, upgrading all
2359 campsites to 50 amp service, repairing or replacing all restrooms, removing or replacing
2360 dilapidated facilities and buildings, and repairing or replacing existing day use facilities
2361 such as barbeque grills, picnic tables and benches, and pavilion roofs.

2362

2363 5.3.4 Brockdale Park

2364 Operated by USACE and lessee, Brockdale Park encompasses 114 acres and
2365 includes a USACE-operated access point with boat ramp and parking lot. The area is
2366 frequented by fishermen and hunters as one of the primary launch points for access to
2367 the northwestern reaches of the lake. Brockdale Park also contains an area leased to
2368 the non-profit Blackland Prairie Raptor Center (BPRC) which is the only raptor
2369 rehabilitation center capable of flight therapy and rehabilitation for raptors in North
2370 Texas. The leased area includes a pavilion, nine picnic sites, restroom and an
2371 amphitheater. The Brockdale Park Equestrian Trailhead is in the western part of the
2372 park which is traversed by the Trinity Trail and includes a large equestrian trailhead with
2373 a restroom, parking area, small group pavilion, and round riding pen. The trailhead is
2374 popular because it is relatively secluded and provides good access north and south on
2375 the trail. Use fees are not collected at this park. The City of Lucas has expressed
2376 interest in leasing a portion of Brockdale Park that includes the boat ramp complex and
2377 additional acreage for covered picnic sites. During the public comment period, the city
2378 stated their intent to support the continued use of the Trinity Trail, the work of the
2379 BPRC, improvement of wildlife habitat, and the current passive use nature of Brockdale
2380 Park. The CCRTMP proposes a soft surface multiuse trail that would traverse through
2381 the park and connect neighborhoods within the City of Lucas to the north and south.
2382 USACE policy is to actively seek leasing partners to pursue initiatives that better serve
2383 the public on USACE lands. Future USACE initiatives for Brockdale Park include
2384 fencing along the project boundary line to provide improved security for the park.

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5.3.5 Highland Park

Operated by USACE, Highland Park encompasses 131 acres and is one of the most popular hunting and fishing access points on Lavon Lake. The park features a restroom, boat ramp, and access to the Trinity Trail. The Highland Park Equestrian Trailhead is a large, fenced gravel lot at the southern end of the park and includes a small group pavilion and a restroom; it is the northernmost trailhead for the Trinity Trail and is very popular with riders. Use fees are not collected at this park. As with Brockdale Park, the City of Lucas has expressed interest in a potential lease of Highland Park. Future improvements needed in the park, whether leased to the City or remaining under direct USACE management, include repairs to roads and parking lot, security lights at the restroom and boat ramp, and repairing or replacing the restroom. Electrical service to the trailhead is needed and would likely be installed by Collin County acting through the Trinity Trails Preservation Association. The CCRTMP proposes a soft surface trail traversing through Highland Park to connect neighborhoods within the City of Lucas.

5.3.6 Bratonia Park

Operated by USACE and lessee, Bratonia Park encompasses 138 acres and is a popular launching point for duck hunters and fishermen using the western arm of Lavon Lake. The park has a boat ramp, parking lot, and two vault toilets. Use fees are not collected at this park. The boat ramp is constructed of concrete to a higher elevation than many other Lavon ramps, making it one of the last to go underwater during high water events. Prior to the pool raise in the 1970's, the park was part of a private hunting and fishing club. The dikes of the club's ponds still remain and are heavily used by waterfowl hunters. The park's southern reaches are leased to the Richardson Radio Control Club and include their remote control airplane landing strip and associated out buildings. The primary visitors to this park are hunters, fishermen, and flyers. Future improvements in the park include repair of park roads and parking areas, and repair or replacement of the existing restrooms.

5.3.7 Clearlake Park

Operated by USACE, Clearlake Park encompasses 88 acres and is a combination day use and camping park on the central peninsula of Lavon Lake. The park features the lake's largest pavilion area, two large boat ramps with courtesy docks, 23 camping sites with 30-amp service and sewer hookups, 18 picnic sites, a fishing pier, and a playground. Use fees for boat launching, day use, camping, and pavilion rentals are collected at the entrance station. The campground and part of the day use facilities close seasonally from 1 October to 31 March each year due to reduced visitation. The fishing pier is popular when the lake elevation is high enough. A small, active, cemetery that pre-dates Federal acquisition is located within the park. USACE intends to allow continued access to the cemetery.

During the master plan process, the land classification of Clearlake Island was changed from High Density Recreation to Low Density Recreation because the island is not developed and the water level at conservation pool does not allow vehicle access. Future plans for the park include moving the pavilion to the northern day use area,

2433 repair or replacement of restrooms in the northern day use area and relocating the
2434 displaced day use sites to an area along the south boat ramp access road and adjoining
2435 parking lots. A second camping loop is proposed near the current pavilion location by
2436 extending the current camping loop to the west of the pavilion area, ensuring that the
2437 park has a minimum of 50 full-service RV sites with 50-amp electrical and sewer
2438 hookups. Further improvements in the park include repair of failing roads, repaving the
2439 boat ramp parking lots, upgrading the wiring to 50-amp service throughout the park,
2440 repairing or replacing the restrooms, and installation of Wi-Fi.

2441

5.3.8 Ticky Creek Park

2442 Operated by USACE, Ticky Creek Park encompasses 38 acres and is a very
2443 busy day use area. The area contains a four-lane boat ramp, courtesy dock, 16 picnic
2444 sites, two restrooms and a large swim beach. Use fees are not charged in this park. The
2445 day use portion of the park is closed from October through May but the boat ramp
2446 remains open and accessible year round. The area is used heavily by families for
2447 swimming, fishing, picnicking, and boating access. The swim beach is not protected
2448 from wave action and southerly winds tend to create large swells at the beach. Future
2449 improvements in the park include construction of a wave break near the swim beach to
2450 mitigate damage to the swim beach and to decrease shoreline erosion within the park
2451 boundaries. Other needed improvements include the addition of hardened abutments
2452 for the boat ramp courtesy dock to increase stability during prolonged high water
2453 events. Plans for this day use area also include repair and replacement of the western
2454 restroom and improvement of the existing roads and parking lots.

2456

5.3.9 Twin Groves Park

2457 Operated by USACE, Twin Groves Park covers 115 acres and is a small access
2458 point for the northeast portions of the lake. The park features two restrooms, a two-lane
2459 boat ramp, and two large parking lots. Use fees are not charged in this park. The boat
2460 ramp is unusable to larger deep draft vessels due to the shallow and flat nature of the
2461 lake bottom. The relative flatness of the Sister Grove Creek floodplain creates
2462 consistent shallows and provides some of the best duck hunting and catfishing areas on
2463 the lake making the park a favorite launch point for sportsmen. Aside from duck hunting
2464 and fishing seasons, this park receives little visitation. Objectives for this area include
2465 repair and upgrade of the road system and repair or replacement of the restrooms as a
2466 single building with separated services. The CCRTMP proposes a hardened surface
2467 trail that would traverse through the park connecting neighborhoods in the vicinity of
2468 Princeton and nearby unincorporated areas.

2470

5.3.10 Caddo Park

2471 Operated by USACE, Caddo Park encompasses 515 acres and was originally
2472 designed as a park with special access features for persons with disabilities. The park
2473 includes three fishing ponds, 13 picnic sites, two restrooms, and a four-lane boat ramp.
2474 Use fees are not charged in this park. The park closes seasonally from 1 October to 31
2475 March. Future improvements for the park include repair and rehabilitation of the
2476 walkway and fishing ponds to current universal accessibility standards, expansion of
2477 wildlife viewing opportunities, replacement and maintenance of the roads, repair or
2478

2479 replacement of the restrooms, connection to City of Farmersville water system, and
2480 connection to the City of Farmersville trail network. USACE policy would support leasing
2481 this park to the City of Farmersville should the City ever express interest in a lease
2482 arrangement.

2483

2484 5.3.11 Elm Creek Park

2485 Operated by USACE, Elm Creek Park encompasses 189 acres and serves as a
2486 small access point. The park contains a small, two-lane boat ramp, adjacent parking lot,
2487 and restroom facilities. Use fees are not charged in this park. The park is a popular
2488 access point for fishing and hunting the northeastern reaches of Lavon Lake. Future
2489 plans for the park include repair and improvement of roads, replacement or repair of the
2490 restroom facilities, planting additional trees and woody shrubs to facilitate transition from
2491 improved park areas to more natural adjacent habitat, and improvement of the boundary
2492 fencing.

2493

2494 5.3.12 Lakeland Park

2495 Operated by USACE, Lakeland Park encompasses 105 acres and serves as a
2496 small, primitive camping park. The park contains 32 campsites, a large group pavilion,
2497 several large parking lots, two restrooms, and a four-lane boat ramp. The boat ramp is
2498 subject to sedimentation and requires routine maintenance. Use fees are charged for
2499 use of the pavilion but are not charged for camping in the park. While traditionally
2500 underutilized compared to the developed campgrounds on the lake, Lakeland Park is
2501 the only free camping on the lake, has a strong following, and is popular with the
2502 surrounding communities of Copeville, Nevada, Josephine, and Farmersville. Future
2503 plans call for converting the northern parking lot to additional primitive camping spaces,
2504 improving the roads, improving the boundary fence, constructing a covered gate
2505 attendant site, repairing or replacing the pavilion roof and pavilion restroom.

2506

2507 5.3.13 Pebble Beach Park

2508 Operated by USACE, Pebble Beach Park encompasses 35 acres and serves as
2509 a large day use park on the eastern shore of the lake. The park contains 21 picnic sites,
2510 a four-lane boat ramp, parking lots, a restroom, and a swim beach. The boat ramp is
2511 subject to sedimentation and requires routine maintenance. Use fees are not charged in
2512 this park. Future plans for the park are to maintain the roads, increase the number of
2513 picnic sites, install a centralized parking lot, and repair or replace the existing restrooms.
2514 Consideration will be given to adding a fishing pier and small restroom near the existing
2515 swim beach

2516

2517 5.3.14 Little Ridge Park

2518 Operated by USACE, Little Ridge Park encompasses 45 acres and is a heavily
2519 used day use park popular with fishermen and families. The park contains 28 picnic
2520 sites, a large four-lane boat ramp, parking lots, and two restrooms. Use fees are not
2521 charged in this park. Proximity to the Garland Power and Light power plant creates
2522 fishing opportunities not available elsewhere on the lake due to the warm water
2523 discharge channel from the power plant. Additionally, a pre-pool-raise boat ramp
2524 becomes accessible during extended low water conditions, making it one of the only

2525 boat launches operable at both low and high water. The day use portion of the park is
2526 well used and is popular with larger groups because the tables are spaced far enough
2527 apart to accommodate multiple families. Future plans for the park include repair or
2528 replacement of the restrooms, maintenance of the existing infrastructure, extension of
2529 the main boat ramp to a lower elevation, installation of a fishing pier on the south side of
2530 the park, and hardened abutments for the boat ramp courtesy dock to prevent wave
2531 damage.

2532

2533 5.3.15 Mallard Park

2534 Operated by USACE, Mallard Park is an 81 acre day use facility on the
2535 southeasternmost arm of the lake. The park features ten picnic sites, a four-lane boat
2536 ramp with a courtesy dock, and a swim beach. Use fees are not charged at this park.
2537 Mallard Park is a popular launch point for fishermen and is especially popular with
2538 families during summer holidays. Mallard's swim beach is the largest designated beach
2539 on the lake. The day use portion of the park is closed seasonally from 1 October to 31
2540 March, but the boat ramp and associated parking remain open for use year round.
2541 Significant improvements are planned for the park including the following:

2542

- 2543 • Increase the number of picnic sites and parking area in the park and expand the
2544 day use area to the southwest and also northeast toward the boat ramp parking
2545 lot
- 2546 • Additional day use sites and increased parking area upslope to the southeast of
2547 the existing park road
- 2548 • Reroute the entry road to prevent a straight line approach to the boat ramp;
- 2549 • Install an automated fee collection station
- 2550 • Replace both restrooms
- 2551 • Repave park roads
- 2552 • Harden abutments of the boat ramp courtesy dock to reduce damage from wave
2553 action.

2554

2555 5.3.16 Lavonia Park

2556 Operated by USACE, Lavonia Park encompasses 126 acres and serves as a
2557 combination day use and camping park. The park has 38 full service RV sites with water
2558 and sewer hookups, five tent sites, two four-lane boat ramps, a playground, an
2559 amphitheater, several parking lots, 4 restrooms, and a camper service building. Use
2560 fees for boat launching, day use, and camping are collected at the entrance station.
2561 Lavonia Park has significant future potential, but will need major renovation to achieve
2562 this potential. Future modifications and renovations include the following:

2563

- 2564 • Convert the existing day use loop to additional RV sites
- 2565 • Construct a dedicated tent camping loop between A loop and the boat ramp road
- 2566 • Add a third leg of RV sites in the large field between the upper and lower A loop
2567 legs
- 2568 • Move the existing day use sites to the south boat ramp and include a group
2569 pavilion

- 2570 • Convert B loop from RV camping to a dedicated volunteer village complete with
- 2571 wash facilities, a camper service building, storage area/building, and a small
- 2572 group pavilion. Similar facilities at other lakes have proven invaluable in attracting
- 2573 and retaining talented volunteers
- 2574 • Modify the park entrance so access to the south boat ramp is inside the park and
- 2575 behind the gatehouse
- 2576 • Additional improvements should focus on leveling the RV sites and building
- 2577 necessary retaining walls, installing hardened impact pads, remove
- 2578 amphitheater, repair and replacement of existing roads, upgrading the electrical
- 2579 system to 50-amp service, repair or replacement of the bathrooms, and
- 2580 installation of Wi-Fi
- 2581

2582 **5.4 ENVIRONMENTALLY SENSITIVE AREAS**

2583 Eleven distinct parcels totaling 4,319 acres are designated as Environmentally
 2584 Sensitive Areas (ESA). Each of these areas was designated taking into consideration
 2585 habitat values listed in the 2010 habitat evaluation report (see Appendix D), institutional
 2586 knowledge of project lands, and expressed public interest. The rationale for these ESA
 2587 designations is based primarily on high wildlife habitat value and the need to protect
 2588 these and similar areas as described in planning documents published by TPWD,
 2589 NCTCOG and Collin County Parks and Open Space Program. The habitat evaluation
 2590 report in Appendix D shows that habitat values of the riparian woodland and bottomland
 2591 hardwood ESAs range from poor for wood ducks to excellent for the Carolina
 2592 chickadee. In general, the primary factors that prevent the forested ESAs from
 2593 achieving an overall average score of excellence include:

- 2594
- 2595 • The dominant overstory trees are too young and/or small to meet the needs of
- 2596 cavity nesting species such as the barred owl, wood ducks, and downy
- 2597 woodpecker
- 2598 • The absence or scarcity of hard mast producing trees such as oaks and pecans
- 2599 that serve as a winter food source for numerous species
- 2600

2601 These limiting factors will be overcome as the woodlands age and supplemental
 2602 plantings are completed. Each of the ESAs is described in the following paragraphs.

- 2603
- 2604 • ESA 1 – East Fork Park Vertisol Blackland Prairie. This 55-acre blackland prairie
- 2605 site has a good mix of native grasses including Indiangrass, little bluestem, and
- 2606 the official state grass of Texas, sideoats grama. There has been no significant
- 2607 disturbance to the site since USACE acquired the land in the early 1950’s. Prior
- 2608 to that, the area was likely used for livestock grazing but appears to have been
- 2609 spared the plow. Future management of this area will focus on improving the
- 2610 existing native grass and forb mix through the use of prescription burning,
- 2611 supplemental seeding, and control of aggressive competition from species such
- 2612 as eastern redcedar, and Johnsongrass. Public use of the area is currently
- 2613 limited to equestrian and hiking activity on the Trinity Trail and bank fishing
- 2614 throughout the area. A day use trailhead to the Trinity Trail is located within this

2615 area with parking and restroom facilities. Future use of this area includes
2616 continued operation of the Trinity Trail and trailhead and pedestrian access for
2617 bank fishing and nature study. Natural surface interpretive trails would be
2618 appropriate within the area as a compliment to East Fork Park. As an ESA, future
2619 use of this area for high density recreation uses, such as expansion of the
2620 camping or picnicking facilities in East Fork Park, or utility line outgrants will not
2621 be permitted.
2622

2623 • ESA 2 – West Shore Blackland Prairie. This 308-acre ESA encompasses all
2624 USACE land lying between Collin Park and Brockdale Park. This area is a
2625 blackland prairie site with interspersed gallery woodlands following intermittent
2626 streams. The Trinity Trail traverses this entire area with the higher elevations
2627 along the trail offering excellent panoramic vistas of Lavon Lake. Future public
2628 use includes the Trinity Trail as well as a proposed soft surface trail described in
2629 the CCRTMP. Management of this area includes prairie management techniques
2630 to include prescription burning, supplemental seeding, removal of encroaching
2631 eastern redcedar, and maintenance of the property boundary line.
2632

2633

2634 • ESA 3 – Brockdale Park Riparian Area. This riparian area of approximately 129
2635 acres has a common boundary with the west boundary line of Brockdale Park but
2636 no part of this ESA is located within Brockdale Park. At lower elevations, this
2637 area supports impressive stands of mature cedar elm, hackberry and pecan.
2638 Higher elevations are prairie sites that are negatively affected by dense stands of
2639 eastern redcedar. Future management of this area calls for improvement of the
2640 riparian woodlands by thinning some of the thick early successional stands of
2641 hackberry and cedar elm, supplemental plantings of Shumard oak, bur oak, black
2642 walnut and pecan, and improvement of upland prairie sites by removal of some
2643 but not all redcedar, prescription burning, and supplemental planting of native
2644 grasses and forbs. Maintaining a boundary fence is a high priority to prevent
2645 unauthorized vehicular access and acts of trespass. Public use of this area
2646 currently includes an approximate two-mile segment of the Trinity Trail. The area
2647 is bordered by approximately 12-15 residential properties and is likely used by
2648 these neighbors for hiking and pedestrian access to the lake. Future public use
2649 includes continuation of existing uses and possible addition of interpretive trails
2650 that may originate in Brockdale Park, portions of which are currently managed
2651 through a lease arrangement between USACE and the non-profit Blackland
2652 Prairie Raptor Center.
2653

2654 • ESA 4 – White Rock Creek Riparian Hardwoods. This riparian area of
2655 approximately 224 acres supports excellent mature stands of Shumard oak, bur
2656 oak, black walnut, and sycamore along the banks of White Rock Creek and
2657 several minor tributaries. Going upslope from the creek, the flood plain supports
2658 thickets of cedar elm, eastern redcedar, honey locust and hackberry. Moving
2659 upslope out of the floodplain and along the USACE boundary are prairie grasses
2660 that are heavily impacted by aggressive eastern redcedar. Management of the

2661 area calls for improving the riparian woodlands by thinning early successional
2662 stands of cedar elm and hackberry, removal of some but not all honey locust and
2663 eastern redcedar, and supplemental plantings of beneficial mast producing
2664 hardwoods. The upland prairie along the boundary provides an excellent buffer
2665 between adjacent private lands and the riparian zone. The prairie will be
2666 improved by prescription burning, removal of aggressive eastern redcedar and
2667 supplemental seeding of grasses and forbs. Current public use of this area
2668 includes an approximate 2 mile segment of the Trinity Trail and bank fishing. The
2669 area is bordered by numerous residential properties on private land. Future
2670 public use of the area includes continued use of the Trinity Trail and bank fishing.
2671 No other uses are anticipated.
2672

2673 • ESA 5 – Wilson Creek Riparian Area. This 236 acre area takes in the highest
2674 quality riparian hardwoods along Wilson Creek as well as the majority of USACE
2675 land lying west of a major utility line easement granted to the North Texas
2676 Municipal Water District (NTMWD) that runs in a northeast-southwest direction.
2677 The area is bordered on the north and south by the USACE boundary line and on
2678 the west by another utility line easement granted to the NTMWD. This beautiful
2679 area includes groves of mature Shumard oak, bur oak, pecan and sycamore.
2680 One exceptional grove includes a Texas state champion sycamore tree. Future
2681 management includes improvement of the riparian woodlands through selective
2682 thinning and supplemental tree and shrub plantings. Most of the USACE land
2683 lying south of the main channel of Wilson Creek is within the floodplain of Wilson
2684 Creek and appears to have been used for row crop agriculture prior to federal
2685 ownership and is dominated by early successional riparian hardwoods including
2686 cedar elm, hackberry and honey locust. This area will be improved through
2687 selective thinning and supplemental plantings of desirable trees and shrubs. The
2688 large regional wastewater treatment plant operated by NTMWD is located on
2689 private land a short distance south of the ESA. The effluent discharge point for
2690 this plant is on Wilson Creek located on USACE land downstream from the ESA.
2691 Current public use of the ESA and adjoining USACE land includes a loop
2692 segment of the Trinity Trail, bank fishing and hunting. Hunting is managed
2693 through a USACE permit system. These uses are compatible with the ESA
2694 designation and will continue in the future.
2695

2696 • ESA 6 – East Fork of the Trinity River Bottomland Hardwoods. This 568 acre
2697 area encompasses all USACE land lying north of FM 546. The area has excellent
2698 bottomland hardwoods in close proximity to the river channel but much of the
2699 area was farmed prior to federal ownership and is in an early successional state
2700 with thick stands of young cedar elm, hackberry, and honeylocust covering large
2701 areas. Future management efforts will be directed at restoring bottomland
2702 hardwoods throughout the area. In select areas with appropriate topography and
2703 hydrology, construction and/or restoration of wetlands will be considered. Public
2704 use of this area currently includes hunting and fishing in the river channel.
2705 Canoeing and kayaking in the river channel also takes place. Future recreation

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use includes all current uses and the potential establishment of natural surface, multiuse hike/bike/equestrian trails.



Photo 5.1 Mature Bur Oak - Shumard Oak Forest, East Fork of Trinity River (USACE)

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- ESA 7 – County Road 437 Riparian Area. This comparatively small area of 47 acres supports mature pecans and oaks along the banks of an unnamed tributary. The higher elevations of this area support prairie grasses that are negatively affected by encroaching eastern redcedar. Future management of the area includes improvement of the riparian hardwoods through thinning and supplemental planting. The prairie grasses will be improved by removing some, but not all encroaching eastern redcedar and other species such as mesquite and honey locust. Recreation use currently includes hiking and nature study by adjacent landowners. Future recreation use includes all current uses and could also include establishment of a natural surface, multiuse trail that could connect to USACE land to the south of this area.
- ESA 8 – Sister Grove Creek Riparian Area. This area of approximately 226 acres supports excellent bottomland hardwoods in close proximity to the main creek channel. The boundaries of this area are indefinite but include all mature bottomland hardwoods on both sides of the main channel of Sister Grove Creek. Adjacent USACE lands were farmed extensively prior to federal ownership and

2733 exhibit characteristics of early successional bottomland hardwoods such as thick
2734 stands of honey locust, cedar elm and hackberry. Future management of this
2735 area includes expansion of the area on both sides of the creek channel by
2736 thinning and supplemental tree planting. Current recreational use of the area
2737 includes hunting and bank fishing. Future recreational use includes all existing
2738 uses as well as possible establishment of natural surface multiuse
2739 hike/bike/equestrian trails. The Collin County Regional Trails Master Plan
2740 identifies Sister Grove Creek as a possible location for a 26-mile paddle trail
2741 originating in Twin Groves Park and traversing north through open water of the
2742 lake and into the stream channel of Sister Grove Creek. The paddle trail would
2743 continue up Sister Grove Creek through USACE land and extending up the creek
2744 to FM 2862 just east of the city of Anna. This paddle trail would be appropriate
2745 within the ESA.
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- 2747 • ESA 9 – Pilot Grove Creek Bottomland Hardwoods. This comparatively large
2748 area of 1,829 acres encompasses several large stands of high quality bottomland
2749 hardwoods along Pilot Grove and Indian Creeks. Some stands have a
2750 Chinquapin Oak – Slippery Elm component that is listed by TPWD as a rare
2751 vegetative community. Future management of this area includes improvement of
2752 the bottomland hardwood forest through thinning and supplemental tree and
2753 shrub plantings. The bottomland hardwood forest will be expanded into nearby
2754 areas that were extensively farmed prior to federal ownership. Depending on
2755 topography and hydrology, some of the nearby USACE lands may present
2756 opportunities for wetland development or restoration. All agricultural leasing for
2757 grazing or hay production will cease. Current recreational use includes primarily
2758 hunting and bank fishing. Future recreational use includes existing uses as well
2759 as the potential addition of natural surface hike/bike/equestrian trails. Having
2760 relatively good public road access at several locations, portions of this ESA have
2761 potential for use as a regional nature center that could be used by schools and
2762 other organizations for environmental education and enjoyment.
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Photo 5.2 Slippery Elm – Chinquapin Oak Forest, Pilot Grove Creek (USACE)

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Photo 5.3 American Elderberry shrub in ESA 8 – Pilot Grove Creek Bottomlands (USACE)

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- ESA 10 – Price and George Creeks Riparian Area. This area of approximately 247 acres supports high quality riparian woodlands along the main channels of Price and George Creeks as well as prairie grasses in upland areas along the USACE boundary line. Future management of this area includes improvement of the riparian hardwoods through selective thinning and supplemental planting. Prairie areas should be improved through prescription burning and removal of some, but not all, eastern redcedar and other aggressive woody species. Current recreational use includes primarily hunting. Future recreational use includes existing uses and may include natural surface, multiuse hike/bike/equestrian trails.
- ESA 11 – Bottomland Hardwood Forest Below Dam. This area of approximately 450 acres encompasses high quality bottomland hardwood forest. Although the hydrology of the area has been altered by the presence of Lavon Dam, the release of flood waters from the lake will occasionally flood portions of the area thus mimicking historic, pre-dam, flooding to a limited extent. Future management of this area includes improvement of the bottomland hardwoods through thinning and supplemental tree and shrub planting. Current recreational use is primarily bank fishing along the discharge channel and the original channel of the East Fork of the Trinity River. Future recreational use includes existing use, and may include a natural surface, multiuse hike/bike/equestrian trail as described in Section 5.2 of this Plan. Interpretive nature trails would also be compatible within this area.



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Photo 5.4 Mature Shumard Oaks in ESA 8 – Pilot Grove Creek (USACE)

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5.5 MULTIPLE RESOURCE MANAGEMENT LANDS

Multiple Resource Management Lands (MRML) are, as the name implies, lands that serve multiple purposes, but that are sub-classified and manage for a predominant use. The following paragraphs describe the various sub-classifications of MRML at Lavon Lake, the number of acres in each sub-classification, and the management plan for these lands.

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5.5.1 MRML - Low Density Recreation

There are 2,468 acres of MRML – Low Density Recreation at Lavon Lake. These lands are generally narrow parcels of land that are adjacent to private residential developments. Ecologically, most of these lands are blackland prairie sites ranging in value from poor to excellent. Many of the areas have been negatively affected by Johnsongrass, eastern redcedar and other aggressive woody species. Small riparian corridors on some areas support good quality riparian hardwood trees and shrubs. Future management of these lands calls for maintaining a healthy, ecologically adapted vegetative cover to reduce erosion and improve aesthetics. Prevention of unauthorized use such as trespass or encroachments is an important management objective for all USACE lands, but is especially important for those lands in close proximity to private development. Management objectives call for restoration of native prairie conditions where practical. These lands are typically open to the public, including adjacent landowners, for pedestrian traffic and are frequently used by adjacent landowners for access to the shoreline near their homes.

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Currently, portions of these Low Density Recreation areas are leased to Collin County for the Trinity Trail and Sister Grove Park, an area where trails are maintained for hiking and off-road bicycling. Both areas are currently maintained by volunteers. The general public may use these lands for bank fishing, hiking, and for access to the shoreline. Hunting may be allowed in designated hunting areas. Future recreational uses include existing uses and may include additional designated natural surface hike/bike/equestrian trails. The CCRTMP describes several trails and trail corridors that would affect MRML – Low Density Recreation. The placement of public trails in areas near residential properties will require public involvement prior to trail design.

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5.5.2 MRML - Wildlife Management

There are 6,476 acres of MRML – Wildlife Management at Lavon Lake. These lands are generally medium to large parcels that are located in the upper reaches of the major tributaries to Lavon Lake as well as a few other smaller parcels. Typically, these areas are adjacent to, or completely surround, one of the ten designated Environmentally Sensitive Areas. Future management of these lands calls for managing the habitat to support native, ecologically adapted vegetation which in turn supports native wildlife species. Specific management techniques including, but not limited to placement of nesting structures, construction of water features or brush piles, fencing, and planting of specific food producing plants may be necessary to support the needs of

2844 wildlife Species of Greatest Conservation Need (see Appendix F for a listing of Species
2845 of Greatest Conservation Need). Migratory species, both game and non-game, will
2846 generally be given priority over non-migratory species when implementing wildlife
2847 management measures. Priority will also be given to the improvement or restoration of
2848 existing wetlands, or where topography, soil type, and hydrology are appropriate, the
2849 construction of wetlands. Where beneficial to long term ecological management goals,
2850 agricultural leases for grazing or hay production may be employed. In general, any
2851 grazing lease would be limited to stocker calf operations and short rotation grazing with
2852 lease periods of three to five years.

2853
2854 Current public use of these lands includes hiking and horseback riding on
2855 existing trails, bank fishing, canoeing and kayaking, and hunting. Future public use
2856 includes all existing uses and may include development of nature/wildlife viewing
2857 opportunities and expansion of trail opportunities where feasible. The CCRTMP
2858 describes several trails and trail corridors that would affect several areas classified as
2859 MRML – Wildlife Management. Some MRML – Wildlife Management may support the
2860 establishment of nature centers or environmental learning areas.

2861 5.5.3 MRML - Vegetative Management

2862 There are 824 acres of MRML – Vegetation Management at Lavon Lake.
2863 These lands include two parcels on the east side of the lake that are large enough to
2864 support intensive prairie restoration efforts. These lands are generally on upland sites
2865 with blackland soil types that will, with proper management, support native prairie.
2866 Future management calls for prescription burning, fencing, removal of female eastern
2867 redcedar and some but not all male eastern redcedar as well as other aggressive
2868 woody species such as mesquite and honey locust, and supplemental seeding of
2869 desirable native grasses and forbs. In some locations, eradication of invasive
2870 Johnsongrass, Bermudagrass and King Ranch bluestem may require the use of
2871 herbicides. Short rotation grazing leases or hay production leases may be employed
2872 where deemed beneficial to the establishment of healthy native prairie.

2873
2874 Current recreational use of these lands includes bank fishing and pedestrian
2875 access by adjoining landowners. Hunting is currently allowed on the northern parcel that
2876 is located adjacent to and south of Highway 380. Future uses include all existing uses
2877 with the possibility of creating multiuse trail opportunities.

2878
2879



2880
2881 **Photo 5.5** Prescription Burning to Improve Native Prairie Grassland
2882 (USACE photo)
2883

2884 **5.6 WATER SURFACE**

2885 In accordance with national USACE policy set forth in EP 1130-2-550, the water surface
2886 of the lake at the conservation pool elevation may be classified using the following four
2887 classifications:
2888

- 2889 • Restricted
 - 2890 • Designated No-Wake
 - 2891 • Fish and Wildlife Sanctuary
 - 2892 • Open Recreation
- 2893

2894 At the conservation pool elevation of 492' NGVD, Lavon Lake has a water
2895 surface of 21,400 acres. The following water surface classifications are designated at
2896 Lavon Lake.

2897 5.6.1 Restricted

2898 Restricted water surface includes those areas where recreational boating is
2899 prohibited or restricted for project operations, safety and security purposes. The
2900 Restricted water surface at Lavon Lake includes a designated strip of water surface
2901 along the north side of the Tainter Gate structure of Lavon Dam and small restricted
2902 areas near the three NTMWD water intake structures, the RWPS1, and the intake and
2903 discharge channel for the Garland Power Station. Designated swimming beaches are
2904 also classified as Restricted water surface. The total acreage of Restricted water
2905 surface is approximately 63 acres. These areas are normally marked with standard
2906 United States Coast Guard (USCG) regulatory buoys stating that boats are excluded
2907 from the area. In some instances, physical barriers may be in place on the water.

2908 5.6.2 Designated No-Wake

2909 Designated No-Wake areas are intended to protect environmentally sensitive
2910 shorelines and improve visitor safety near key recreational water access areas such as
2911 boat ramps, swim beaches and marinas. Designated No-Wake areas at Lavon Lake
2912 include approximately five acres at the entry point for each of the two existing marinas,
2913 and an area of approximately two acres at each of the 16 public boat ramps on Lavon
2914 Lake. These areas are typically marked with standard USCG regulatory buoys.

2915 5.6.3 Open Recreation

2916 Open Recreation includes all water surface areas available for year round or
2917 seasonal water-based recreational use. With the exception of the Restricted and
2918 Designated No-Wake areas described in the above paragraphs, the remaining water
2919 surface of approximately 21,295 acres of Lavon Lake water surface is designated as
2920 Open Recreation. Large segments of the Open Recreation water surface were not
2921 cleared of standing timber during the construction phase of the project. An approximate
2922 location of the uncleared areas is shown on the land classification maps in Appendix A.
2923 These uncleared areas are not physically marked on the water surface and are a
2924 navigational hazard that requires boaters to be attentive and use caution when boating
2925 in these areas. Signs at boat ramps warn boaters that navigation hazards including, but
2926 not limited to standing dead timber, shallow water, and floating debris may be present at
2927 any time and location and it is incumbent on boat operators to exercise caution.

2928 5.6.4 Fish and Wildlife Sanctuary

2929 This water surface classification applies to areas with annual or seasonal
2930 restrictions to protect fish and wildlife species during periods of migration, resting,
2931 feeding, nesting, and/or spawning. Coordination with TPWD during preparation of the
2932 Master Plan resulted in a determination that no permanent fish and wildlife sanctuary is
2933 needed at Lavon Lake. This determination was based on several factors including the
2934 current “no hunting” restriction that applies to a large portion of the Lavon Lake water
2935 surface, the existence of many privately owned ponds and small lakes throughout the
2936 region surrounding Lavon Lake that provide sanctuary areas for waterfowl and
2937 shorebirds, and the fact that annual waterfowl counts conducted by TPWD for the past
2938 several years have indicated healthy waterfowl populations. Should it become
2939 necessary to designate sanctuary areas in the future, such designation can be
2940 accomplished as needed on an annual basis taking into account habitat conditions,
2941 public use levels, and changing fish & wildlife populations.

2942
2943 Future management of the water surface includes the maintenance of warning,
2944 information, and regulatory buoys as well as routine water safety patrols during peak
2945 use periods. Depending on available funding and appropriate lake conditions, USACE
2946 intends to conduct a water-oriented recreation use study to determine the level and type
2947 of boating traffic occurring on the lake. The outcome of such a study may include
2948 changes in water surface zoning.

2949 5.7.4 Recreational Seaplane Operations

2950 Many USACE-administered reservoirs, including Lavon Lake, have areas where
2951 recreational seaplane operations are allowed. Areas where recreational landings and

2952 takeoffs are prohibited are determined by USACE through a public process separate
2953 from the Master Plan process and the information is furnished to the Federal Aviation
2954 Administration for publication as a Notice to Airmen. Appendix G is a USACE, Fort
2955 Worth District, publication listing District-wide prohibitions and restrictions as well as a
2956 description of areas at each lake where recreational seaplane landings and takeoffs are
2957 prohibited. Once a seaplane has landed it is considered a vessel and may taxi in
2958 locations where boating traffic is allowed.
2959

2960 **5.7 PROJECT EASEMENT LANDS**

2961 Future management of the 849 acres of Flowage Easement Lands at Lavon Lake
2962 includes routine inspection of these areas to ensure that the Government's rights
2963 specified in the easement deeds are protected. In almost all cases, the Government
2964 acquired the right to prevent placement of fill material or habitable structures on the
2965 easement area. Placement of any structure that may interfere with USACE flood risk
2966 management and water conservation missions may also be prohibited.

2967
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DRAFT

CHAPTER 6 – SPECIAL TOPICS

2969
2970

2971 6.1 INTRODUCTION

2972 The purpose of this chapter is to set forth topics of special interest that are
2973 important to the overall future management of Lavon Lake. These topics generally
2974 involve multiple land classifications and resource management objectives. Some of
2975 these topics are the subject of high public and/or stakeholder interest that warrants in-
2976 depth coverage.

2977
2978 According to the U.S. Census Bureau, during the period 2010 – 2014 the
2979 population of Texas grew by 7.2% compared to 3.3% for the entire United States.
2980 During the same period, the population of Collin County grew at a rate of 13.2%, adding
2981 approximately 103,000 new residents in only four years. Collin County is also one of the
2982 wealthiest counties in the U.S. with per capita income approximately 25% above the
2983 national average. Within the zone of influence for this Plan, the adjoining counties of
2984 Denton and Rockwall have population growth rates that are approximately equal to that
2985 of Collin County whereas adjacent Dallas County is slightly below the statewide
2986 average. Counties to the north and east of Lavon Lake include Fannin, Grayson and
2987 Hunt Counties where population growth is well below the statewide average, especially
2988 in Fannin County where population growth was – 0.5% for the four year period.
2989 Because Lavon Lake is located completely within Collin County, the focus of this section
2990 is on the effect of population growth in the immediate area surrounding the lake.

2991
2992 The Collin County government website (<http://collincountytx.gov>) provides many
2993 county statistics including the following summary statements:

- 2994
- 2995 • One of the fastest growing counties in Texas and the U.S.
 - 2996 • The sixth most populace county in Texas
 - 2997 • Among counties with more than a half million people, the highest sustained
2998 growth rate since the 2000 Census, at 73.9%
- 2999

3000 According to the website, 80 people move to Collin County each day. The
3001 county's population stood at 885,000 in mid-2014 and is projected to reach 1.2 million
3002 by 2030. Where and how this growth occurs will have a major effect on the future of
3003 Lavon Lake. In the NCTCOG's 2010 publication, *North Texas 2050*, five regional growth
3004 scenarios are described with both undesirable and desirable outcomes. The five
3005 scenarios included: Business as Usual; Connected Centers; Return on Investment;
3006 Diverse, Distinct Communities; and Green Region. In general, undesirable outcomes
3007 would result from the "Business as Usual" scenario where future development occurs
3008 somewhat randomly with little focus on infill, efficient mobility, maintenance of existing
3009 communities, or protection of natural assets and open space. The remaining four
3010 scenarios each provide desirable outcomes including, but not limited to maximizing
3011 return on investment in existing infrastructure, easy and efficient mobility including light

3012 rail and trail networks, and protection of natural assets and open space. Stakeholder
3013 sessions conducted by NCTCOG indicate strong public support for a preferred future
3014 that was better than “Business as Usual”.

3015
3016 Public and stakeholder input during preparation of this plan echoes input
3017 gathered by NCTCOG for their North Texas 2050 vision document. The majority of
3018 comments from individuals, agencies and municipalities support protection of open
3019 space values and passive use activities. There appears to be a general consensus that
3020 exponential growth will continue near Lavon Lake and protection of the public lands and
3021 resources offered by the lake must be given high priority. Although USACE
3022 management actions at Lavon Lake cannot directly influence regional growth patterns,
3023 future management by USACE can support and augment desirable growth patterns.
3024 Examples include the classification of appropriate USACE lands as ESAs, and
3025 implementation of resource objectives that promote boundary line maintenance and
3026 connection of communities with hike and bike trails (trails are specifically addressed in
3027 paragraph 6.4 of this chapter). Other examples include designation of utility corridors to
3028 allow major, cross country utilities to cross USACE lands where no viable route on non-
3029 USACE land exists. Utility corridors preserve habitat and open space by concentrating
3030 utilities in areas where negative effects are minimized. Utility Corridors are discussed in
3031 section 6.2 of this Plan.

3032
3033 Further supporting protection of natural resources are national USACE policies in
3034 ER and EP 1130-2-550 that provide significant protections against inappropriate use of
3035 USACE lands. Most importantly, Chapter 17 of the above ER sets forth a non-recreation
3036 outgrant policy that places strict limitations on road, utility line, or municipal
3037 infrastructure easements or leases and requires compensatory and non-compensatory
3038 mitigation for negative impacts resulting from easements that cannot be avoided.
3039 Additionally, Chapter 16 of the above ER sets forth a recreation outgrant policy that
3040 restricts recreation development on USACE lands to those activities that are dependent
3041 on a project’s natural resources and typically include water-based activities, overnight
3042 use, and day use such as marinas, campgrounds, picnic areas, trails, swimming
3043 beaches, boat launching ramps and comprehensive resorts. Examples of activities that
3044 are not dependent on a project’s natural resources include, theme parks or ride-type
3045 attractions, sports or concert stadiums, and stand-alone facilities such as restaurants,
3046 bars, motels, hotels, and golf courses.

3047
3048 In summary, rapid population growth is likely to continue in the region and will
3049 bring with it increased demand for recreational access and facilities, as well as pressure
3050 to cross USACE lands with utility and road easements. By following the land
3051 classifications and resource objectives in this plan, complying with national USACE
3052 policy with respect to outgrants, and maintaining constant communication with the
3053 public and key stakeholders, USACE is well positioned to ensure that the natural
3054 resources and public outdoor recreation opportunities at Lavon Lake are protected for
3055 present and future generations.

3056

3057 **6.2 UTILITY CORRIDORS**

3058 USACE policy encourages the establishment of designated corridors on project
3059 lands, where feasible, to serve as the preferred location for future outgrants such as
3060 easements for roads or utility lines. After obtaining public input and examining the
3061 location of existing roads and utility lines on project lands, USACE determined that only
3062 utility corridors would be designated at Lavon Lake. Because USACE policy in EP 1130-
3063 2-550, Chapter 17, states that project lands will generally be available only for roads
3064 that are considered regional arteries or freeways, and all current regional and county
3065 mobility plans include no proposals for regional arterials crossing USACE land at Lavon
3066 Lake, there is no need for designation of roadway corridors. Regional and county
3067 mobility plans call for widening of some existing roadways across USACE lands and
3068 these will be addressed on a case-by-case basis.

3069
3070 The following eleven utility corridors have been designated across USACE land
3071 at Lavon Lake with each corridor incorporating and/or running parallel to an existing
3072 easement. Several of the corridors have sub-corridors and each serves to cross a
3073 tributary to Lavon Lake. These corridors are shown on map number LA15MP-OU-01
3074 provided in Appendix A. Future use of these corridors, where the corridor is limited to an
3075 existing easement, would in most cases require prior approval of those entities that
3076 have legal rights to the easement.

- 3077
- 3078 • Corridor 1. This corridor includes the existing right-of-way of an overhead
3079 electrical transmission line plus an additional 50-foot wide strip parallel to the
3080 west boundary of the existing right-of-way. The corridor generally runs from the
3081 southeast boundary line of USACE Tract 4520 to the west boundary line of
3082 USACE Tract 4516.
 - 3083
 - 3084 • Corridors 2a & 2b. This corridor includes the existing right-of-way of East Lucas
3085 Road (FM 3286) where the road crosses the White Rock Creek and the East
3086 Fork of the Trinity River arms of Lavon Lake, plus an additional 50-foot wide
3087 strip of USACE land running parallel to both the north and south right-of-way
3088 boundaries of the road.
 - 3089
 - 3090 • Corridor 3. This corridor includes the existing right-of-way of FM 546 as well as
3091 the existing right-of-way of an overhead electrical transmission line running
3092 parallel to the south side of FM 546. The corridor also includes an additional 25-
3093 foot wide strip of USACE land running parallel with the north right-of-way line of
3094 FM 546.

3095
3096 The segment of this corridor lying north of FM 546 lies within ESA 6 but the 25-
3097 foot wide strip has been previously disturbed and would serve well as a
3098 corridor.

- 3099
- 3100 • Corridor 4. This corridor includes the existing right-of-way for FM 982 where it
3101 crosses Ticky Creek plus an additional 50-foot wide strip of USACE land
3102 adjacent to the south and north right-of-way line of FM 982.

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- Corridor 5. This corridor crosses Sister Grove Creek on both sides of FM 1377 with the downstream side taking in the existing right-of-way for FM 1377 and the existing 50-foot wide easement for an overhead transmission line easement owned and operated by Texas-New Mexico Power Company. The upstream side takes in the existing right-of-way for FM 1377 as well as a second 50-foot wide existing easement for an overhead transmission line operated by Texas-New Mexico Power Company. The full extent of the corridor includes the two existing transmission line easements as well as all land lying between the two overhead transmission line easements. This corridor is located within an ESA but the area included in the corridor has been previously disturbed by construction of FM 1377 and the two transmission lines.

- Corridor 6, 7 & 8. These corridors are clustered near the Highway 380 bridge crossing of Lavon Lake and are described as follows:
 - Corridor 6. Includes the existing right-of-way for Highway 380 where it crosses the Pilot Grove arm of Lavon Lake plus an additional 100 feet-wide strip running parallel with the south right-of-way boundary. On the north side of Highway 380, Corridor 6 includes all land up to the existing fence fronting Twin Groves and Caddo Parks.

 - Corridor 7. Includes the existing right-of-way of County Road 559. Most of this corridor consists of a bridge over open water. Future use of this corridor will be limited to utility lines that could be attached to the bridge and can be placed within the existing right-of-way boundaries.

 - Corridor 8. Includes the existing right-of-way for an above ground electric transmission line that runs from the south boundary line of USACE tract 2816 to the west boundary line of USACE tracts 2827 and 2828. Use of this corridor is limited to the existing transmission line right-of-way plus an additional 50 feet running parallel to both sides of the existing easement.

- Corridor 9. Includes the existing right-of-way for FM 2756 and the existing right-of-way for an overhead transmission line running parallel to the south right-of-way line of FM 2756 to include the narrow strip of USACE land lying between FM 2756 and the overhead transmission line. This corridor passes through ESA 7. Use of the previously disturbed easements will not adversely affect the ESA.

- Corridor 10a & 10b. These are two distinct and separate corridor alignments that cross the Tom Bean Creek arm of Lavon Lake. This corridor includes the following:
 - The existing right-of-way for Highway 78
 - The existing right-of-way for an underground pipeline.

3149
3150 Future use of this corridor is limited to the existing rights-of-way described
3151 above as well as an additional 50 feet running parallel to both sides of each
3152 right-of-way.

- 3153
- 3154 • Corridor 11a & 11b. This corridor includes two distinct strips of USACE land that
3155 cross the George Creek arm of Lavon Lake described as follows:
3156
 - 3157 ○ The existing right-of-way for Highway 78
 - 3158 ○ The existing right-of-way for an electric transmission line.

3159

3160 Future use of this corridor is limited to the existing rights-of-way described
3161 above as well as an additional 50 feet running parallel to both sides of the
3162 Highway 78 and the electrical transmission line.

3163

3164 In summary, the following best management practices shall be applied in the future
3165 use of the eleven corridors, three of which have parts (a) and (b), described above:

- 3166
- 3167 • Use existing easements before using additional space.
 - 3168 • Efficient use of the designated corridor space to allow the maximum number of
3169 utilities possible to occupy the space. Reduced cost is not a reason to occupy
3170 more space. A typical drawing depicting how utility lines can be placed
3171 efficiently within a corridor is provided in Appendix A following the map of
3172 corridor locations.
 - 3173 • In accordance with USACE policy at Chapter 17 of EP 1130-2-550, Non-
3174 Recreation Outgrant Policy, avoid placement of utility lines on USACE land
3175 unless there is no reasonable alternative route.
 - 3176 • Underground utilities shall be installed by boring at all creek crossings, and
3177 where feasible, across the full extent of designated corridors. Bore pits shall be
3178 a minimum of 100 feet from the centerline of creeks and, depending on site
3179 conditions, may need to be placed farther than 100 feet.
 - 3180 • Overhead electric and communication lines must meet minimum sag height
3181 requirements to be specified by USACE.
 - 3182 • Natural resources damaged or destroyed within corridors shall be mitigated per
3183 USACE requirements.
 - 3184 • Current and future identified cultural resources will be protected.
- 3185

3186 **6.3 PUBLIC HUNTING PROGRAM**

3187 Currently, approximately 16,253 acres of USACE land and water surface at
3188 Lavon Lake is open to public hunting with certain restrictions. Population growth around
3189 the lake, coupled with a general scarcity of public land available for hunting within the
3190 seven county zone of influence, has resulted in significant public interest in hunting
3191 opportunities at Lavon Lake. Other public lands available within the zone of influence
3192 include USACE land and water surface at nearby Lewisville Lake, Ray Roberts Lake
3193 and Lake Texoma (operated by USACE Tulsa District), as well as the Caddo Unit of the

3194 Lyndon B. Johnson National Grasslands managed by the U.S. Forest Service. All of
3195 these areas have a steady following of hunters.
3196

3197 The hunting program at Lavon Lake has evolved over the years to a system that
3198 requires hunters to obtain a no-cost annual permit from USACE. USACE has authority
3199 to charge an administrative fee for issuing permits and may charge a fee in the future.
3200 To obtain a permit, hunters must have a hunter safety certificate from the State of Texas
3201 or another state with equivalent hunter safety education requirements. When permits
3202 are issued, hunters are provided maps and other information showing where hunting is
3203 allowed and describing applicable restrictions. Returning hunters must complete an on-
3204 line hunter survey from the previous year in order to obtain a new permit. The program
3205 is adjusted annually based on wildlife populations, habitat conditions, changes in state
3206 wildlife regulations, and the proximity of new residential development near USACE land.
3207 The number of permits issued in recent years has varied from 1,222 in 2012 to 1,360 in
3208 2014. Based on surveys completed and returned to USACE by hunters, waterfowl
3209 hunting is by far the most popular type of hunting taking place at Lavon Lake.
3210

3211 Topics of high interest for the foreseeable future include the following:
3212

- 3213 • TPWD recently established an open season for whitetail deer in Collin County
3214 with the restriction that only archery equipment, including crossbows, may be
3215 used. There is high interest among Lavon Lake hunters in this topic. Given the
3216 limited land base with suitable deer habitat, population surveys will be needed
3217 prior to allowing deer to be hunted. USACE will cooperate with TPWD to conduct
3218 the necessary population surveys. If a sustainable population is found to exist,
3219 USACE will determine to what extent deer hunting can be allowed. Other USACE
3220 lakes with a limited land base have found it necessary to implement a lottery
3221 system to ensure that deer populations are sustainable and hunters can enjoy a
3222 safe and rewarding hunting experience. Similar measures may be necessary at
3223 Lavon Lake.
- 3224 • Hunting of feral hogs is popular at Lavon Lake and is allowed in certain
3225 management units. Because feral hogs are considered a nuisance invasive
3226 species, this hunting will be encouraged for the foreseeable future.
- 3227 • Currently, equestrian, hiking and off-road biking trails traverse hunting areas in
3228 two locations, one is the Trinity Trail near Wilson Creek and the other is the off-
3229 road bicycle trails in Sister Grove Park. The Trinity Trail and Sister Grove Park
3230 are both outgranted to Collin County. Trails that traverse hunting areas are not
3231 uncommon on public lands. USACE, as well as USFWS, and USFS maintain
3232 such trails. Although USACE has never recorded an incident involving trail users
3233 and hunters, the possibility exists and requires all users to be aware of necessary
3234 safety precautions. When hunters are issued a permit at Lavon Lake, they are
3235 provided written advisory information that hunters are not the only users of
3236 USACE lands. Other users may include agricultural lessees, trail users, bird
3237 watchers and others which requires that hunters exercise caution.
3238

3239 Administration of the hunting program requires a significant investment in labor
3240 and materials in the form of maps, signs, and access gates. Future efforts may include
3241 establishment of designated parking areas on USACE property. As stated in the
3242 resource objectives in this plan, public hunting opportunities will continue to be made
3243 available to the extent that funding and personnel are available, and residential
3244 development along the boundary line will allow. Where feasible, volunteers will be
3245 utilized to reduce costs.
3246

3247 **6.4 TRAILS**

3248 Pedestrian, bicycle, and equestrian trails are popular at Lavon Lake and public
3249 comment during preparation of this Plan supports development of new trails and
3250 expansion of existing trails. Adding to this support are national and regional trends
3251 identified in the 2012 TORP that trail use is one of the fastest, if not the fastest, growing
3252 form of outdoor recreation in the United States. Trails that may affect USACE land are
3253 also described in the 2012 CCRTMP, which was produced through a multi-jurisdictional
3254 planning effort. The goal of the CCRTMP is to provide coordination and connectivity
3255 between cities within the County for future trail development. The CCRTMP addresses,
3256 to some extent, all of the public comments related to trails that were received by
3257 USACE during the preparation of this Plan. While USACE lands are often appropriate
3258 for trail development, even moderate flood events can cause trails to be closed for
3259 weeks until flood waters can be released, the area dries out, and flood debris is
3260 removed from the trails. Major flood events can cause trails to be closed for several
3261 months. In spite of these operational realities, there can be long periods of time when
3262 trails are fully functional and offer very rewarding outdoor recreation opportunities.
3263

3264 Trail development experience at Lavon Lake and other USACE lakes in the
3265 region including Ray Roberts, Lewisville, Grapevine, Benbrook and Joe Pool lakes
3266 indicates that trails fall within two broad categories described as low intensity trails and
3267 high intensity trails. A description of each category, and how each category fits within
3268 the land classifications at Lavon Lake is described in the following paragraphs.

3269 6.4.1 Low Intensity Trails

3270 Low intensity trails are generally defined as soft surface trails and typically have
3271 a natural earth surface with the exception of trail sections that may need reinforcement
3272 such as steep slopes, sensitive soils, or wet locations. Minor use of natural
3273 reinforcement materials such as wood chips, gravel, or crushed granite is acceptable to
3274 control erosion or improve trail safety. Use of geotextiles, boardwalks, or comparable
3275 materials is acceptable at stream crossings or in wetlands. Use of professionally
3276 designed bridges, subject to USACE approval and of an appropriate scale, is
3277 acceptable at stream crossings. With careful planning to protect sensitive resources and
3278 to ensure operational security, low intensity trails are appropriate in all land
3279 classifications. However, trailheads, which normally require a vehicle parking area,
3280 should not be located in ESAs.

3281 6.4.2 High Intensity Trails

3282 High intensity trails are generally defined as trails with a hardened surface such
3283 as concrete, asphalt, soil cement, or extensive use of crushed stone or gravel. These
3284 trails are intended for high traffic locations and are generally appropriate only in areas
3285 classified for High Density Recreation. However, if a community expresses a need for a
3286 high intensity trail to connect to other nearby communities, with careful planning the trail
3287 may be located in areas classified as Multiple Resource Use Lands – Low Density
3288 Recreation.

3289 6.4.3 Existing and Future Trail Placement at Lavon Lake

3290 Existing trails at Lavon Lake include the Trinity Trail, a pedestrian and equestrian
3291 trail operated under an MOU with Collin County and maintained by volunteers, and off-
3292 road bicycle trails in Sister Grove Park, leased to Collin County and maintained by
3293 volunteers. These existing trails are noted in the CCRTMP. Based on public comments
3294 received during preparation of this Plan, and trail concepts described in the CCRTMP,
3295 the following future trail scenarios appear suitable for future consideration.

- 3296
- 3297 • Expansion of the Trinity Trail. This would very likely require a substantial bridge
3298 over Wilson Creek at the current northern terminus of the trail. If Wilson Creek
3299 can be crossed, the trail, as described in the CCRTMP could traverse north along
3300 the west side of the East Fork of the Trinity River until it exits USACE land and
3301 proceeds further north. Currently, no bridge crossing of the East Fork is
3302 proposed.
 - 3303
 - 3304 • High Intensity/Hardened Surfaced Trails. The CCRTMP shows several of these
3305 trails proposed for placement on USACE land. The City of Wylie has proposed a
3306 trail that would traverse along the shoreline in East Fork and Avalon Parks before
3307 turning south and exiting USACE land at SH 78. Another trail would traverse
3308 down both sides of Wilson Creek. The trail on the north side of Wilson Creek
3309 would turn north and traverse up the west side of the East Fork of the Trinity
3310 River before exiting USACE land. A high intensity trail is also proposed in the
3311 Princeton area. This trail originates on USACE land at the intersection of CR 462
3312 and 458 where it traverses south along the USACE boundary line going through
3313 Twin Groves Park, across Highway 380, and continuing south along the
3314 shoreline to the southern tip of the former Cedar Grove Park (now a wildlife
3315 management area). At the Highway 380 crossing, the trail would also turn east
3316 across Lavon Lake, presumably on the Highway 380 bridge if and when the
3317 bridge is widened to 4 lanes. A short segment of high intensity trail is also shown
3318 originating on USACE land where Highway 78 crosses Tom Bean Creek. The
3319 trail then traverses northeast along the USACE boundary until it exits USACE
3320 land. Some of these high intensity trails would traverse through Environmentally
3321 Sensitive Areas where only low intensity trails would be appropriate. In general,
3322 high intensity trails are not appropriate on lands classified for low intensity
3323 recreation. However, USACE will consider trail proposals where the trails are
3324 critical for linking communities.
 - 3325

- 3326 • Low Intensity/Soft Surface Trails. The City of Lucas has proposed two trails, the
3327 first beginning near Osage Lane and traversing north through Brockdale Park to
3328 FM 3286. The second trail begins on the east side of the FM 3286 bridge and
3329 traverses north to the north end of Highland Park. This trail would parallel
3330 portions of the Trinity Trail near Brockdale Park.
3331
- 3332 • An off-road bicycle trail in the southern sector of Lavon Lake. The off-road bicycle
3333 trail in Sister Grove Park is very popular, but some users expressed a desire for
3334 a second trail location further south. A potential location exists within an old
3335 borrow pit located on the downstream side of Lavon Dam. Should a hike-bike trail
3336 be developed within the trail corridor below Lavon Dam (described below under
3337 Trail Corridors and in paragraph 5.2 of this Plan), an off-road bicycle “loop” trail
3338 could be created that would traverse through the old borrow pit area.
3339
- 3340 • Trail Corridors. In addition to the planned or proposed trails described above, the
3341 CCRTMP also describes several “spine” trail corridors that cross USACE lands.
3342 A full description and map of each corridor is provided in the CCRTMP which is
3343 posted on the Collin County website. For convenience, each spine corridor is
3344 briefly described as follows:
3345
 - 3346 ○ A corridor originating in Clear Lake Park and proceeding north along the
3347 shoreline and along Ticky Creek where it exits USACE land and continues
3348 on private land. After crossing Highway 380, the corridor rejoins USACE
3349 land along Sister Grove Creek near FM 1377 and then continues north
3350 along Sister Grove Creek before exiting USACE land.
3351
 - 3352 ○ Two separate corridors that proceed from Princeton and Farmersville and
3353 traverse in a northerly direction on USACE land following Pilot Grove
3354 Creek and Indian Creek until exiting USACE land. These two corridors
3355 connect on USACE land.
3356
 - 3357 ○ A corridor originating near the west end of Lavon Dam and proceeding
3358 east across Lavon Dam then northeast along the shoreline and across the
3359 Highway 78 bridge before exiting USACE land. The corridor then rejoins
3360 USACE land at the Highway 78 bridge where it crosses Elm Creek, then
3361 proceeds northeast along Elm Creek before exiting USACE land. Under
3362 current USACE policy, this corridor cannot be approved as described in
3363 Chapter 5, Paragraph 5.2 of this Plan.
3364
 - 3365 ○ A corridor that originates near the west end of Lavon Dam then proceeds
3366 south and east on USACE land parallel to Highway 78 before exiting
3367 USACE land in the city of Lavon.
3368



Photo 6.1 Trail Riders on the Trinity Trail in the Prairies North of Collin Park

3369
3370
3371

3372 **6.5 BOUNDARY LINE MANAGEMENT**

3373 With more than 155 miles of boundary line and the potential for new residential
3374 areas and expansion of existing residential areas along the boundary line, maintenance
3375 of the boundary line will be given high priority to prevent trespass and to inform the
3376 public of the location of USACE lands. Boundary line management may include
3377 construction of a fence or other vehicle barrier on the boundary, replacing corner
3378 markers, clearing a minimal line of sight between property corners, placement of signs
3379 along the boundary, and routine inspection by USACE park rangers. Adjacent
3380 landowners may apply for written permission to reduce the hazard of wildfire by mowing
3381 and removing underbrush along the boundary fronting their property. Permission for
3382 such mowing is generally granted only if a Zone 1 defensible space, as defined by
3383 national Firewise criteria, cannot be created on the landowner's property. Specific
3384 details regarding shoreline use permits for mowing and underbrushing activities are set
3385 forth in the Shoreline Management Policy Statement for Lavon Lake.
3386

3387 **6.6 BOATING CAPACITY STUDY**

3388 USACE monitors the recreational use of the water surface at all USACE-
3389 operated lakes to ensure safe and enjoyable conditions for lake visitors. To ensure that
3390 boating activity is safe and enjoyable, USACE, Fort Worth District, prepared a Water-
3391 Related Development Policy (WRDP) that, under certain conditions at any given lake,
3392 requires a boating capacity study. The policy sets a target of 22 acres of boatable water

3393 surface per boat on peak use days and assumes, based on findings from a
3394 comprehensive study at Lewisville Lake, that for every ten wet slips in a marina, and for
3395 every parking spot at boat ramps, one boat will be on the water on peak use days.
3396 Lavon Lake currently has approximately 725 wet slips at marinas, 1,335 parking spaces
3397 at boat ramps, and approximately 17,434 boatable acres. Using these numbers, Lavon
3398 Lake has the potential to have approximately 1,437 boats on the water during peak use
3399 periods resulting in one boat for every 12 acres of boatable water surface. This is only a
3400 potential level of use, but because the potential is high, the WRDP would require a
3401 comprehensive boating capacity study before any additional wet slips or boat ramp
3402 parking spaces are authorized over current authorizations. A comprehensive study
3403 would involve on-the-water boat counts on several peak use days, as well as surveys to
3404 determine how boaters, elected officials, law enforcement officials and adjacent
3405 landowners perceive the level of boating traffic.
3406

3407 **6.7 MARINA POTENTIAL ON EAST SIDE OF LAVON LAKE**

3408 The possible future need for a marina on the east side of Lavon Lake did not
3409 surface during public meetings or public comments, but USACE believes that if and
3410 when residential development increases on the east side of the lake there will
3411 eventually be public interest in having a marina on the east side. If a boating capacity
3412 study is conducted before interest in an east side marina occurs, the study should
3413 address the marina topic. If the study concludes that an additional marina is needed,
3414 and would not cause the target capacity to be exceeded, a suitable location would have
3415 to be determined.
3416

3417 **6.8 NEW USACE PROJECT OFFICE AND VISITOR INFORMATION CENTER**

3418 The current project office consists of the original office constructed in the early
3419 1950's with additional space added through the years. The current visitor information
3420 center is small, office space is inadequate, and the only meeting room is not
3421 conveniently located. The current layout of visitor parking is awkward and small. A new
3422 office and visitor information center with adequate office space, meeting facilities, and
3423 visitor parking is needed and will be planned and constructed depending on available
3424 funding.
3425
3426

CHAPTER 7 - PUBLIC AND AGENCY COORDINATION

3427
3428

3429 7.1 PUBLIC AND AGENCY COORDINATION OVERVIEW

3430 USACE policy guidance in ER 1130-2-550, Change 7, January 30, 2013 and EP
3431 1130-2-550, Change 5, January 30, 2013 requires thorough public involvement and
3432 agency coordination throughout the master plan revision process including any
3433 associated environmental assessment process. Public involvement is especially
3434 important at Lavon Lake to ensure that future management actions are both
3435 environmentally sustainable and responsive to public outdoor recreation needs in a
3436 region that is experiencing exceptionally rapid population growth. The following
3437 milestones provide a brief look at the overall process of revising the Lavon Lake Master
3438 Plan.

3439

- 3440 • January 2010 – USACE holds internal meetings to initiate master plan
3441 revision process.
- 3442 • Summer of 2010 – USACE and USFWS conduct wildlife habitat evaluation
3443 field work on all Lavon Lake project lands.
- 3444 • February - March 2011 – USFWS completes habitat evaluation report
3445 (attached as Appendix D) with mapping assistance from USACE
- 3446 • 2011-2013 – Preliminary work continues (team assembled, gather data,
3447 research files). Lake Manager and project staff continue meeting with key
3448 stakeholders to personally inform them of the master plan process.
- 3449 • January - December 2014 – Draft document preparation begins. Public
3450 Involvement plan is drafted
- 3451 • January 2015 – Initial stakeholder and public meetings announced to take
3452 place on February 24, 2015. Meeting was delayed until March 10 due to
3453 winter storm
- 3454 • April - Dec 2015 – Public comment analyzed. Draft master plan prepared
- 3455 • (enter new dates here as public meetings are held to review draft master
3456 plan)

3457

3458 7.2 INITIAL STAKEHOLDER AND PUBLIC MEETINGS

3459 The initial stakeholder and public meetings were held on March 10, 2015, at the
3460 City of Wylie Recreation Center, 300 Country Club Road, Wylie, Texas. The stakeholder
3461 meeting was held at 3:00 pm for the convenience of elected officials, city and county
3462 employees, agency personnel, and lessees operating on USACE land, and was
3463 attended by 30 individuals. The following entities were represented at the stakeholder
3464 meeting:

3465

- 3466 • Cities: Lucas, McKinney, Saint Paul, Wylie
- 3467 • Collin County

- 3468 • Agencies: Texas Parks and Wildlife Department; Texas Department of
3469 Transportation; Texas Historical Commission; North Texas Municipal
3470 Water District; Garland Power & Light
- 3471 • Lessees: East Fork Marina; Blackland Prairie Raptor Center
- 3472 • Volunteers: Trinity Trails Preservation Association; Dallas Off-Road
3473 Bicycle Association
- 3474 • Media: Wylie News

3475
3476 Following the stakeholder meeting, an open public meeting was held at 5:30 pm
3477 and was attended by 93 individuals. At both meetings USACE presented a short slide
3478 presentation explaining the purpose of the Master Plan, the overall process involved in
3479 revising the plan, and how individuals can participate. Following the presentation,
3480 attendees were invited to visit one of three information tables to view maps and ask
3481 questions of USACE personnel. Attendees were provided comment sheets for written
3482 comment and were also invited to visit the USACE website where the slide presentation
3483 and additional comment sheets were posted. A 30-day comment period followed the
3484 public meeting and numerous comments were received. A summary of the comments
3485 received can be found in Appendix H of this plan.

3486
3487 Review of comments received led to additional personal contact with
3488 stakeholders and individuals. USACE planners contacted NCTCOG and Collin County
3489 personnel to discuss their respective mobility and transportation plans affecting Lavon
3490 Lake. USACE personnel also met with TPWD biologists on October 2, 2015, to discuss
3491 the status of waterfowl usage of Lavon Lake as well as the overall status of public
3492 hunting activity. A copy of TPWD's summary of topics discussed at the meeting is
3493 provided in Appendix I.

3494



3495
3496
3497

Photo 7.1 Public meeting held March 10, 2015 to discuss proposed revision of Lavon Lake Master Plan

3498 **Remainder to be completed following Public and Agency review of the draft MP**
3499 **and EA/draft FONSI.**
3500

3501 **7.3 PUBLIC AND AGENCY REVIEW OF DRAFT MP, EA, AND FONSI**

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CHAPTER 8 - SUMMARY OF RECOMMENDATIONS

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8.1 SUMMARY OVERVIEW

3508 The preparation of this Master Plan for Lavon Lake followed the new USACE
3509 master planning guidance in ER 1130-2-550 and EP 1130-2-550, both dated 30
3510 January 2013. Three major requirements set forth in the new guidance include the
3511 preparation of contemporary Resource Objectives, Classification of project lands using
3512 the newly approved classification standards, and the preparation of a Resource Plan
3513 describing in broad terms how the land in each of the land classifications will be
3514 managed into the foreseeable future. Additional important requirements include rigorous
3515 public involvement throughout the process, and consideration of regional recreation and
3516 natural resource management priorities identified by other federal, state, and municipal
3517 authorities. The study team endeavored to follow this guidance to prepare a Master
3518 Plan that will provide for enhanced recreational opportunities for the public, improve
3519 environmental quality, and foster a management philosophy conducive to existing and
3520 projected USACE staffing levels at Lavon Lake. Factors considered in the Plan
3521 development were identified through public involvement and review of statewide
3522 planning documents including TPWD's 2012 TORP (synonymous with SCORP) and the
3523 TCAP – Texas Blackland Prairies Ecoregion. Other important reference documents
3524 included the NCTCOG's Vision 2050 and Mobility 2035, Collin County's Parks and
3525 Open Space Strategic Plan and the Collin County Regional Trails Master Plan. This
3526 Master Plan will ensure the long term sustainability of the recreation and environmental
3527 stewardship program associated with Lavon Lake.

3528

8.2 LAND RECLASSIFICATION PROPOSALS

3530 A key component in preparing this Master Plan was examining prior land
3531 classifications and addressing the needed transition to the new land classification
3532 standards. Public comment was solicited to assist in making these land reclassification
3533 decisions. Chapter 7 of this Plan describes the public involvement process and
3534 Appendix H provides a summary of public comments received. After analyzing public
3535 comment, USACE team members reclassified the Federal lands associated with Lavon
3536 Lake as described in Table 8.1.

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3547 **Table 8.1** Change in Land Classifications from Prior Classifications to New Classifications

Prior (1972) Land Classifications		New Land Classifications		Net Difference
	Acres		Acres	
Project Operations	131	Project Operations	508	377
Recreation – Intensive Use	2,971	High Density Recreation	2,011	(960)
Natural Area	527	Environmentally Sensitive Areas	4,319	3,792
Recreation – Low Density Use	6,403	Multiple Resource Management – Low Density Recreation	2,468	(3,935)
Wildlife Management	6,574	Multiple Resource Management – Wildlife Management	6,476	(98)
		Multiple Resource Management – Vegetation Management	824	824

3548 * **Note:** These acreage figures were measured using GIS technology and may vary
 3549 slightly from official land acquisition records.

3550

3551

3552 **Table 8.2** Land Classification Changes and Justifications for New Land Classifications

Land Classification	Description of Changes	Justification
Project Operations	The increase of Project Operations from 131 acres to 508 acres resulted from the following actions: <ul style="list-style-type: none"> • Conversion of former Intensive Use Recreation land near the USACE Office • Conversion of Low Density Use lands near the east end of the dam • Conversion of a narrow strip of Natural Area along the downstream toe of the dam. 	All lands converted to Project Operations have historically been used primarily in support of critical operational requirements related to the primary missions of flood risk management and water conservation. The conversion of 377 acres to Project Operations will have no effect on current or projected public use.
High Density Recreation	Lands under the prior classification of Recreation-Intensive Use were converted to the new and similar classification of High Density Recreation but were reduced from 2,971 acres to 2,011 acres through the following changes:	The four park areas that were converted to another, more appropriate classification had never been developed and are not suitable for future development. The small portions of parks were converted due to loss of acreage to shoreline erosion or, in the case of conversion to ESA, to

Land Classification	Description of Changes	Justification
	<ul style="list-style-type: none"> • Two park areas under the prior Recreation- Intensive Use classification were converted to Multiple Resource Management Lands (MRML) – Low Density Recreation. • Two park areas under the prior Recreation-Intensive Use classification were converted to MRML – Wildlife Management • Small portions of several areas under the prior Recreation-Intensive Use classification were converted to MRML-Low Density Recreation or Wildlife Management, or ESA. 	<p>recognize significant ecological value. The conversion of these lands will have no effect on current or projected public use.</p>
<p>Environmentally Sensitive Areas</p>	<p>The classification of 4,319 acres as Environmentally Sensitive Areas resulted from the following land classification changes:</p> <ul style="list-style-type: none"> • All lands under the prior classification of Natural Area were converted to ESA with the exception of a small portion converted to Project Operations and a small portion converted MRML – Wildlife Management. • Several parcels under the prior classification of Low Density Use were converted to ESA. These areas included lands along Wilson Creek, White Rock Creek, George Creek, and the rolling prairies between Collin Park and Brockdale Park • Large parcels of land under the prior classification of Operations – Wildlife were converted to ESA. 	<p>These classification changes were necessary for two reasons:</p> <ul style="list-style-type: none"> • The simple change in nomenclature from Natural Area to ESA. • The need to recognize those areas having the highest ecological value. Included were areas of high value bottomland hardwood and riparian forest, and areas supporting high value native prairie. These conversions were supported by public comment and recommendations from the USFWS and TPWD. The conversion of these lands will have no effect on current or projected public use. Lands classified as ESA are given the highest order of protection among possible land classifications

Land Classification	Description of Changes	Justification
MRML – Low Density Recreation	<p>The definition of the prior classification of Low Density Use is very comparable to the definition of the current classification of MRML – Low Density Recreation. Land classification changes resulted in a net reduction of these acres from 6,403 acres to the current 2,468 acres. This reduction resulted from the following changes:</p> <ul style="list-style-type: none"> • Several parcels of land under the prior classification of Low Density Use were converted to ESA as describe under the ESA discussion in this table. • Several parcels were converted to MRML – Wildlife Management or Vegetation Management. • Several small portions of parks under the prior classification of Recreation – Intensive Use were converted to MRML – Low Density Recreation 	<p>The change from Low Density Use to ESA was necessary to recognize the high ecological and scenic values of the land in question and was supported by public comment and recommendations from USFWS and TPWD. The change to MRML – Wildlife or Vegetation Management was needed to better reflect historic management and how these lands will be managed in the future.</p> <p>The small portion of park areas converted to MRML – Low Density Recreation was necessary because these small parcels were never developed and are not suitable for future development due to limited size, exposure to shoreline erosion or low elevation resulting in frequent inundation. The conversion of these lands will have no effect on current or projected public use.</p>
MRML – Wildlife or Vegetation Management	<p>The classification of 6,476 acres to MRML – Wildlife Management and 824 acres to MRML – Vegetation Management resulted from the following changes:</p> <ul style="list-style-type: none"> • Lands under the prior classification of Operations – Wildlife Management were converted to MRML – Wildlife Management or to ESA. • Several parcels of land under the prior classification of Operations – Low Density Use were converted to MRML – Wildlife Management or to MRML – Vegetation. 	<p>The change from the prior Operations – Wildlife Management classification to MRML – Wildlife Management was a simple change to the current nomenclature. The change to ESA was needed to reflect the high ecological value of the land in question.</p> <p>The change from the prior classification of Operations – Low Density Use to MRML – Wildlife or Vegetation Management was needed to better reflect historic management patterns and future management. The conversion of these lands will have no effect on current or projected public use.</p>

3553

CHAPTER 9 - REFERENCES

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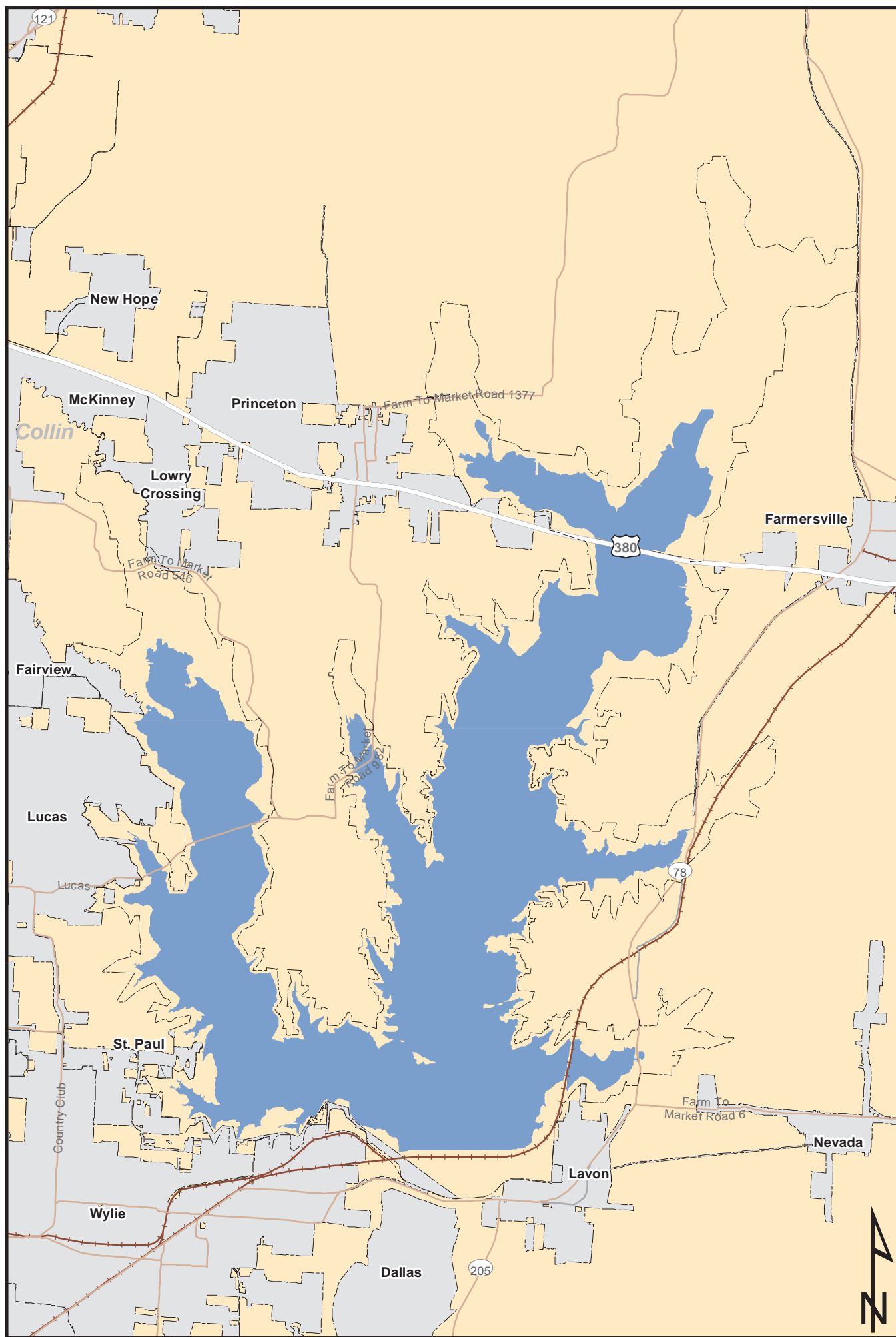
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Appendix A - Maps



INDEX TO MASTER PLAN MAPS

GENERAL

MAP NO.	TITLE
LA15MP-OI-00	PROJECT LOCATION & INDEX TO MAPS
LA15MP-OU-01	UTILITY CORRIDOR MAP

DEPTH CONTOUR

MAP NO.	TITLE
LA15MP-OD-00	DEPTH CONTOUR INDEX (SHEET 00)
LA15MP-OD-01	DEPTH CONTOUR (SHEET 01)
LA15MP-OD-02	DEPTH CONTOUR (SHEET 02)
LA15MP-OD-03	DEPTH CONTOUR (SHEET 03)
LA15MP-OD-04	DEPTH CONTOUR (SHEET 04)
LA15MP-OD-05	DEPTH CONTOUR (SHEET 05)

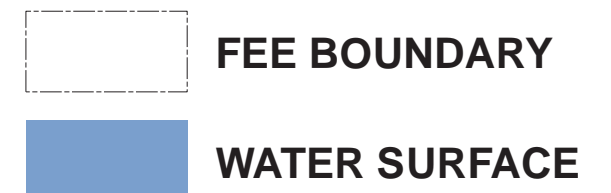
LAND CLASSIFICATION

MAP NO.	TITLE
LA15MP-OC-00	LAND CLASSIFICATION INDEX (SHEET 00)
LA15MP-OC-01	LAND CLASSIFICATION (SHEET 01)
LA15MP-OC-02	LAND CLASSIFICATION (SHEET 02)
LA15MP-OC-03	LAND CLASSIFICATION (SHEET 03)
LA15MP-OC-04	LAND CLASSIFICATION (SHEET 04)
LA15MP-OC-05	LAND CLASSIFICATION (SHEET 05)
LA15MP-OC-06	LAND CLASSIFICATION (SHEET 06)
LA15MP-OC-07	LAND CLASSIFICATION (SHEET 07)
LA15MP-OC-08	LAND CLASSIFICATION (SHEET 08)
LA15MP-OC-09	LAND CLASSIFICATION (SHEET 09)
LA15MP-OC-10	LAND CLASSIFICATION (SHEET 10)
LA15MP-OC-11	LAND CLASSIFICATION (SHEET 11)

RECREATIONAL AREAS

MAP NO.	TITLE
LA15MP-OR-01	AVALON PARK - LITTLE AVALON
LA15MP-OR-02	AVALON PARK
LA15MP-OR-03	EAST FORK PARK
LA15MP-OR-04	COLLIN PARK - SOUTH
LA15MP-OR-05	COLLIN PARK - NORTH
LA15MP-OR-06	BROCKDALE PARK
LA15MP-OR-07	HIGHLAND PARK
LA15MP-OR-08	BRATONIA PARK
LA15MP-OR-09	CLEAR LAKE PARK
LA15MP-OR-10	TICKY CREEK PARK
LA15MP-OR-11	TWIN GROVES PARK
LA15MP-OR-12	CADDO PARK
LA15MP-OR-13	ELM CREEK PARK
LA15MP-OR-14	LAKELAND PARK
LA15MP-OR-15	PEBBLE BEACH PARK
LA15MP-OR-16	LITTLE RIDGE PARK
LA15MP-OR-17	MALLARD PARK
LA15MP-OR-18	LAVONIA PARK

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**U.S. ARMY CORPS
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FORT WORTH DISTRICT

LAVON LAKE
EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

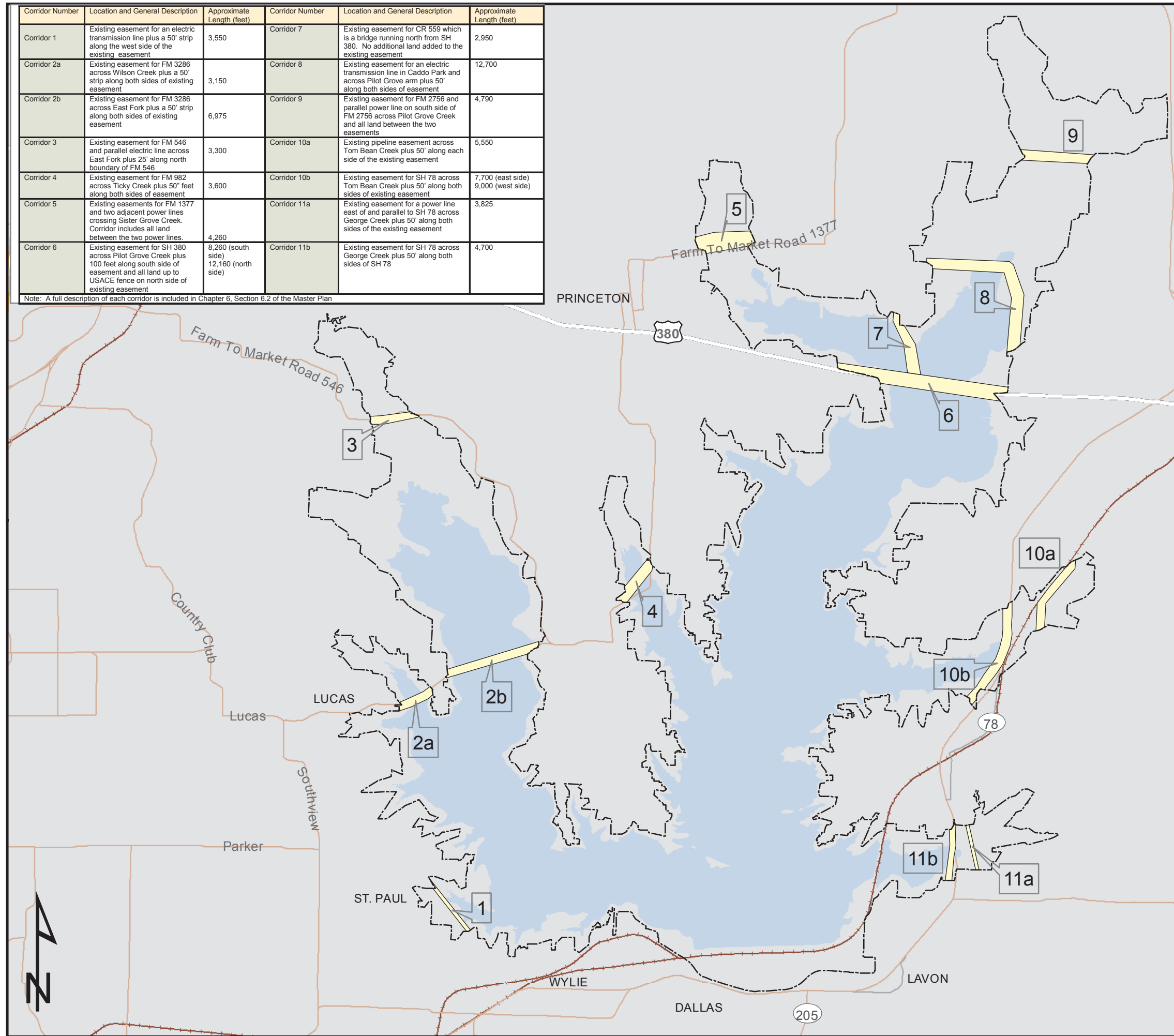
PROJECT LOCATION AND INDEX



1 0.5 0 1 2 3 MILES

DATE: MAY 2016	MAP NO. LA15MP-OI-00
-------------------	-------------------------

Corridor Number	Location and General Description	Approximate Length (feet)	Corridor Number	Location and General Description	Approximate Length (feet)
Corridor 1	Existing easement for an electric transmission line plus a 50' strip along the west side of the existing easement	3,550	Corridor 7	Existing easement for CR 559 which is a bridge running north from SH 380. No additional land added to the existing easement	2,950
Corridor 2a	Existing easement for FM 3286 across Wilson Creek plus a 50' strip along both sides of existing easement	3,150	Corridor 8	Existing easement for an electric transmission line in Caddo Park and across Pilot Grove arm plus 50' along both sides of easement	12,700
Corridor 2b	Existing easement for FM 3286 across East Fork plus a 50' strip along both sides of existing easement	6,975	Corridor 9	Existing easement for FM 2756 and parallel power line on south side of FM 2756 across Pilot Grove Creek and all land between the two easements	4,790
Corridor 3	Existing easement for FM 546 and parallel electric line across East Fork plus 25' along north boundary of FM 546	3,300	Corridor 10a	Existing pipeline easement across Tom Bean Creek plus 50' along each side of the existing easement	5,550
Corridor 4	Existing easement for FM 982 across Ticky Creek plus 50' feet along both sides of easement	3,600	Corridor 10b	Existing easement for SH 78 across Tom Bean Creek plus 50' along both sides of existing easement	7,700 (east side) 9,000 (west side)
Corridor 5	Existing easements for FM 1377 and two adjacent power lines crossing Sister Grove Creek. Corridor includes all land between the two power lines.	4,260	Corridor 11a	Existing easement for a power line east of and parallel to SH 78 across George Creek plus 50' along both sides of the existing easement	3,825
Corridor 6	Existing easement for SH 380 across Pilot Grove Creek plus 100 feet along south side of easement and all land up to USACE fence on north side of existing easement	8,260 (south side) 12,160 (north side)	Corridor 11b	Existing easement for SH 78 across George Creek plus 50' along both sides of SH 78	4,700

Note: A full description of each corridor is included in Chapter 6, Section 6.2 of the Master Plan




-  PROJECT BOUNDARY
-  UTILITY CORRIDOR



U.S. ARMY CORPS OF ENGINEERS

FORT WORTH DISTRICT

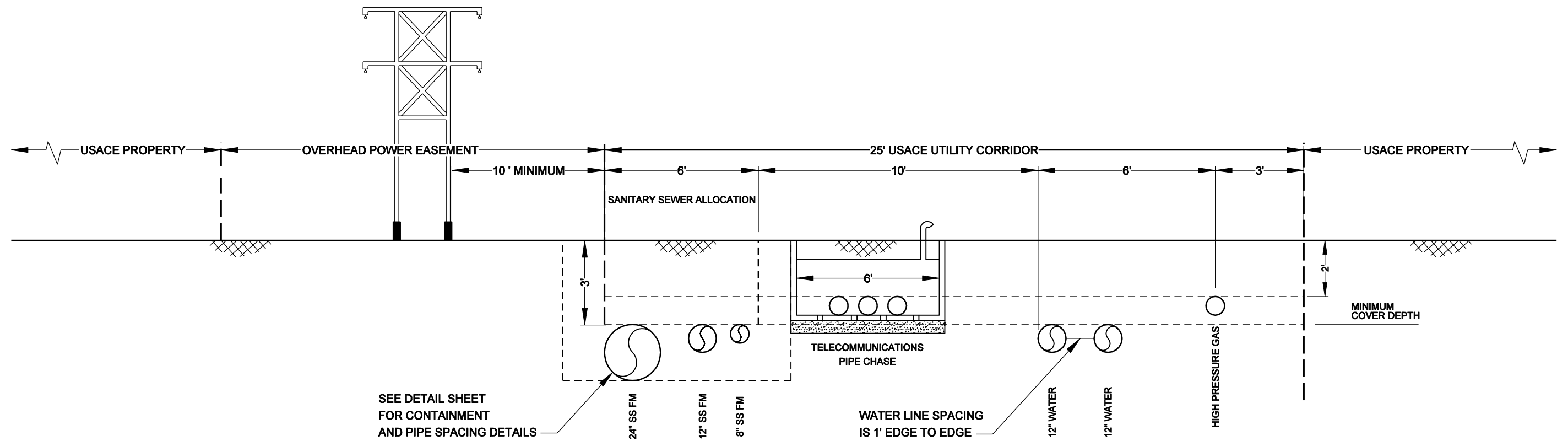
LAVON LAKE
LAVON LAKE MASTER PLAN
UTILITY CORRIDOR MAP



0 1 2 3 MILES

DATE: MAY 2016	MAP NO. LA15MP-OU-01
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NOTES:

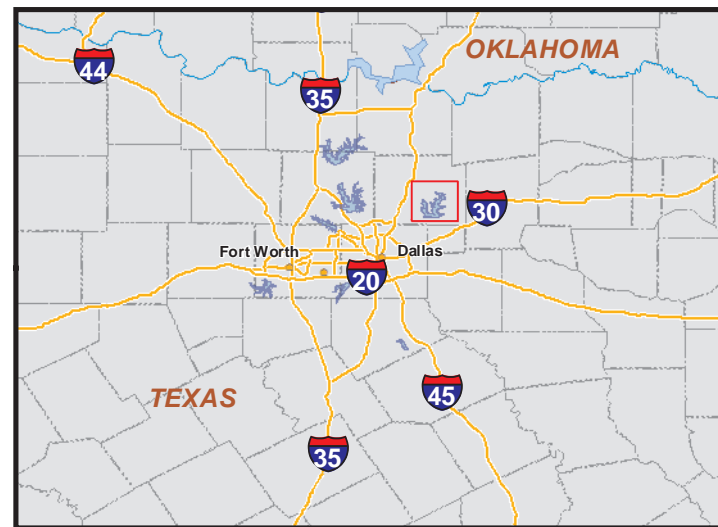
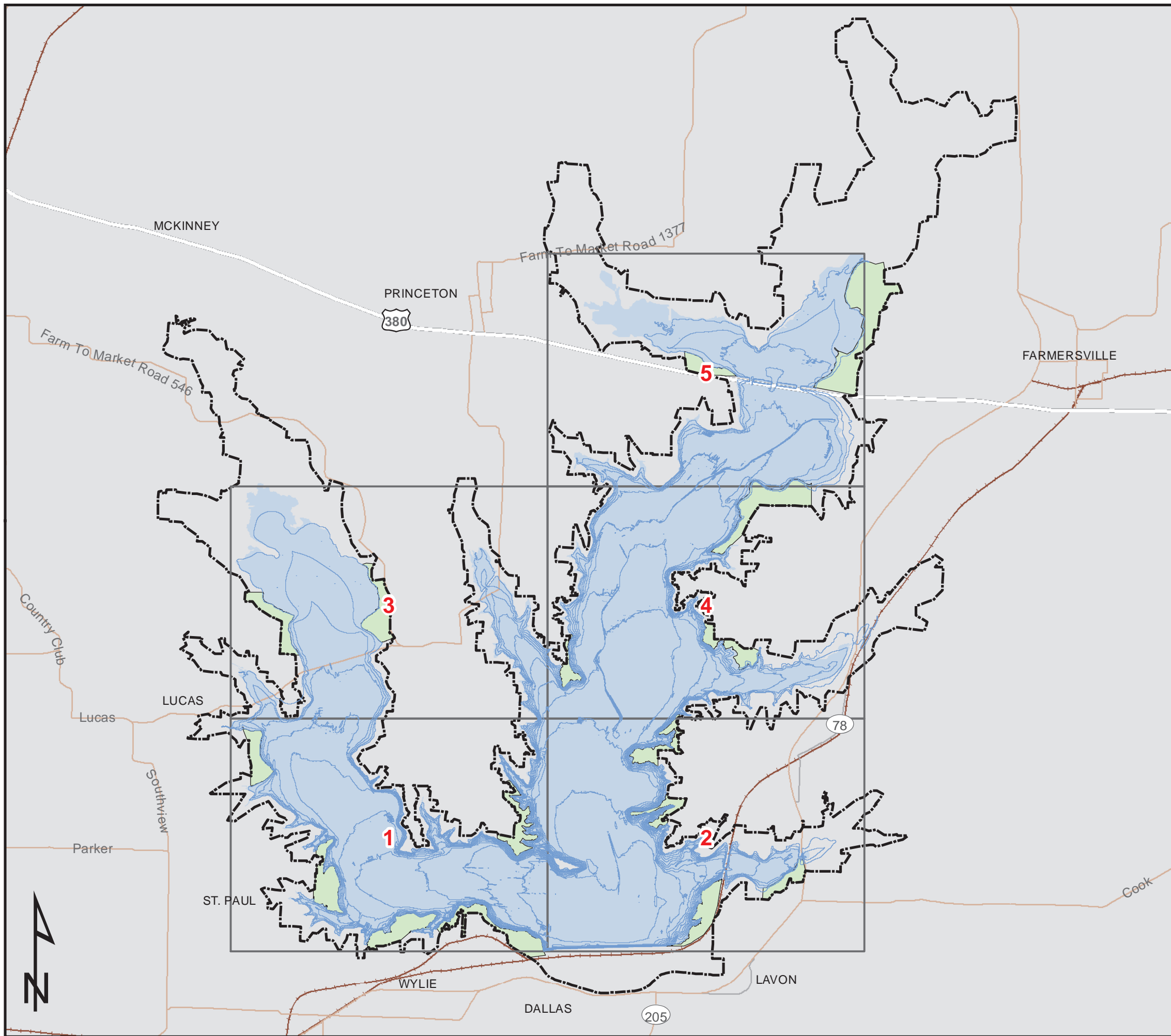
1. CONTAIN ALL WASTE WATER LINES: SEE DETAIL SHEET.
2. USE TRENCH BOXES <20' FROM POWER POLES.
3. SEWERS SHALL BE LOCATED NO CLOSER THAN 10' HORIZONTALLY TO POTABLE WATER LINES.
4. IN AREAS WITH HIGH-VALUE NATURAL RESOURCES AND NATURAL AESTHETICS, INCLUDING ENVIRONMENTALLY SENSITIVE AREAS, WILDLIFE MANAGEMENT AREAS AND RECREATION AREAS, THE USE OF SUBSURFACE BORING MAY BE REQUIRED TO AVOID DAMAGE TO THE RESOURCES.
5. THIS DESIGN OPTION IS FOR ADVISORY PURPOSES ONLY. APPLICANTS SHALL PROVIDE ENGINEERING DRAWINGS.




**OPTION 7: MULTIPLE FORCE MAINS
AND MULTIPLE WATER LINES
CROSS SECTIONAL VIEW**


NOT TO SCALE



U. S. ARMY CORPS OF ENGINEERS FORT WORTH DISTRICT	
<h2 style="margin: 0;">USACE UTILITY CORRIDORS</h2> <p style="margin: 0;">UTILITY EASEMENT INSTALLATION OPTIONS</p>	
JUNE 2003	OPTION 7



-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE
EAST FORK TRINITY RIVER, TEXAS

LAVON LAKE

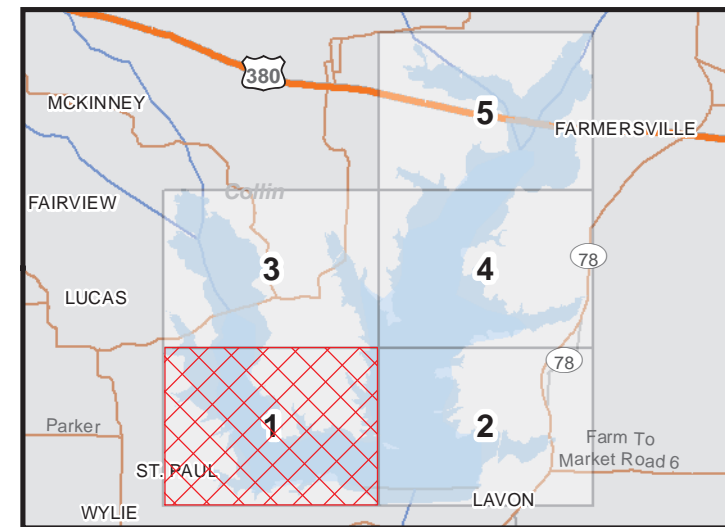
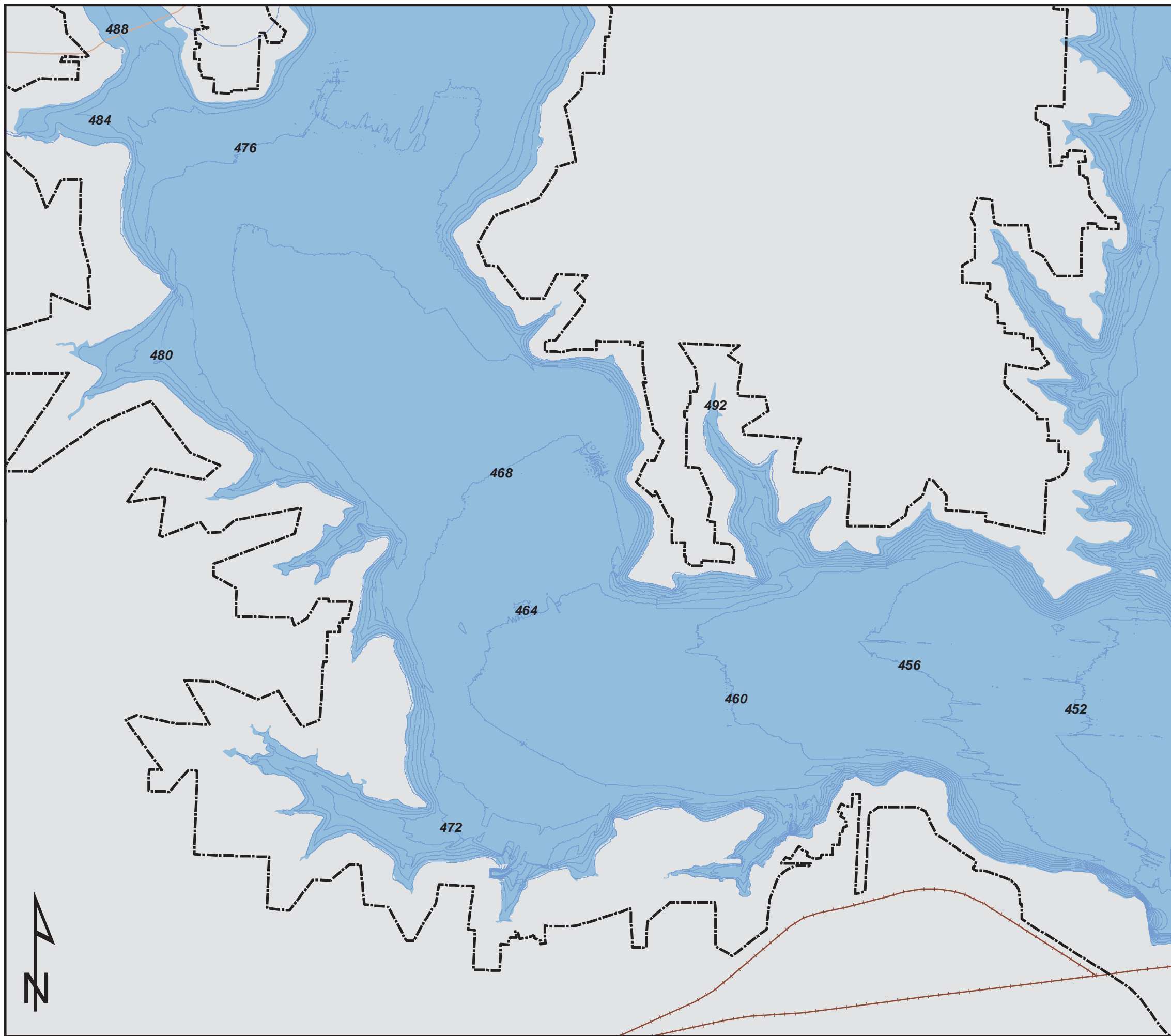
LAVON LAKE MASTER PLAN





DEPTH CONTOUR INDEX (SHEET 00)



0 1 2 3 MILES

DATE: MAY 2016	MAP NO. LA15MP-OD-00
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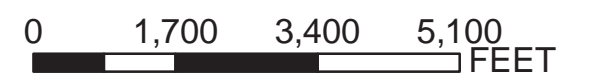
-  BOAT RAMP
-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

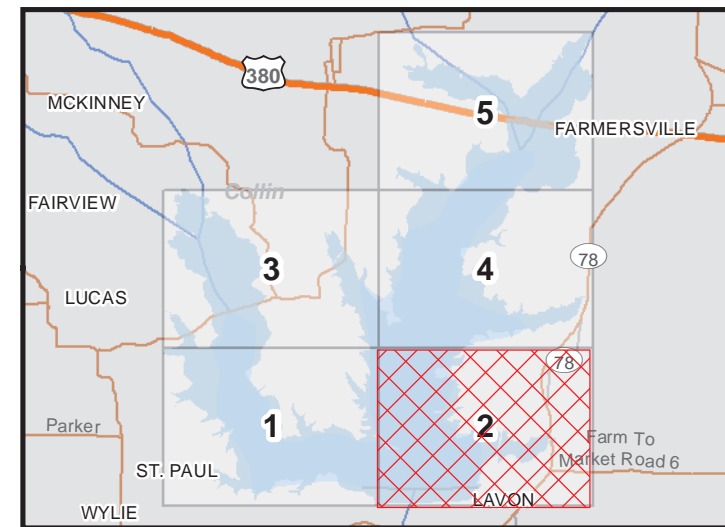
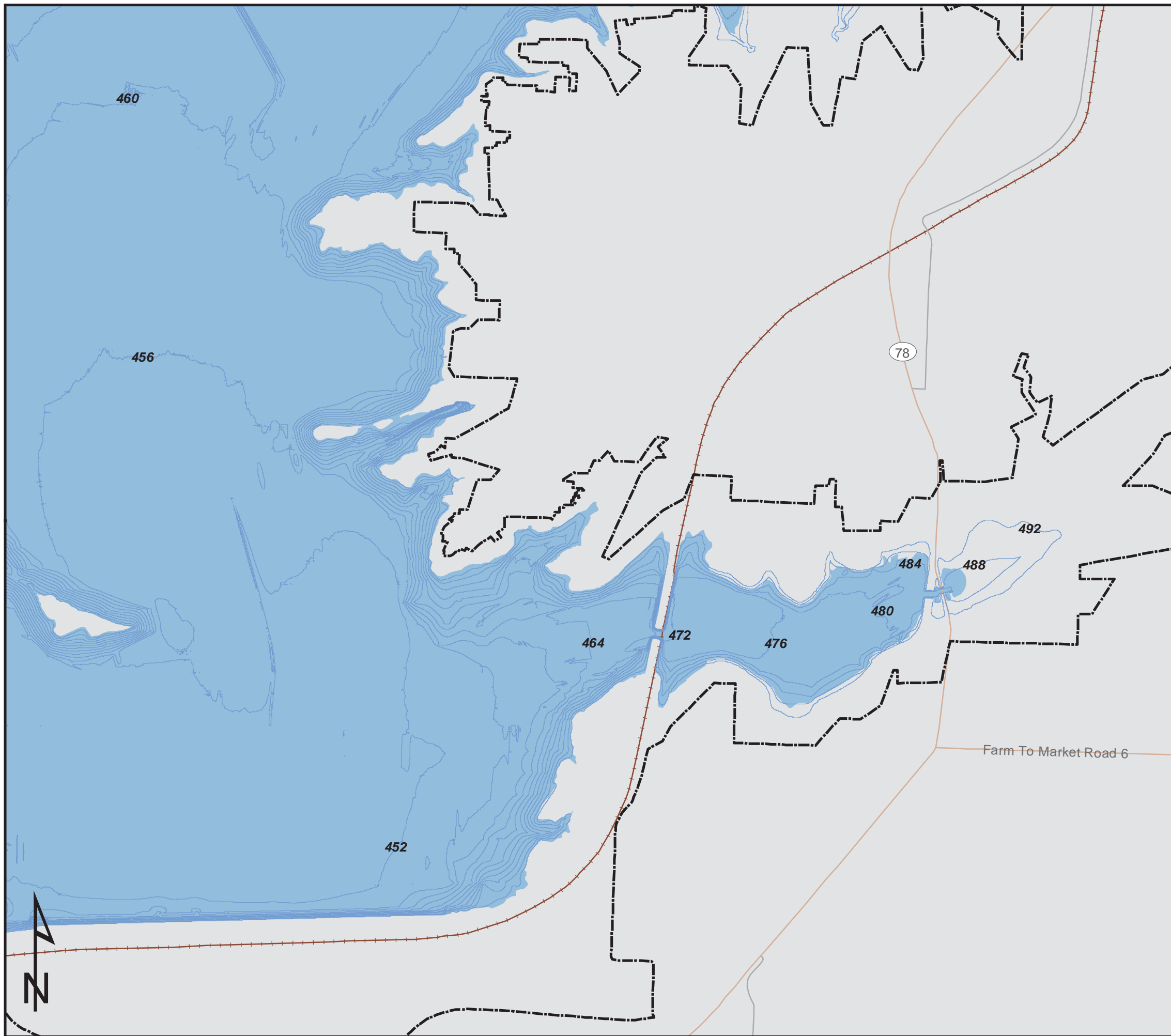
LAVON LAKE EAST FORK TRINITY RIVER, TEXAS





LAVON LAKE
LAVON LAKE MASTER PLAN
DEPTH CONTOUR INDEX (SHEET 01)



DATE:
MAY 2016

MAP NO.
LA15MP-OD-01



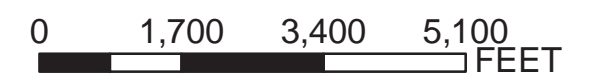
-  BOAT RAMP
-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

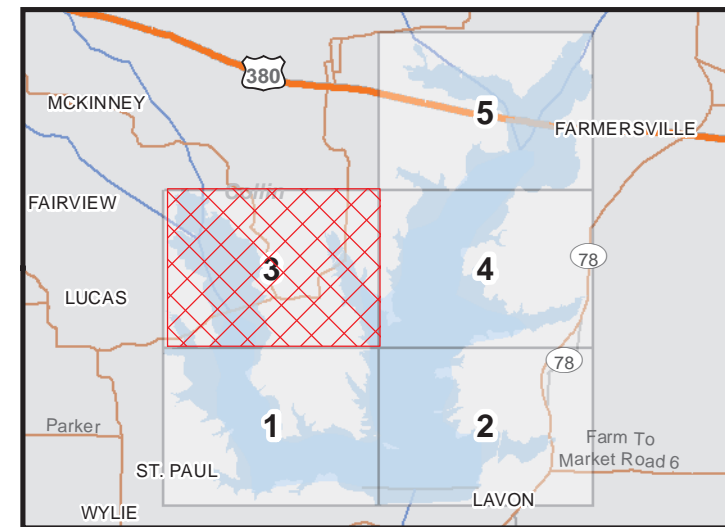
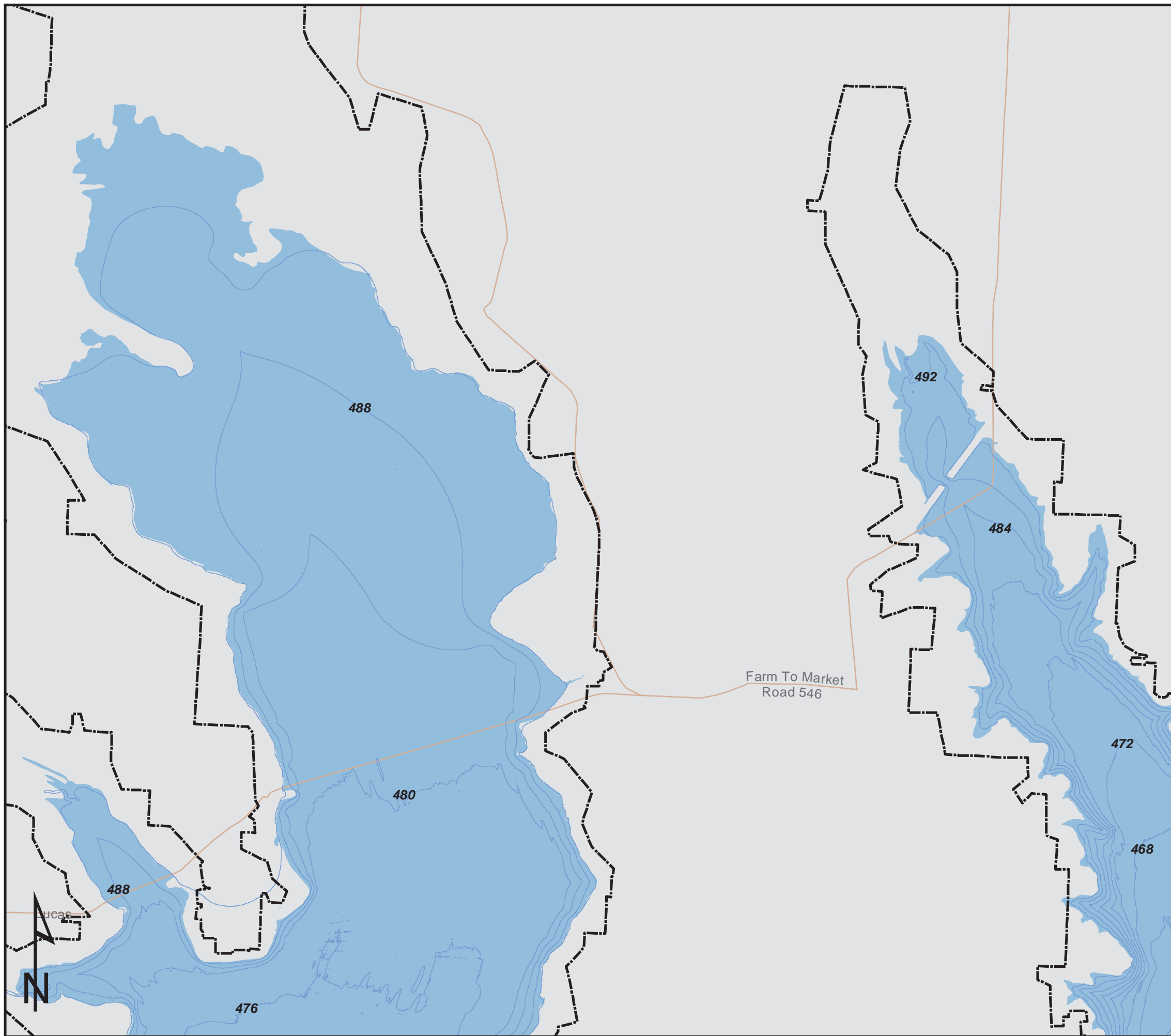
LAVON LAKE EAST FORK TRINITY RIVER, TEXAS





LAVON LAKE
LAVON LAKE MASTER PLAN
DEPTH CONTOUR INDEX (SHEET 02)



DATE:
MAY 2016

MAP NO.
LA15MP-OD-02



-  BOAT RAMP
-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

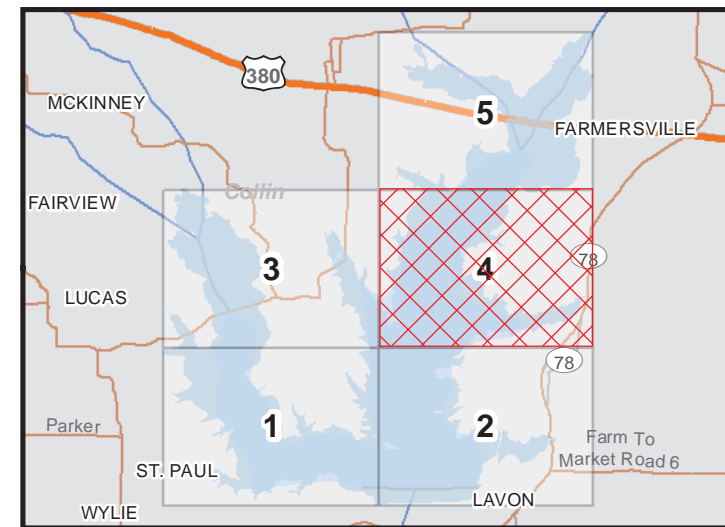
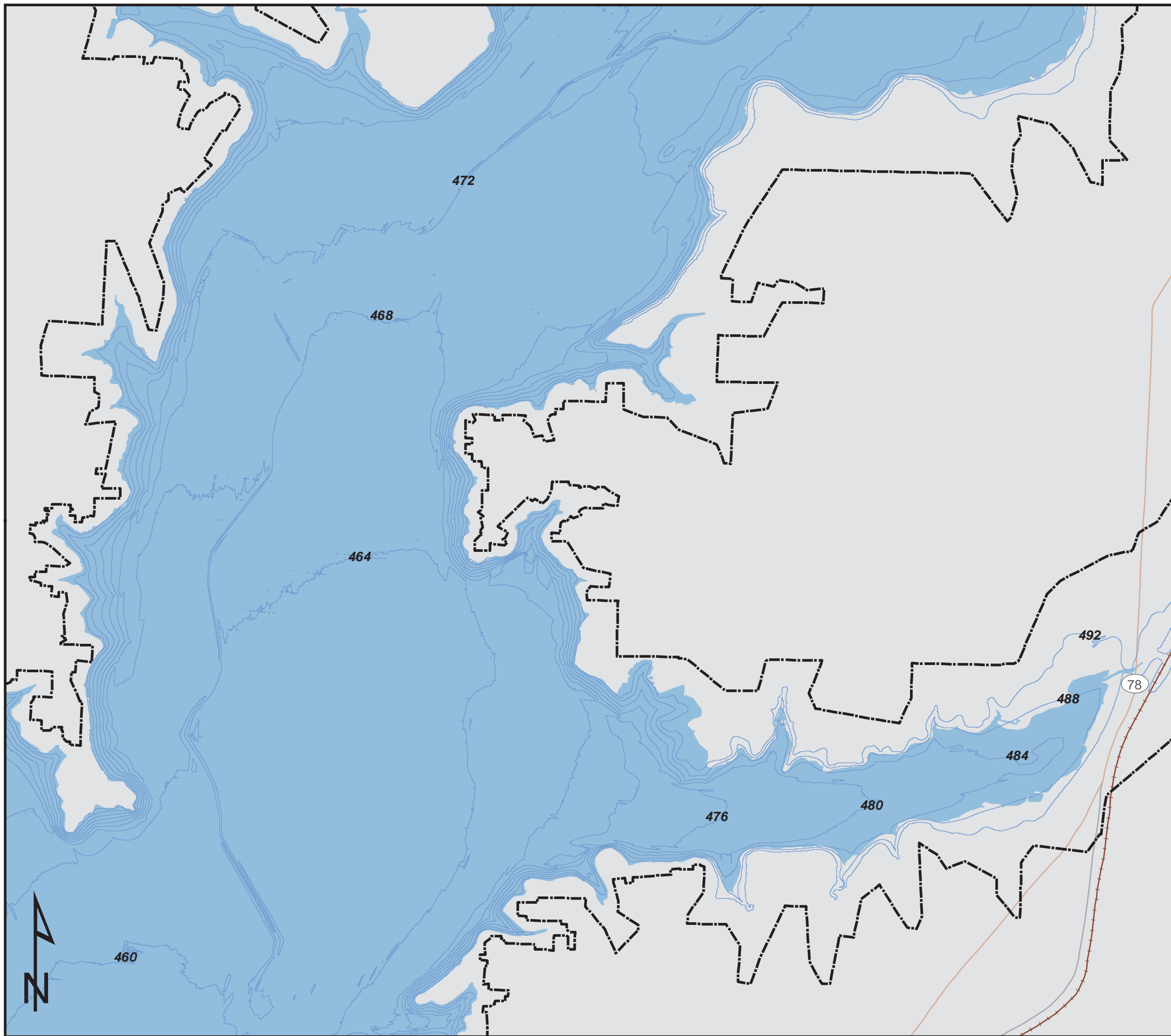
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

LAVON LAKE
LAVON LAKE MASTER PLAN
DEPTH CONTOUR INDEX (SHEET 03)

0 1,700 3,400 5,100 FEET

DATE:
MAY 2016

MAP NO.
LA15MP-OD-03



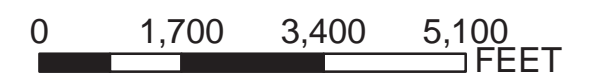
-  BOAT RAMP
-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

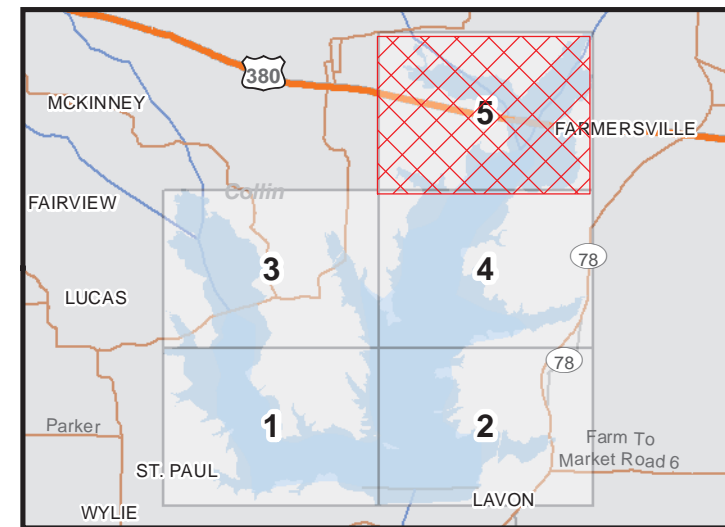
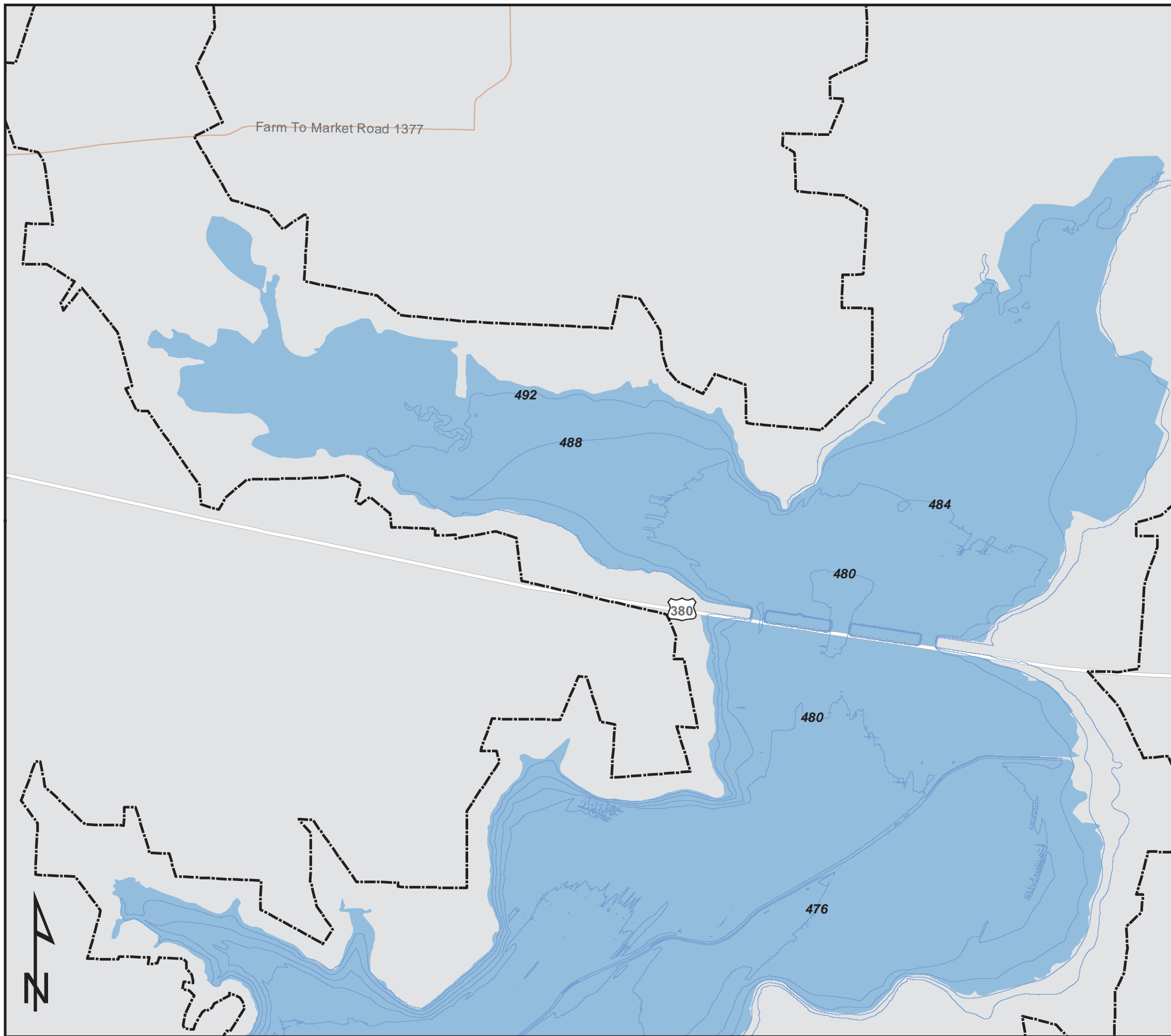
LAVON LAKE EAST FORK TRINITY RIVER, TEXAS





LAVON LAKE
LAVON LAKE MASTER PLAN
DEPTH CONTOUR INDEX (SHEET 04)



DATE:
MAY 2016

MAP NO.
LA15MP-OD-04



-  BOAT RAMP
-  FEE BOUNDARY
-  RECREATION AREA
-  DEPTH CONTOUR



**U.S. ARMY CORPS
OF ENGINEERS**
FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

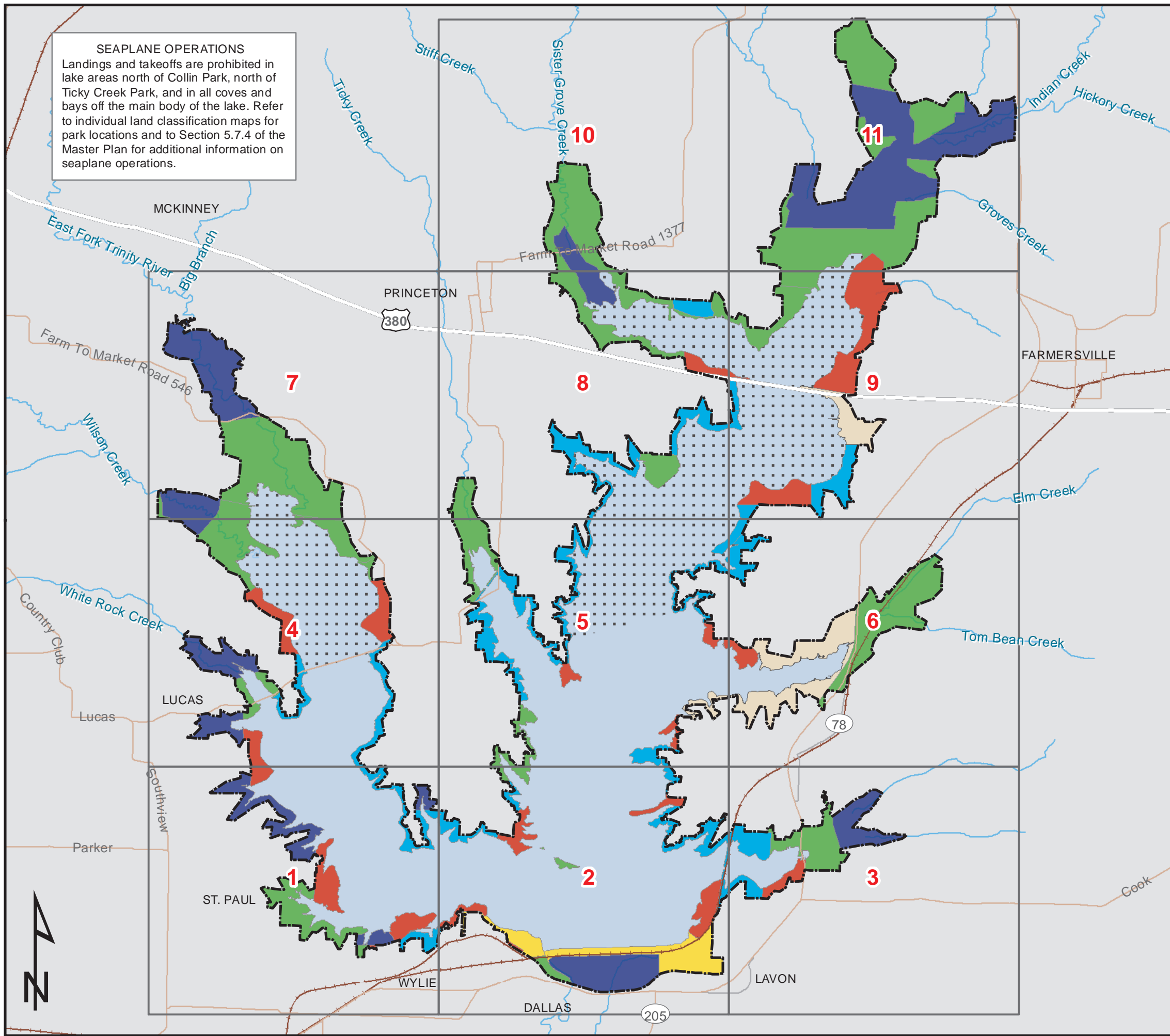
LAVON LAKE
LAVON LAKE MASTER PLAN
DEPTH CONTOUR INDEX (SHEET 05)



DATE:
MAY 2016

MAP NO.
LA15MP-OD-05

SEAPLANE OPERATIONS
 Landings and takeoffs are prohibited in lake areas north of Collin Park, north of Ticky Creek Park, and in all coves and bays off the main body of the lake. Refer to individual land classification maps for park locations and to Section 5.7.4 of the Master Plan for additional information on seaplane operations.




- PROJECT BOUNDARY
- UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
- PROJECT OPERATIONS
- HIGH DENSITY RECREATION
- ENVIRONMENTALLY SENSITIVE AREA
- LOW DENSITY RECREATION
- VEGETATIVE MANAGEMENT
- WILDLIFE MANAGEMENT
- WATER SURFACE



U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

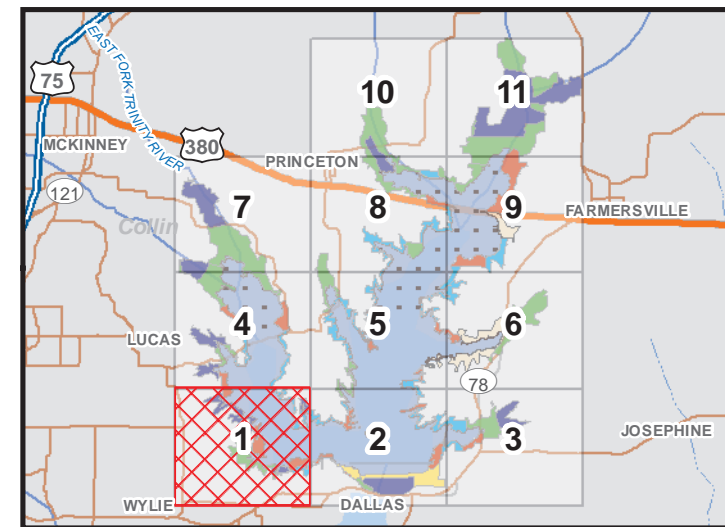
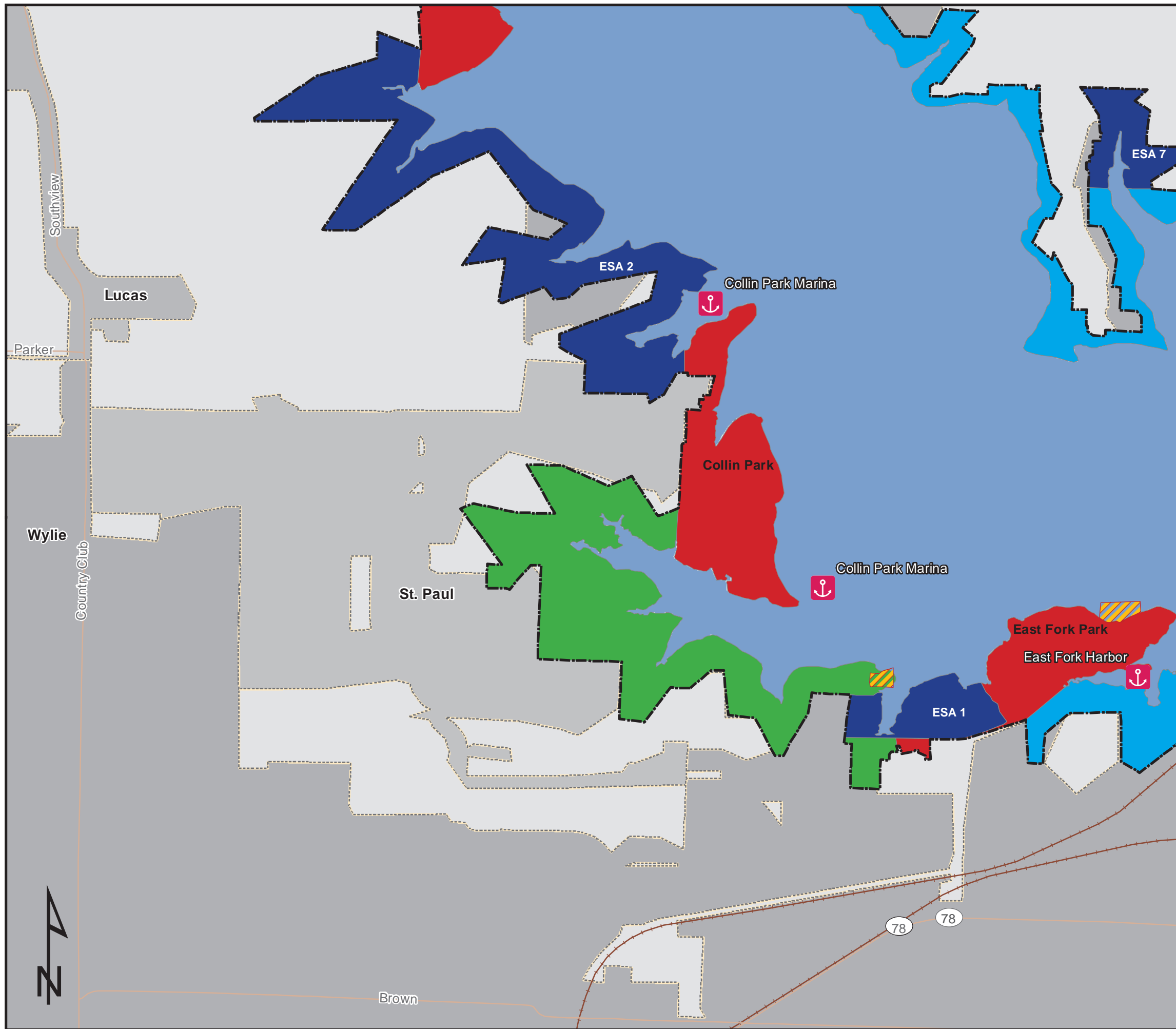
LAVON LAKE EAST FORK TRINITY RIVER, TEXAS


LAVON LAKE
LAVON LAKE MASTER PLAN
LAND CLASSIFICATION INDEX (SHEET 00)



DATE: MAY 2016	MAP NO. LA15MP-OC-00
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-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

LAVON LAKE

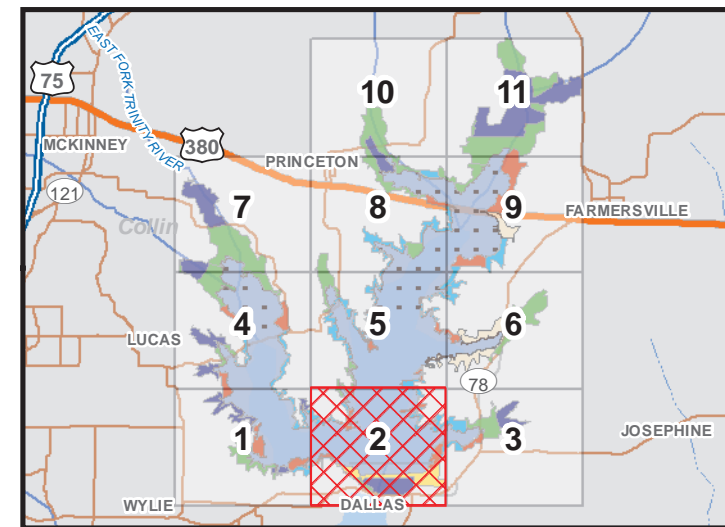
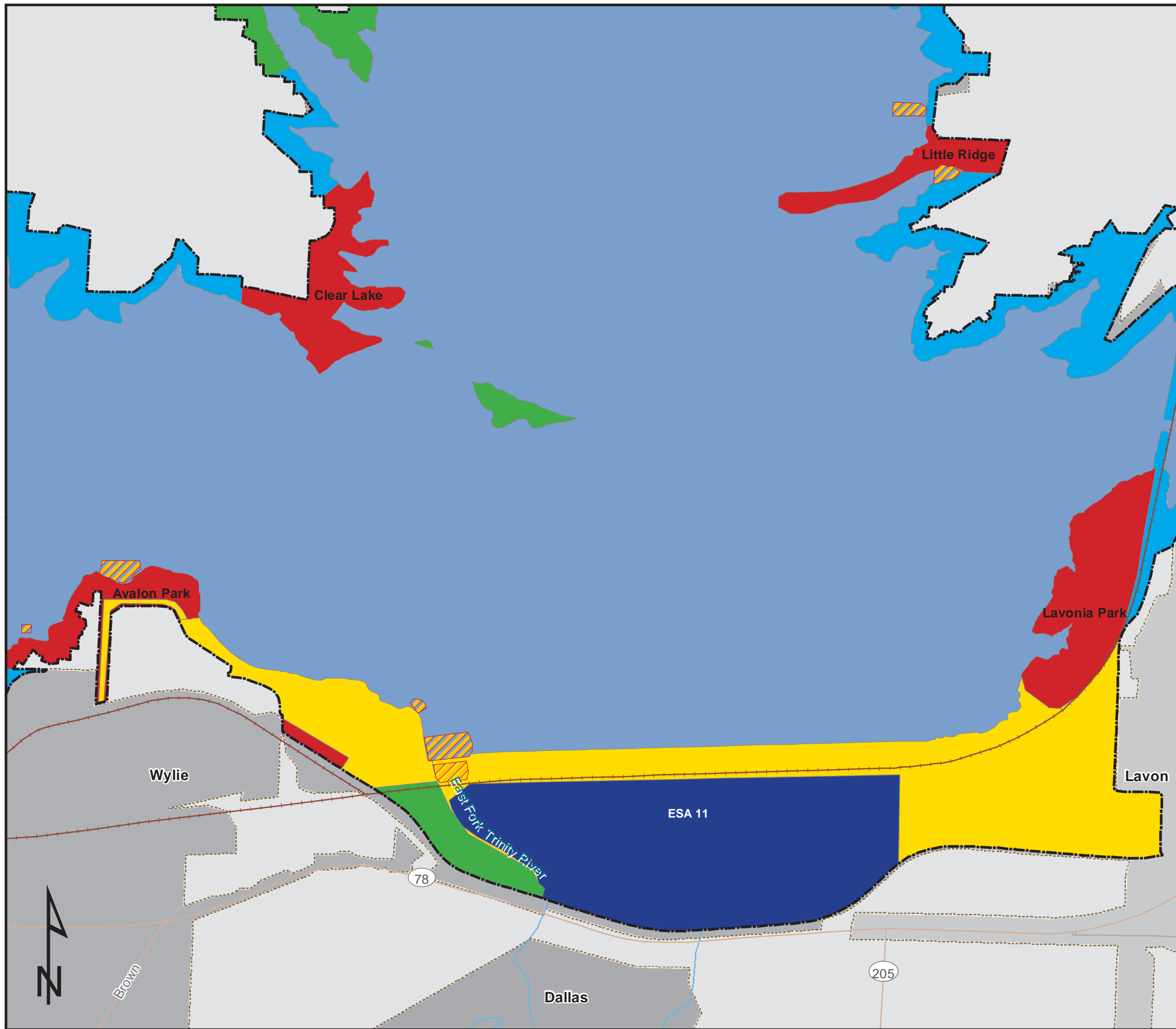
LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 01)



0 1,500 3,000 4,500 FEET

DATE: MAY 2016	MAP NO. LA15MP-OC-01
-------------------	-------------------------



-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

LAVON LAKE

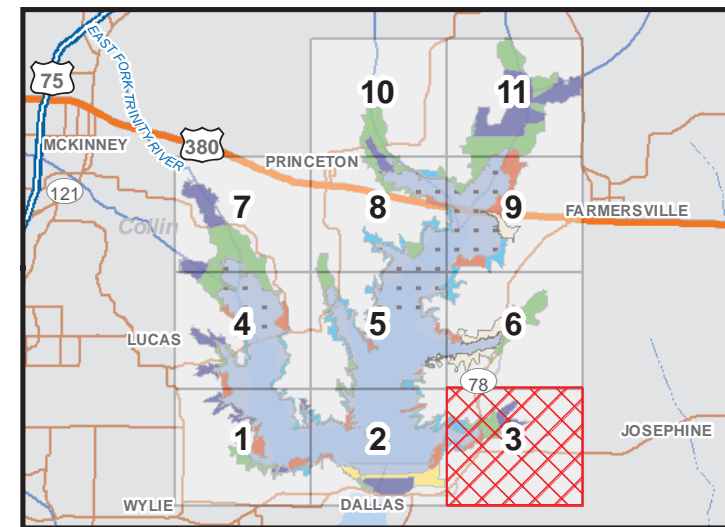
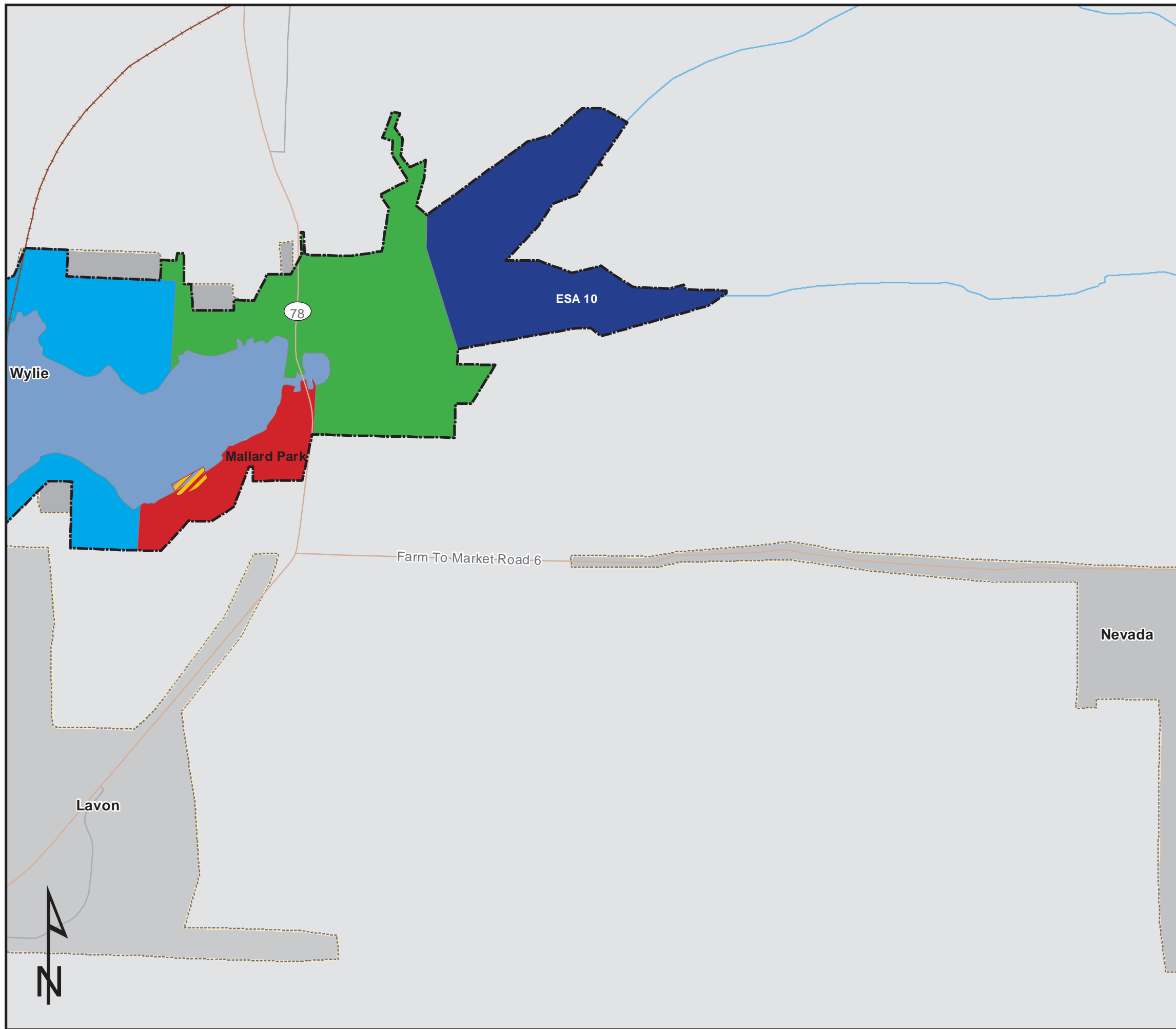
LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 02)



0 1,500 3,000 4,500 FEET

DATE: MAY 2016	MAP NO. LA15MP-OC-02
-------------------	-------------------------



-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

LAVON LAKE

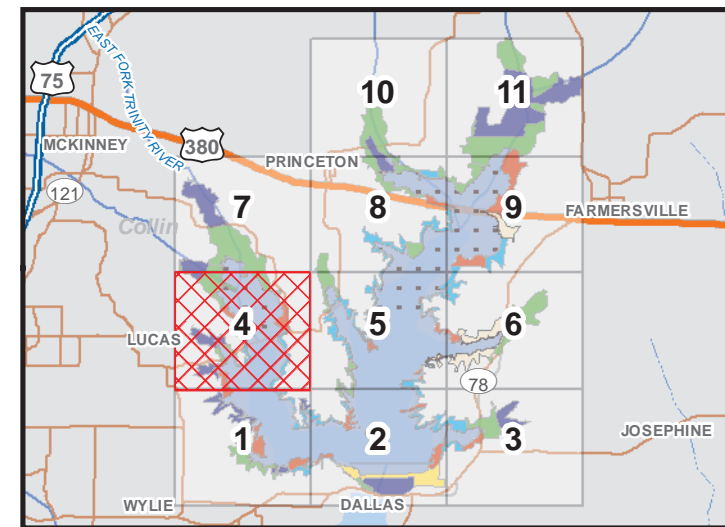
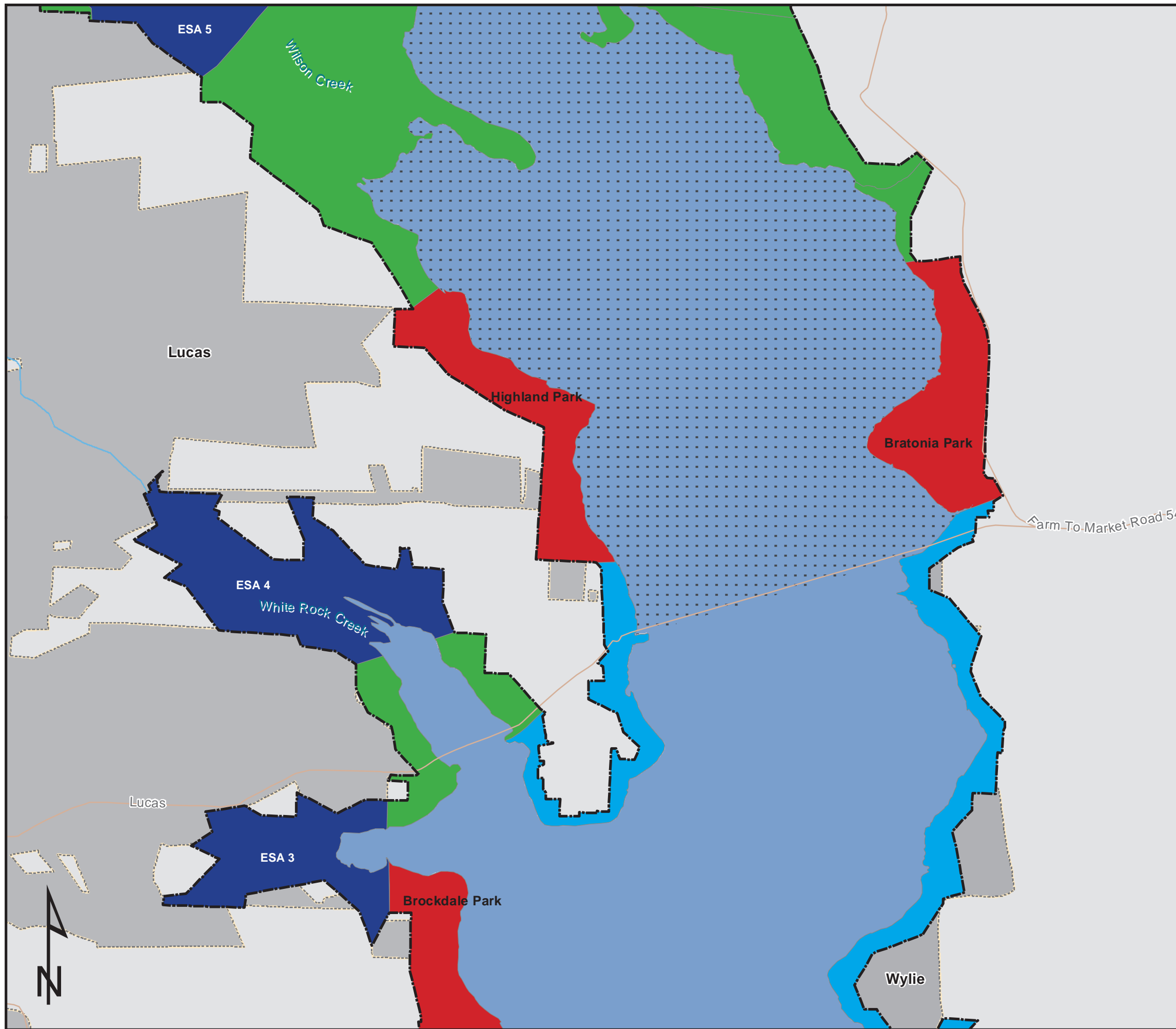
LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 03)



0 1,500 3,000 4,500 FEET

DATE: MAY 2016	MAP NO. LA15MP-OC-03
-------------------	-------------------------



-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

LAVON LAKE

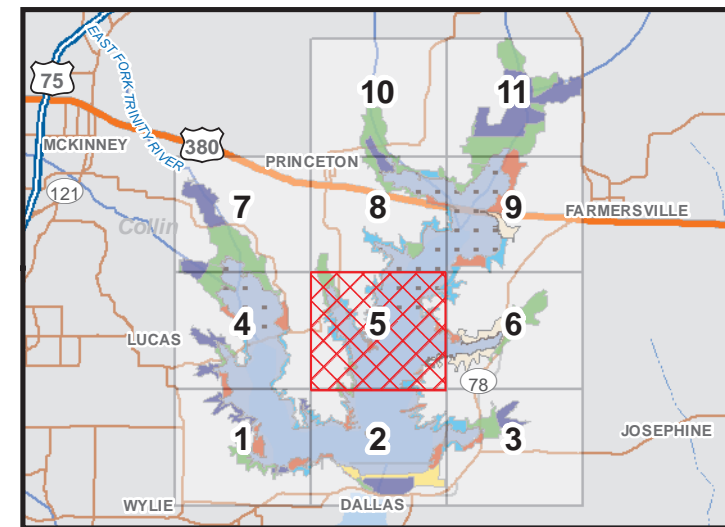
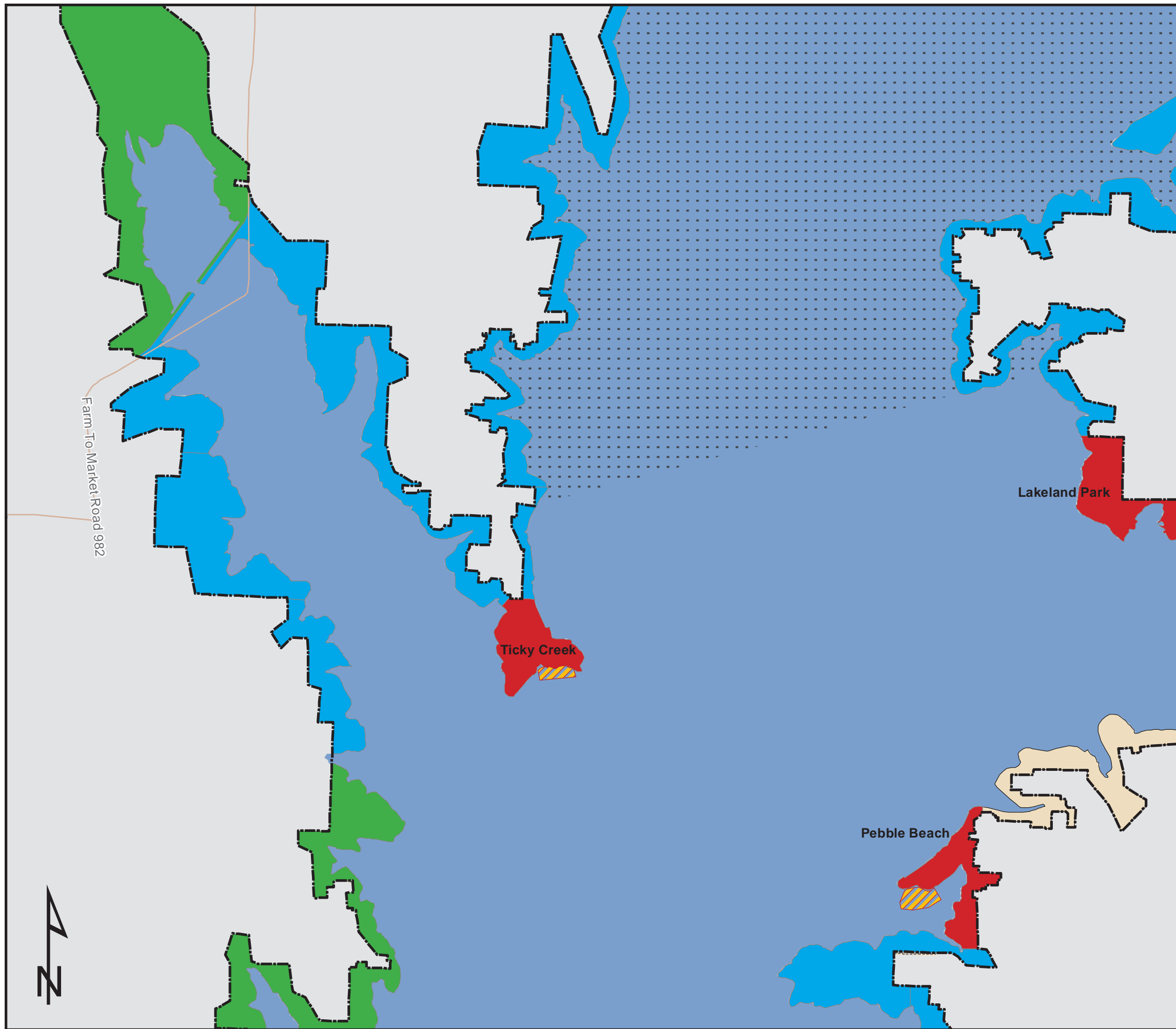
LAVON LAKE MASTER PLAN


LAND CLASSIFICATION (SHEET 04)



DATE: MAY 2016	MAP NO. LA15MP-OC-04
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-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

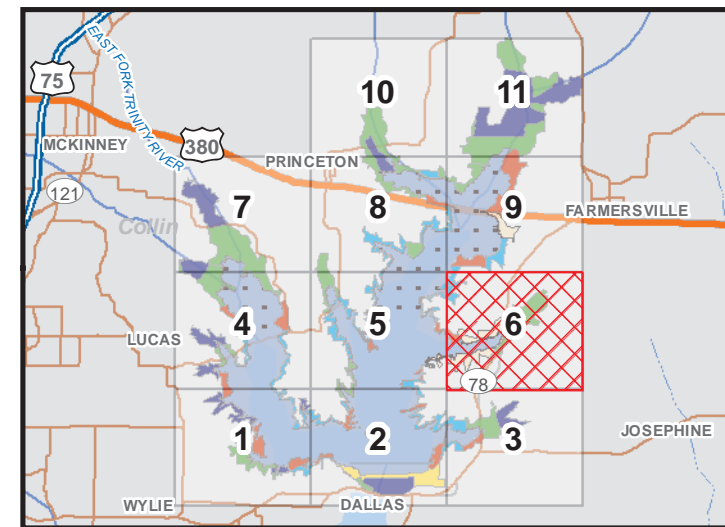
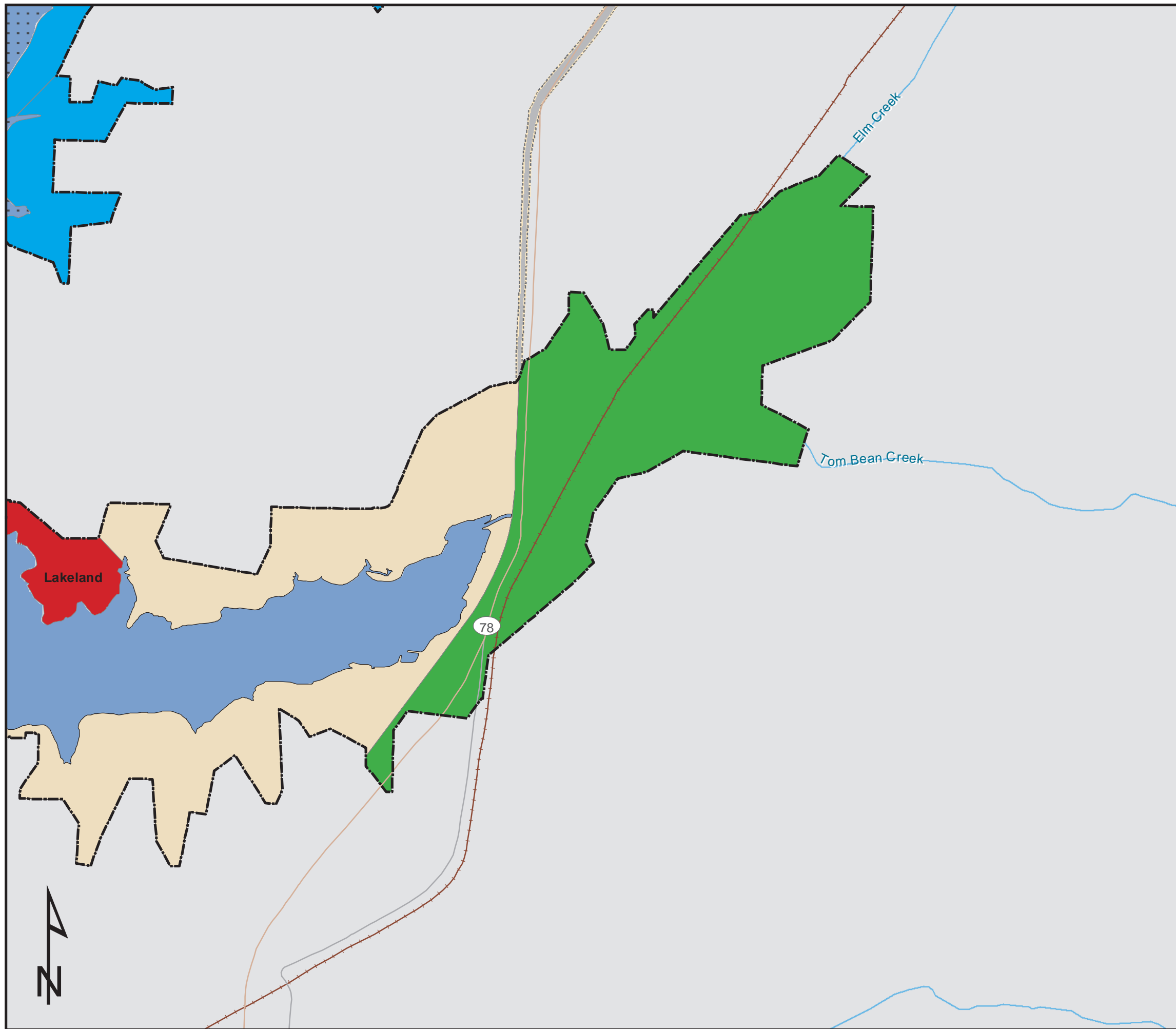
LAVON LAKE

LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 05)



DATE: MAY 2016	MAP NO. LA15MP-OC-05
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-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

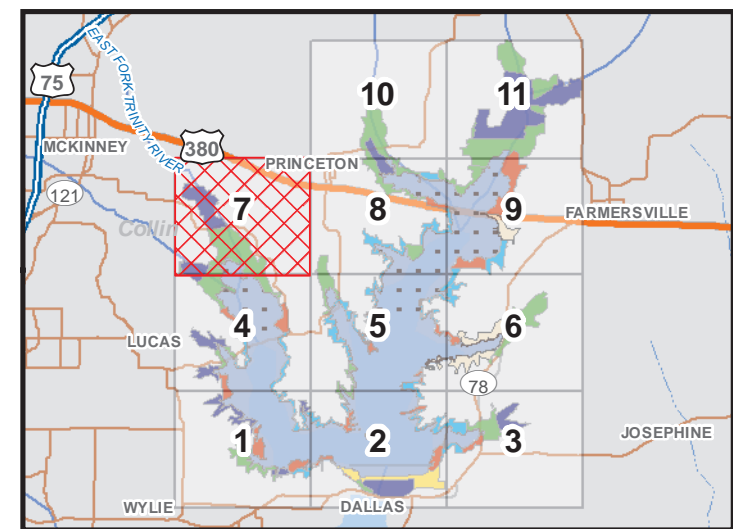
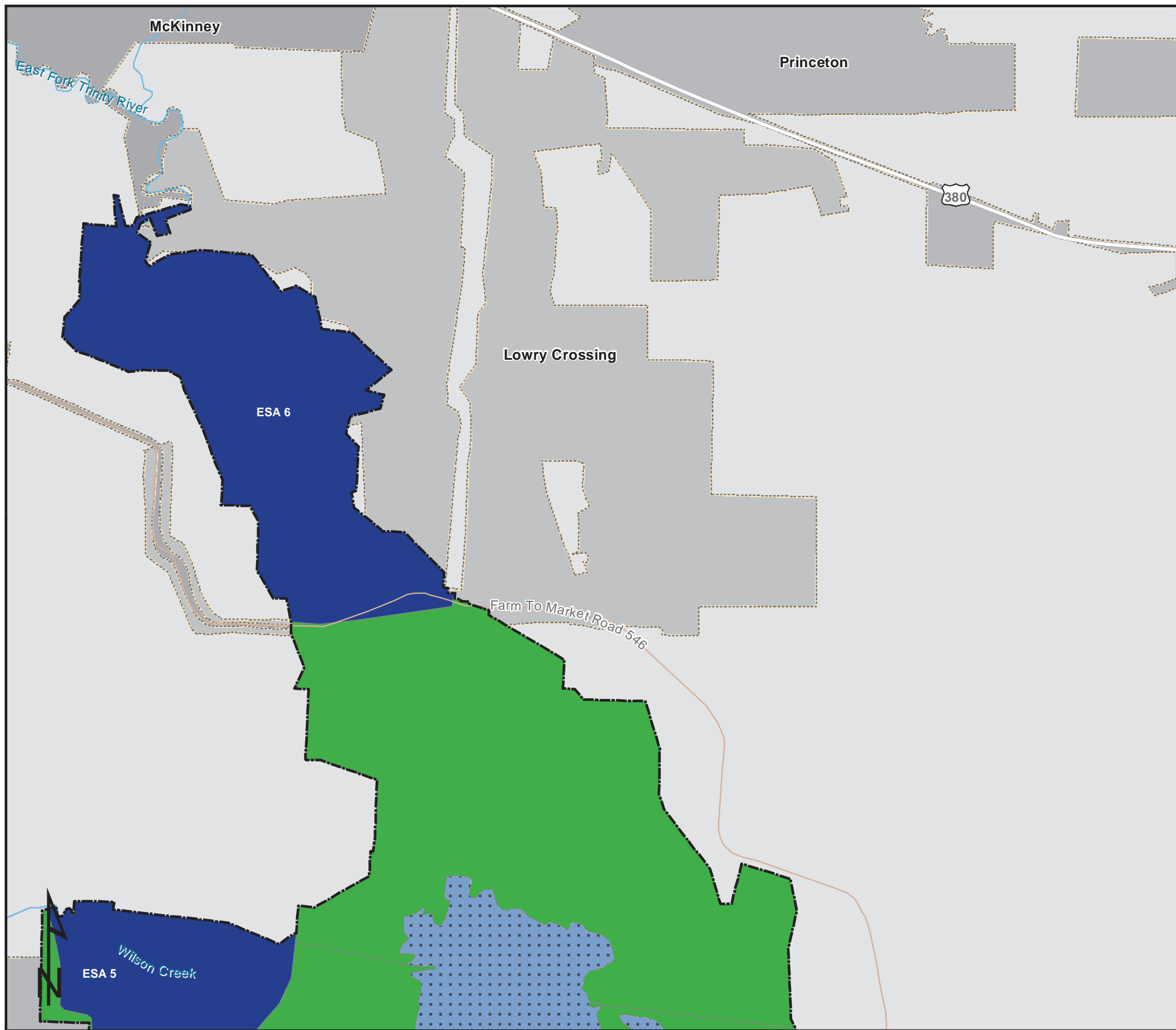
LAVON LAKE




LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 06)



DATE: MAY 2016	MAP NO. LA15MP-OC-06
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-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

LAVON LAKE

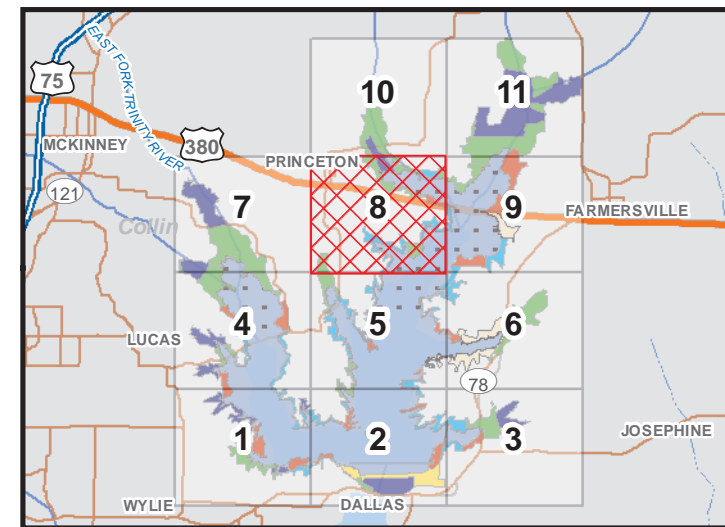
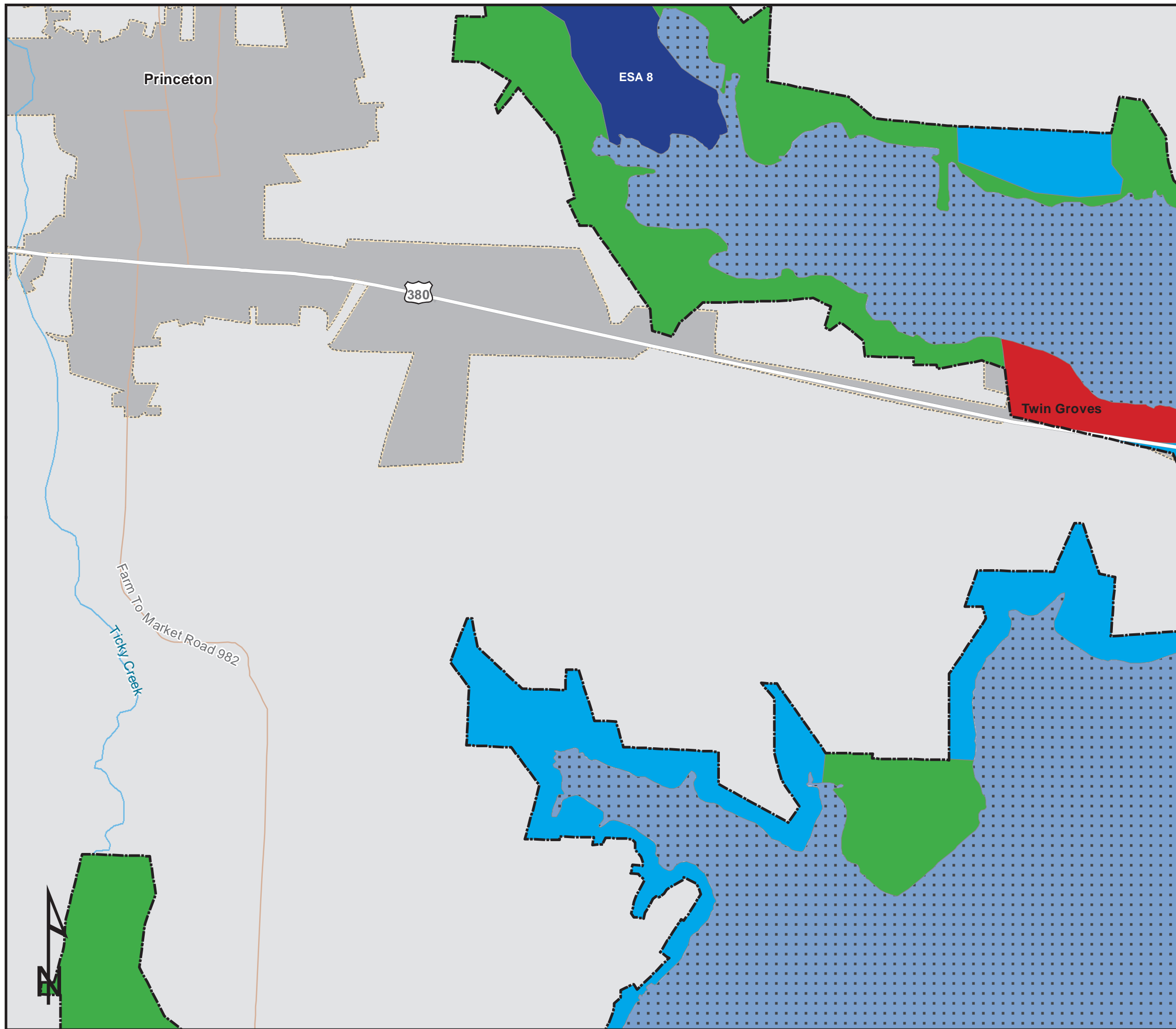
LAVON LAKE MASTER PLAN


LAND CLASSIFICATION (SHEET 07)



0 1,500 3,000 4,500 FEET

DATE: MAY 2016	MAP NO. LA15MP-OC-07
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-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

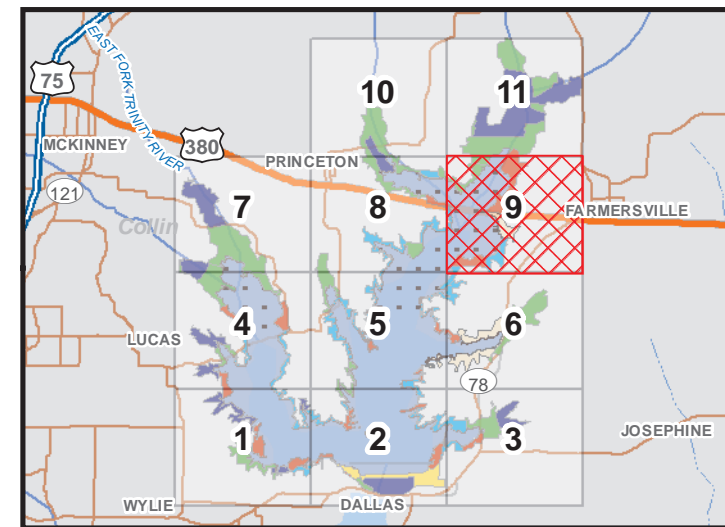
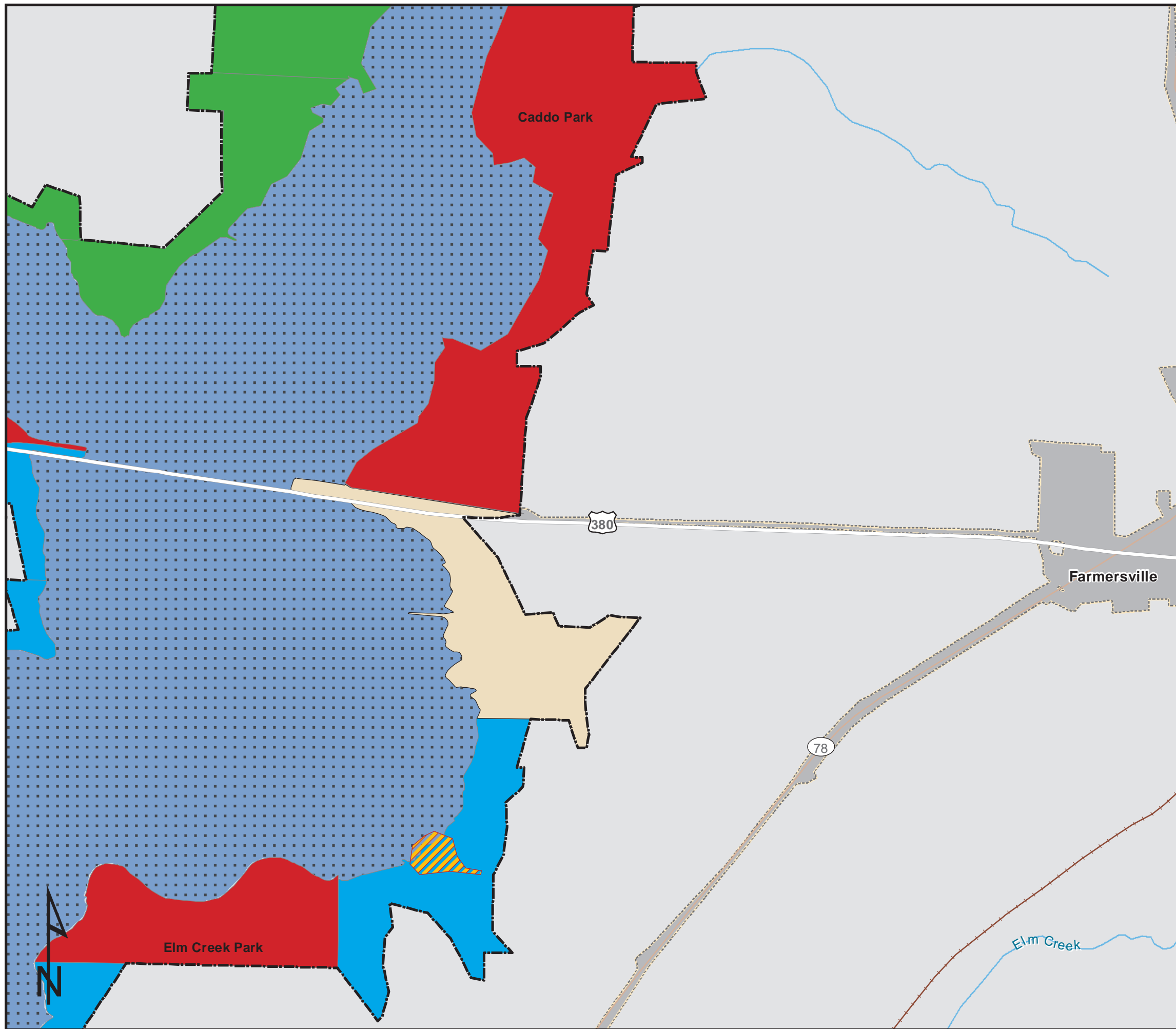
LAVON LAKE

LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 08)



DATE: MAY 2016	MAP NO. LA15MP-OC-08
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-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

LAVON LAKE

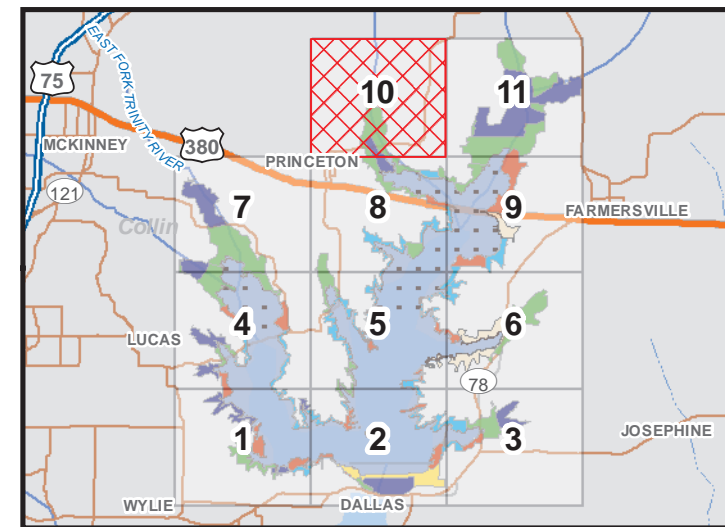
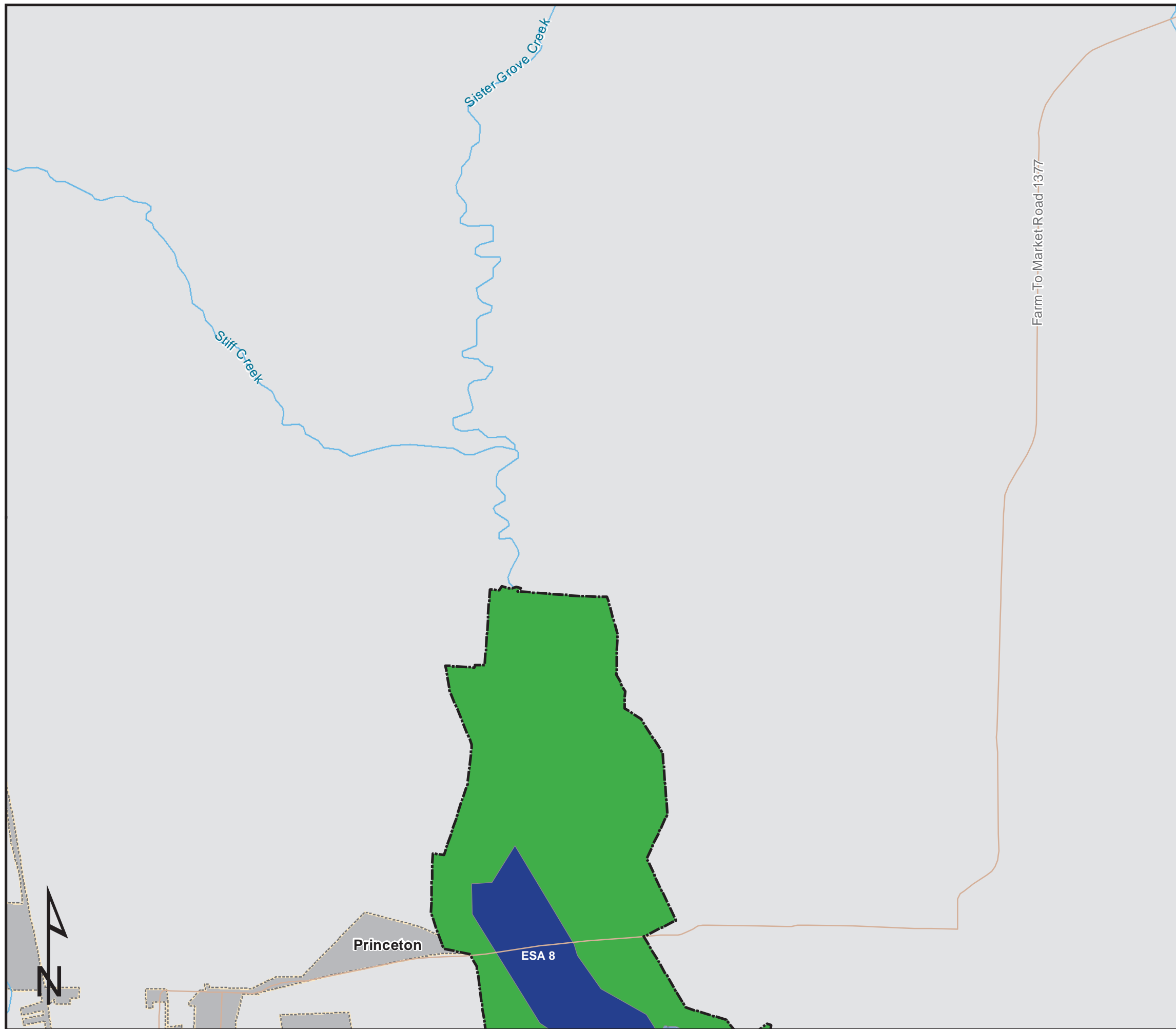
LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 09)



0 1,500 3,000 4,500 FEET

DATE: MAY 2016	MAP NO. LA15MP-OC-09
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-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

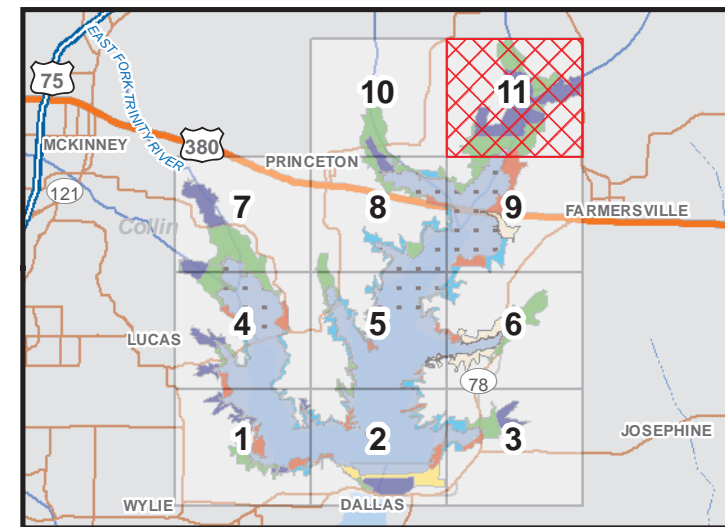
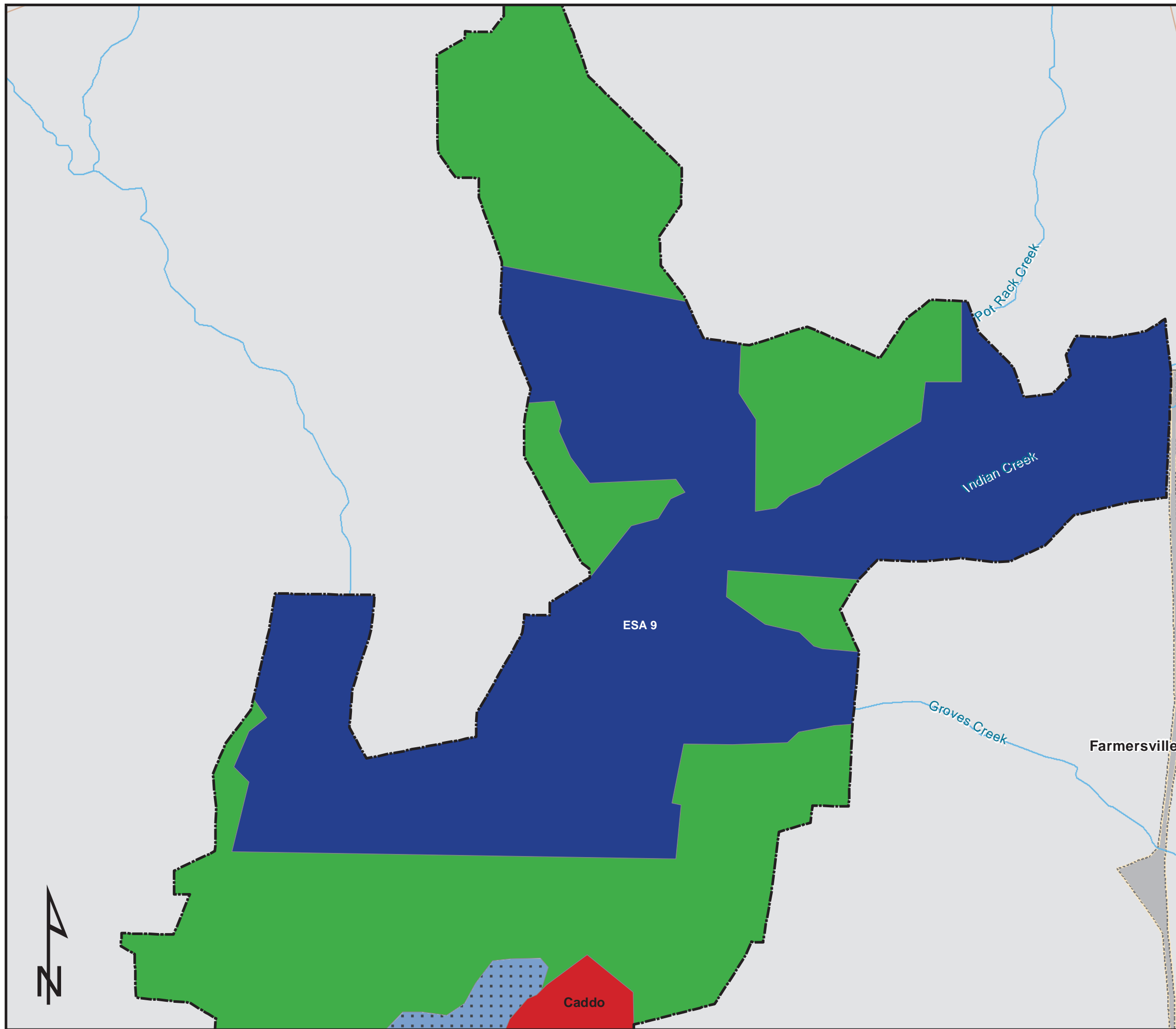
LAVON LAKE

LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 10)



DATE: MAY 2016	MAP NO. LA15MP-OC-10
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-  MARINA
-  PROJECT BOUNDARY
-  UNCLEARED WATER SURFACE
- LAND CLASSIFICATION**
-  PROJECT OPERATIONS
-  HIGH DENSITY RECREATION
-  ENVIRONMENTALLY SENSITIVE AREA
-  LOW DENSITY RECREATION
-  VEGETATIVE MANAGEMENT
-  WILDLIFE MANAGEMENT
- WATER SURFACE**
-  OPEN RECREATION
-  RESTRICTED



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT

LAVON LAKE EAST FORK TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

LAND CLASSIFICATION (SHEET 11)








0 1,500 3,000 4,500
FEET

DATE: MAY 2016	MAP NO. LA15MP-OC-11
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ITEM	EXISTING
PICNIC SITE	12
GROUP PICNIC SHELTER	1
RESTROOM (VAULT)	1

-  FEE BOUNDARY
-  RECREATION AREA
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

RECREATIONAL MAP
(AVALON PARK - LITTLE AVALON)












0 75 150 300 Feet

DATE:
MAY 2016

MAP NO.
LA15MP-OR-01

ITEM	EXISTING
ATTENDENT SITE	1
PICNIC SITE	55
GROUP PICNIC SHELTER	2
RESTROOM (WATERBORNE)	3
BOAT RAMP LANES	4
COURTESY DOCK	1
GATEHOUSE	1



-  FEE BOUNDARY
-  RECREATION AREA
-  ATTENDENT SITE
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK
-  GATEHOUSE



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN
RECREATIONAL MAP (AVALON PARK)














DATE:
MAY 2016

MAP NO.
LA15MP-OR-02

ITEM	EXISTING
CAMPSITE	79
ATTENDENT SITE	2
PICNIC SITE	32
GROUP PICNIC SHELTER	1
RESTROOM (WATERBORNE)	6
DUMP STATION	1
BOAT RAMP LANES	8
GATEHOUSE	1
COURTESY DOCK	2



-  FEE BOUNDARY
-  RECREATION AREA
-  CAMPSITE
-  ATTENDENT SITE
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK
-  DUMP STATION
-  GATEHOUSE



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN
RECREATIONAL MAP (EAST FORK PARK)



DATE:
MAY 2016

MAP NO.
LA15MP-OR-03



ITEM	EXISTING
PICNIC SITE	13
GATEHOUSE	1
RESTROOM (WATERBORNE)	3
BOAT RAMP LANES	8

-  FEE BOUNDARY
-  RECREATION AREA
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM
-  BOAT RAMP
-  GATEHOUSE



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN

RECREATIONAL MAP
(COLLIN PARK - SOUTH)










DATE:
MAY 2016

MAP NO.
LA15MP-OR-04



ITEM	EXISTING
CAMPSITE	65
GATEHOUSE	1
RESTROOM (WATERBORNE)	1
ATTENDENT SITE	1
DUMP STATION	1

-  FEE BOUNDARY
-  RECREATION AREA
-  CAMPSITE
-  ATTENDENT SITE
-  RESTROOM
-  DUMP STATION
-  GATEHOUSE



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN

RECREATIONAL MAP
(COLLIN PARK - NORTH)



0 160 320 640
Feet

DATE:
MAY 2016

MAP NO.
LA15MP-OR-05



ITEM	EXISTING
PICNIC SITE	12
GROUP PICNIC SHELTER	1
RESTROOM (WATERBORNE)	1
BOAT RAMP LANES	4

-  FEE BOUNDARY
-  RECREATION AREA
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM
-  BOAT RAMP



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN

RECREATIONAL MAP (BROCKDALE PARK)







0 187.5 375 750
Feet

DATE:
MAY 2016

MAP NO.
LA15MP-OR-06



ITEM	EXISTING
RESTROOM (WATERBORNE)	1
BOAT RAMP LANES	4

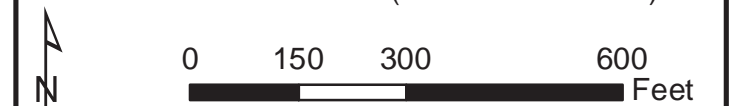
-  FEE BOUNDARY
-  RECREATION AREA
-  RESTROOM
-  BOAT RAMP



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN
RECREATIONAL MAP (HIGHLAND PARK)







DATE:
MAY 2016

MAP NO.
LA15MP-OR-07



ITEM	EXISTING
RESTROOM (VAULT)	2
BOAT RAMP LANES	2

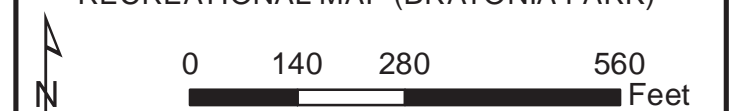
-  FEE BOUNDARY
-  RECREATION AREA
-  RESTROOM
-  BOAT RAMP



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN
RECREATIONAL MAP (BRATONIA PARK)













DATE:
MAY 2016

MAP NO.
LA15MP-OR-08

MODEL AIRPLANE FLYING FIELD



ITEM	EXISTING
CAMPSITE	23
ATTENDENT SITE	2
PICNIC SITE	18
GROUP PICNIC SHELTER	1
RESTROOM (VAULT)	4
BOAT RAMP LANES	8
COURTESY DOCK	1
GATEHOUSE	1

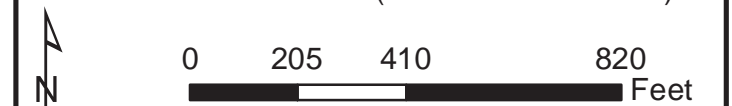
-  FEE BOUNDARY
-  RECREATION AREA
-  CAMPSITE
-  ATTENDENT SITE
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK
-  GATEHOUSE



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OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN
RECREATIONAL MAP (CLEAR LAKE PARK)










DATE:
MAY 2016

MAP NO.
LA15MP-OR-09



ITEM	EXISTING
ATTENDENT SITE	1
PICNIC SITE	16
RESTROOM (VAULT)	2
BOAT RAMP LANES	4
COURTESY DOCK	1

-  FEE BOUNDARY
-  RECREATION AREA
-  ATTENDENT SITE
-  PICNIC SITE
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK



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OF ENGINEERS**


FORT WORTH DISTRICT


LAVON LAKE
EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

RECREATIONAL MAP (TICKY CREEK PARK)









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Feet

DATE: MAY 2016	MAP NO. LA15MP-OR-10
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ITEM	EXISTING
RESTROOM (VAULT)	2
BOAT RAMP LANES	2

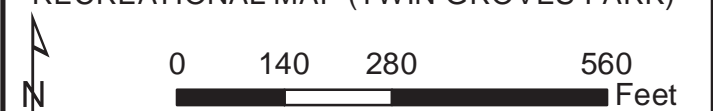
-  FEE BOUNDARY
-  RECREATION AREA
-  RESTROOM
-  BOAT RAMP



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN
RECREATIONAL MAP (TWIN GROVES PARK)










DATE:
MAY 2016

MAP NO.
LA15MP-OR-11



ITEM	EXISTING
PICNIC SITE	13
RESTROOM (WATERBORNE)	2
BOAT RAMP LANES	4
COURTESY DOCK	1

-  FEE BOUNDARY
-  RECREATION AREA
-  PICNIC SITE
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK



**U.S. ARMY CORPS
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FORT WORTH DISTRICT

LAVON LAKE
EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

RECREATIONAL MAP (CADDO PARK)

N

0
187.5
375
750





Feet


DATE:
MAY 2016

MAP NO.
LA15MP-OR-12



ITEM	EXISTING
RESTROOM (VAULT)	1
BOAT RAMP LANES	2

-  FEE BOUNDARY
-  RECREATION AREA
-  RESTROOM
-  BOAT RAMP



**U.S. ARMY CORPS
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FORT WORTH DISTRICT


LAVON LAKE
EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

RECREATIONAL MAP (ELM CREEK PARK)














DATE: MAY 2016	MAP NO. LA15MP-OR-13
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ITEM	EXISTING
CAMPSITE	32
ATTENDENT SITE	1
GROUP PICNIC SHELTER	1
RESTROOM (WATERBORNE)	2
BOAT RAMP LANES	4

-  FEE BOUNDARY
-  RECREATION AREA
-  CAMPSITE
-  ATTENDENT SITE
-  GROUP PICNIC SHELTER
-  RESTROOM
-  BOAT RAMP
-  GATEHOUSE



**U.S. ARMY CORPS
OF ENGINEERS**


FORT WORTH DISTRICT


LAVON LAKE
EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

RECREATIONAL MAP (LAKELAND PARK)











DATE:	MAP NO.
MAY 2016	LA15MP-OR-14



ITEM	EXISTING
PICNIC SITE	22
RESTROOM (WATERBORNE)	1
BOAT RAMP LANES	4

-  FEE BOUNDARY
-  RECREATION AREA
-  PICNIC SITE
-  RESTROOM
-  BOAT RAMP



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FORT WORTH DISTRICT


LAVON LAKE
EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

RECREATIONAL MAP (PEBBLE BEACH PARK)

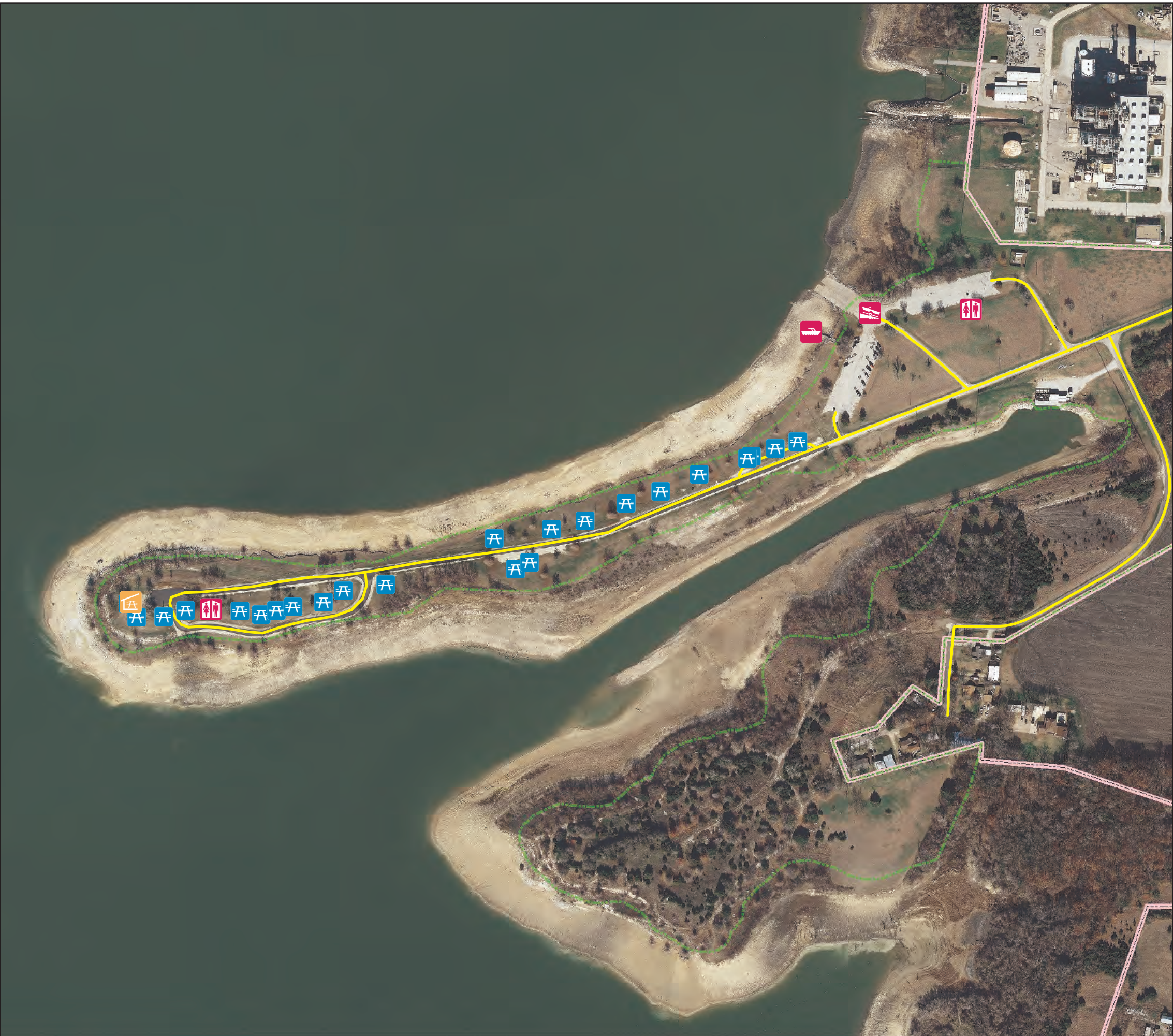





0 140 280 560
Feet

DATE: MAY 2016	MAP NO. LA15MP-OR-15
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ITEM	EXISTING
PICNIC SITE	23
GROUP PICNIC SHELTER	1
RESTROOM (WATERBORNE)	2
BOAT RAMP LANES	4
COURTESY DOCK	1



-  FEE BOUNDARY
-  RECREATION AREA
-  PICNIC SITE
-  GROUP PICNIC SHELTER
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK



**U.S. ARMY CORPS
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FORT WORTH DISTRICT


LAVON LAKE
EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

RECREATIONAL MAP (LITTLE RIDGE PARK)











DATE: MAY 2016	MAP NO. LA15MP-OR-16
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ITEM	EXISTING
PICNIC SITE	10
RESTROOM (WATERBORNE)	2
BOAT RAMP LANES	4
COURTESY DOCK	1

-  FEE BOUNDARY
-  RECREATION AREA
-  PICNIC SITE
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK



**U.S. ARMY CORPS
OF ENGINEERS
FORT WORTH DISTRICT**

LAVON LAKE EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE
LAVON LAKE MASTER PLAN

RECREATIONAL MAP (MALLARD PARK)













0 110 220 440
Feet


DATE:
MAY 2016

MAP NO.
LA15MP-OR-17



ITEM	EXISTING
CAMPSITE	53
ATTENDENT SITE	2
PICNIC SITE	51
RESTROOM (WATERBORNE)	5
DUMP STATION	1
BOAT RAMP LANES	8
COURTESY DOCK	2
GATEHOUSE	1

-  FEE BOUNDARY
-  RECREATION AREA
-  CAMPSITE
-  ATTENDENT SITE
-  PICNIC SITE
-  RESTROOM
-  BOAT RAMP
-  COURTESY DOCK
-  DUMP STATION
-  GATEHOUSE



**U.S. ARMY CORPS
OF ENGINEERS**

FORT WORTH DISTRICT

LAVON LAKE
EAST FORK OF TRINITY RIVER, TEXAS

LAVON LAKE

LAVON LAKE MASTER PLAN

RECREATIONAL MAP (LAVONIA PARK)

N

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N

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205

410

820

Feet

DATE:
MAY 2016

MAP NO.
LA15MP-OR-18

Appendix B – Environmental Assessment

DRAFT

Environmental Assessment for the Lavon Lake Master Plan

East Fork of the Trinity River
Collin County, Texas



April 2016



US Army Corps
of Engineers ®
Fort Worth District

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1 **DRAFT FINDING OF NO SIGNIFICANT IMPACT**
2 **ENVIRONMENTAL ASSESSMENT FOR THE**
3 **LAVON LAKE MASTER PLAN**
4 **COLLIN COUNTY, TEXAS**
5

6 In accordance with the National Environmental Policy Act of 1969, including
7 guidelines in 33 Code of Federal Regulations (CFR), Part 230, the Fort Worth District
8 and the Regional Planning and Environmental Center (RPEC) of the U.S. Army Corps
9 of Engineers (USACE) have assessed the potential impacts that the alternative
10 management scenarios set forth in the 2016 Lavon Lake Master Plan (2016 Master
11 Plan) would have on the natural, cultural, and human environments.
12

13 The 2016 Master Plan is a revision of the 1972 Master Plan entitled *Trinity River*
14 *Basin, Texas – Design Memorandum No 13, (Revised May 1972) Updated Master Plan*
15 *for Lavon Lake Modification – East Fork of the Trinity River, Texas*. The 2016 Master
16 Plan is the strategic land use management document that guides the comprehensive
17 management and development actions related to all project recreational, natural, and
18 cultural resources throughout the life of the water resource project. The 2016 Master
19 Plan guides the execution of efficient and cost-effective management, development,
20 and use of project lands. The 2016 Master Plan is a vital tool for the responsible
21 stewardship and sustainability of project resources for the benefit of present and future
22 generations.

23 The Environmental Assessment (EA) evaluated and analyzed two alternatives: a
24 No Action Alternative (continued use of the 1972 Master Plan) and implementation of
25 the 2016 Master Plan (Proposed Action). Under the No Action Alternative, the USACE
26 would be taking no action, which means the Master Plan would not be revised. With
27 this alternative, no new resource analysis, resource management objectives, revised
28 land classifications, or resource plan would occur. Additionally, no utility corridors would
29 be designated. The management of the lands and associated resources would
30 continue as outlined in the 1972 Master Plan.
31

32 The purpose of the Proposed Action is to ensure that the conservation and
33 sustainability of the land, water, and recreational resources on Lavon Lake are in
34 compliance with applicable environmental laws and regulations and to maintain quality
35 land for future public use. The need for the Proposed Action is to bring the 1972 Master
36 Plan up to date and to reflect ecological, socio-political, and socio-demographic
37 changes that are currently impacting Lavon Lake, as well as those changes anticipated
38 to occur through 2040.
39

40 The Proposed Action includes a revised Master Plan, coordination with the
41 public, and updates to comply with USACE regulations and guidance, and reflects
42 changes in land management and land uses that have occurred since 1972. Land
43 classifications were refined to meet authorized project purposes and current resource
44 objectives that address a mix of natural resource and recreation management
45 objectives that are compatible with regional goals. Required land and water surface

1 classification changes associated with the Proposed Action include five reclassifications
 2 to balance resource objectives:
 3

Land Classification	Proposed Action Description	Justification
Project Operations	<p>The increase of Project Operations from 131 acres to 508 acres resulted from the following:</p> <ul style="list-style-type: none"> • Conversion of former Recreation – Intensive Use lands near the USACE Office • Conversion of Low Density Recreation lands near the east end of the dam • Conversion of a narrow strip of Natural Area along the downstream toe of the dam 	<p>All lands converted to Project Operations have historically been used primarily in support of critical operational requirements related to the primary missions of flood risk management and water conservation. The conversion of 377 acres to Project Operations will have no effect on current or projected public use.</p>
High Density Recreation	<p>Lands under the prior classification of Recreation-Intensive Use were converted to the new and similar classification of High Density Recreation, but total land acreage was reduced from 2,971 acres to 2,011 acres through the following changes:</p> <ul style="list-style-type: none"> • Two park areas under the prior Recreation – Intensive Use classification were converted to Multiple Resource Management Lands (MRML) – Low Density Recreation • Two park areas under the prior Recreation-Intensive Use classification were converted to MRML – Wildlife Management • Small portions of several areas under the prior Recreation-Intensive Use classification were converted to MRML – Low Density Recreation, Wildlife Management, or Environmentally Sensitive Areas 	<p>The four park areas that were converted to other, more appropriate classifications had never been developed and are not suitable for future development. Small portions of parks were converted due to shoreline erosion and the associated loss in acreage or, in the case of conversion to Environmentally Sensitive Areas, to recognize significant ecological value of the lands. The conversion of these lands will have no effect on current or projected public use.</p>
Environmentally Sensitive Areas	<p>The classification of 4,319 acres as Environmentally Sensitive Areas resulted from the following lands classification changes:</p> <ul style="list-style-type: none"> • All lands under the prior classification of Natural Area were converted to Environmentally Sensitive Areas, with the exception of a small portion converted to Project Operations and a small portion converted to MRML – Wildlife Management 	<p>These classification changes were necessary for two reasons: (1) change in nomenclature from Natural Area to Environmentally Sensitive Areas and (2) recognition of areas with the highest ecological value. Included were areas of high-value bottomland hardwood forest, riparian forest, and native prairie. These conversions were supported by public comment and recommendations from the U.S.</p>

Land Classification	Proposed Action Description	Justification
Environmentally Sensitive Areas, continued	<ul style="list-style-type: none"> • Several parcels under the prior classification of Low Density Use were converted to Environmentally Sensitive Areas, including lands along Wilson Creek, White Rock Creek, George Creek, and the rolling prairies between Collin Park and Brockdale Park • Large parcels of lands under the prior classification of Operations – Wildlife were converted to Environmentally Sensitive Areas 	Fish and Wildlife Service (USFWS) and Texas Parks and Wildlife Department (TPWD). The conversion of these lands will have no effect on current or projected public use. Lands classified as Environmentally Sensitive Areas are given the highest order of protection among the land classifications.
MRML – Low Density Recreation	<p>The definition of the prior classification of Low Density Use is comparable to the definition of the current classification of MRML – Low Density Recreation. Land classification changes resulted in a net reduction of these acres from 6,403 acres to the current 2,468 acres because:</p> <ul style="list-style-type: none"> • Several parcels of land under the prior classification of Low Density Use were converted to Environmentally Sensitive Areas • Several parcels were converted to MRML – Wildlife Management or Vegetation Management • Several small portions of parks under the prior classification of Recreation – Intensive Use were converted to MRML – Low Density Recreation 	<p>The change from Low Density Use to Environmentally Sensitive Areas was necessary to recognize the high ecological and scenic values of the lands in question and was supported by public comment and recommendations from USFWS and TPWD. The change to MRML – Wildlife or Vegetation Management was needed to better reflect historic management and how these lands will be managed in the future.</p> <p>The small portion of park areas converted to MRML – Low Density Recreation was necessary because these small parcels were never developed and are not suitable for future development due to limited size, exposure to shoreline erosion, or low elevation resulting in frequent inundation. The conversion of these lands will have no effect on current or projected public use.</p>
MRML – Wildlife or Vegetation Management	<p>The classification of 6,476 acres to MRML – Wildlife Management and 824 acres to MRML – Vegetation Management resulted from the following changes:</p> <ul style="list-style-type: none"> • Lands under the prior classification of Operations – Wildlife Management were converted to MRML – Wildlife Management or to Environmentally Sensitive Areas • Several parcels of land under the prior classification of Operations – Low Density Use were converted to MRML – Wildlife Management or to MRML – Vegetation 	<p>The change from the prior Operations – Wildlife Management classification to MRML – Wildlife Management was a simple change to the current nomenclature. The change to Environmentally Sensitive Areas was needed to reflect the high ecological value of the land in question.</p> <p>The change from the prior classification of Operations – Low Density Use to MRML – Wildlife or Vegetation Management was needed to better reflect historic</p>

Land Classification	Proposed Action Description	Justification
MRML – Wildlife or Vegetation Management, continued		management patterns and future management. The conversion of these lands will have no effect on current or projected public use.
Water Surface	<p>The classification of 21,400 acres of water surface of the lake at the conservation pool elevation may result from the following four changes:</p> <ul style="list-style-type: none"> • 63 acres of Restricted water surface at Lavon Lake including a designated strip of water surface along the northern side of the tainter gate structure of Lavon Dam, small restricted areas near the two North Texas Municipal Water District (NTMWD) water intake structures, the discharge channel for the Garland Power Station, and designated swimming beaches 42 acres of • 42 acres of Designated No-Wake areas including approximately 5 acres at the entry point for each of the two existing marinas and an area of approximately 2 acres at each of the 16 public boat ramps on the lake • 21,295 acres of Open Recreation including all water surface areas available for year-round or seasonal water-based recreational use, except for Restricted and Designated No-Wake areas • 0 acres of Fish and Wildlife Sanctuary 	<p>Restricted water surface areas are areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes.</p> <p>Designated No-Wake areas are intended to protect environmentally sensitive shorelines and improve boating safety near key recreational water access areas such as boat ramps.</p> <p>USACE coordinated with TPWD during preparation of the 2016 Master Plan, and this coordination resulted in a determination that no permanent Fish and Wildlife Sanctuary is currently needed at Lavon Lake.</p>

1
2 The Proposed Action was chosen because it would meet regional goals
3 associated with good stewardship of land and water resources, would meet regional
4 recreation goals, and would allow for continued use and development of project lands
5 without violating national policies or public laws. In addition to the five land
6 reclassification actions described above, the Proposed Action includes the designation
7 of 11 utility corridors strategically aligned with existing utility and road easements. The
8 purpose of the utility corridors is to ensure that future utility lines are concentrated in
9 select areas to conserve wildlife habitat and open space.

10
11 The EA and comments received from other agencies have been used to
12 determine whether the Proposed Action requires the preparation of an Environmental
13 Impact Statement (EIS). All environmental, social, and economic factors that are
14 relevant to the recommended alternative were considered in this assessment. These

1 include, but are not limited to, climate and climate change, environmental justice,
2 cultural resources, air quality, Prime Farmland, water quality, wetlands, fish and wildlife,
3 invasive species, migratory birds, recreation, aesthetics, and threatened and
4 endangered species.

5
6 It is my finding, based on the EA, that the revision of the 1972 Master Plan for
7 Lavon Lake will have no significant adverse impact on the environment and will not
8 constitute a major Federal action significantly affecting the quality of the human
9 environment. Therefore, an EIS will not be prepared.

10
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12
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14

Date

Calvin C. Hudson III
Colonel, U.S. Army
District Commander

15

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1 ENVIRONMENTAL ASSESSMENT ORGANIZATION

2
3 This Environmental Assessment (EA) evaluates the potential environmental impacts of
4 the Lavon Lake Master Plan revision. This EA will facilitate the decision process
5 regarding the Proposed Action and alternatives.

6
7 *SECTION 1 INTRODUCTION, PURPOSE, NEED, AND SCOPE* of the
8 Proposed Action summarizes the purpose of and need for the
9 Proposed Action, provides relevant background information, and
10 describes the scope of the EA.

11
12 *SECTION 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION*
13 examines alternatives for implementing the Proposed Action and
14 describes the recommended alternative.

15
16 *SECTION 3 AFFECTED ENVIRONMENT* describes the existing natural,
17 cultural, and human environments.

18
19 *ENVIRONMENTAL CONSEQUENCES* identifies the potential
20 effects of implementing the Proposed Action and alternatives.

21
22 *SECTION 4 CUMULATIVE IMPACTS* describes the impact on the environment
23 that may result from the incremental impact of the action when
24 added to other past, present, and reasonably foreseeable actions.

25
26 *SECTION 5 COMPLIANCE WITH ENVIRONMENTAL LAWS* provides a listing
27 of environmental protection statutes and other environmental
28 requirements.

29
30 *SECTION 6 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF*
31 *RESOURCES* identifies any irreversible and irretrievable
32 commitments of resources that would be involved in the Proposed
33 Action should it be implemented.

34
35 *SECTION 7 PUBLIC AND AGENCY COORDINATION* provides a listing of
36 individuals and agencies consulted during preparation of the EA.

37
38 *SECTION 8 REFERENCES* provides bibliographical information for cited
39 sources.

40
41 *SECTION 9 ACRONYMS/ABBREVIATIONS*

42
43 *SECTION 10 LIST OF PREPARERS* identifies persons who prepared the
44 document and their areas of expertise.

45
46 *APPENDICES* A Public and Agency Coordination

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SECTION 1: INTRODUCTION 1

1.1 PROJECT LOCATION AND SETTING 1

1.2 PURPOSE OF AND NEED FOR THE ACTION 2

1.3 SCOPE OF THE ACTION 3

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7

8 **SECTION 1: INTRODUCTION**

9 The U.S. Army Corps of Engineers (USACE) is proposing to implement the
10 proposed land use reclassifications in the 2016 Lavon Lake Master Plan (2016 Master
11 Plan). The 2016 Master Plan is a revision of the 1972 Master Plan entitled *Trinity River*
12 *Basin, Texas – Design Memorandum No 13, (Revised May 1972) Updated Master Plan*
13 *for Lavon Lake Modification – East Fork Trinity River, Texas*. The 2016 Master Plan is
14 the strategic land use management document that guides the comprehensive
15 management and development actions related to all project recreational, natural, and
16 cultural resources throughout the life of the water resource project. The 2016 Master
17 Plan guides the execution of efficient and cost-effective management, development,
18 and use of project land. The 2016 Master Plan is a vital tool for the responsible
19 stewardship and sustainability of project resources for the benefit of present and future
20 generations.

21
22 Implementation of the 2016 Master Plan (Proposed Action) would create
23 potential impacts on the natural, cultural, and human environments, and as such, this
24 Environmental Assessment (EA) was prepared, in accordance with the National
25 Environmental Policy Act (NEPA) of 1969, (Public Law [PL] 91-190), and 33 Code of
26 Federal Regulations (CFR) 230.

27 **1.1 PROJECT LOCATION AND SETTING**

28 Lavon Lake is a multipurpose water resources project constructed and operated by
29 the USACE. The lake and associated land are located entirely within Collin County,
30 Texas, at river mile 55.9 on the East Fork of the Trinity River. The Lavon Lake Dam
31 extends in an east-west direction for a distance of approximately five miles and is
32 situated two miles east of Wylie, Texas, and 22 miles northeast of the City of Dallas,
33 Texas. The Lavon Lake Dam and associated infrastructure, as well as all land acquired
34 for the Lavon Lake project, are Federally owned and are administered by the USACE.
35 A Vicinity Map showing the location of Lavon Lake with respect to neighboring
36 municipalities and major roadways associated with the lake can be found in Section 1.5
37 of the 2016 Master Plan.

38
39 The Lavon Lake Dam consists of a rolled-fill, earth embankment and a gated
40 concrete spillway with low-flow sluices. The total length of the dam is 19,493 feet which
41 includes the 586-foot spillway. The top of the embankment is 81 feet above the
42 streambed. The upstream slopes are protected with 24-inch riprap placed on nine
43 inches of granular bedding from elevation 462.0 to the crest, at elevation 514.0 feet
44 National Geodetic Vertical Datum (NGVD). An additional layer of 24 inches of graded

1 riprap was placed between elevations 482.0 and 501.0 feet NGVD during a
2 modification. The downstream slopes are grass-lined.

3
4 The spillway is equipped with 12 40-foot by 28-foot tainter gates. Five low-flow,
5 36-inch sluices are located in the five center piers of the spillway. Each of these sluices
6 consists of a 36-inch conduit controlled by a 36-inch service gate. Each conduit is
7 capable of releasing 220 cubic feet per second (cfs) into the stilling basin. When water
8 is released through the tainter gates it cascades into the stilling basin before flowing
9 down the East Fork of the Trinity River. The stilling basin is 568 feet wide and 125 feet
10 long with training walls on either side. The reinforced training walls are 47 feet high.
11 The floor of the stilling basin is at elevation 415.0 feet NGVD and is five-foot-thick
12 concrete. There are two rows of 8-foot-high baffle blocks and an end sill seven feet in
13 height to dissipate the energy of the discharge. The first row has 47 baffle blocks, while
14 the second row has 46 that are staggered from the first row.

15 **1.2 PURPOSE OF AND NEED FOR THE ACTION**

16 The purpose of the Proposed Action is to ensure that the conservation and
17 sustainability of the land, water, and recreational resources on Lavon Lake are in
18 compliance with applicable environmental laws and regulations and to maintain quality
19 land for future public use. The 2016 Master Plan is intended to serve as a
20 comprehensive land and recreation management plan with an effective life of
21 approximately 25 years.

22
23 The need for the Proposed Action is to bring the 1972 Master Plan up to date
24 and to reflect ecological, socio-political, and socio-demographic changes that are
25 currently impacting Lavon Lake, as well as those changes anticipated to occur through
26 2040. Lavon Lake is located completely within Collin County, Texas, which has
27 experienced a 59 percent growth in population from 2000 to 2010 (U.S. Census Bureau
28 2015). This rapid population growth has resulted in changes to land use in the region
29 and around Lavon Lake. Changes in outdoor recreation trends, increasing
30 fragmentation of wildlife habitat, increasing demand for more infrastructure to support
31 the population growth, and current legislative requirements necessitate a more current
32 examination of the management of Federal land at Lavon Lake.

33
34 The following factors may influence reevaluation of management practices and
35 land uses:

- 36
- 37 • Changes in national policies or public law mandates
- 38 • Operations and maintenance budget allocations
- 39 • Recreation area closures
- 40 • Facility and infrastructure improvements
- 41 • Cooperative agreements with stakeholder agencies (such as Texas Parks
42 and Wildlife Department [TPWD] and the U.S. Fish and Wildlife Service
43 [USFWS]) to operate and maintain public land
- 44 • Evolving public concerns

1 The USACE study team held a public meeting to explain the need for a revised
2 Master Plan and to seek public input on decision making.

3 **1.3 SCOPE OF THE ACTION**

4 This EA addresses the implementation of the 2016 Master Plan with special
5 attention given to revised land classifications, new resource management objectives, a
6 conceptual resource plan for each land classification category, and establishment of
7 strategic utility corridors. This EA analyzes the potential impacts that implementing the
8 2016 Master Plan would have on the natural, cultural, and human environments.

9
10 The typical focus of NEPA compliance consists of environmental impact
11 assessments for individual projects, rather than for long-range plans. However,
12 application of NEPA to more strategic decisions not only meets the Council on
13 Environmental Quality (CEQ) implementing regulations (CEQ 2005) and USACE
14 regulations for implementing NEPA (USACE 1988), but also allows the USACE to
15 consider the environmental consequences of its actions long before any physical activity
16 is implemented. Multiple benefits can be derived from such early consideration.
17 Effective and early NEPA integration with the master planning process can significantly
18 increase the usefulness of the Master Plan to the decision maker.

19
20 NEPA documents prepared concurrently with an updated Master Plan can
21 influence and modify strategic land use decisions, whereas NEPA documents prepared
22 after a Master Plan has been updated would have little influence on strategic decisions
23 already included in the plan. The intention of the revised land use classifications in the
24 2016 Master Plan is to develop land classifications, management goals, and
25 management objectives that will guide the sustainable development of resources within
26 the Lavon Lake Project. It is not feasible to define the exact nature of potential impacts
27 for all potential actions prior to receiving specific project proposals. Therefore,
28 environmental consequences may be less than or may exceed what is described in this
29 EA. To ensure that future environmental consequences are identified and documented
30 as accurately as possible, additional NEPA coordination will be conducted, as
31 appropriate, for future projects that are the result of the implementation of the 2016
32 Master Plan.

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1 **SECTION 2: PROPOSED ACTION AND ALTERNATIVES**

2 The Proposed Action is necessary to revise the 1972 Master Plan so that it is
3 compliant with USACE regulations and guidance, incorporates public needs, and
4 recognizes surrounding land use and recreational trends. As part of this process, which
5 includes public outreach and comment, two alternatives were developed for evaluation,
6 including a No Action Alternative. The alternatives were developed using land
7 classifications that indicate the primary use for which project lands are managed.
8 USACE regulations specify five possible categories of land classification: Project
9 Operations, High Density Recreation, Mitigation, Environmentally Sensitive Areas, and
10 Multiple Resource Managed Lands (MRML). MRML are divided into four subcategories:
11 Low Density Recreation, Wildlife Management, Vegetative Management, and
12 Future/Inactive Recreation Areas. At Lavon Lake, each of these land classifications is
13 applicable with the exception of the Mitigation classification and the MRML –
14 Future/Inactive Recreation Area subcategory.
15

16 The action alternative evaluated in this EA is compared to the No Action, which
17 serves as the baseline condition. USACE guidance recommends the establishment of
18 resource goals and objectives for purposes of development, conservation, and
19 management of natural, cultural, and man-made resources at a project. Goals describe
20 the desired end state of overall management efforts, whereas objectives are concise
21 statements describing measurable and attainable management activities that support
22 the stated goals. Goals and objectives are guidelines for obtaining maximum public
23 benefits while minimizing adverse impacts on the environment and are developed in
24 accordance with 1) authorized project purposes, 2) applicable laws and regulations, 3)
25 resource capabilities and suitabilities, 4) regional needs, 5) other governmental plans
26 and programs, and 6) expressed public desires.
27

28 In the context of the 2016 Master Plan, goals express the overall desired end
29 state of the Master Plan whereas objectives are specific task-oriented actions
30 necessary to achieve the Master Plan goals. The objectives in the 2016 Master Plan
31 are intended to provide project benefits, meet public needs, and foster environmental
32 sustainability of Lavon Lake to the greatest extent possible. The goals for the 2016
33 Master Plan include the following:
34

- 35 • Goal A: Provide the best management practices to respond to regional
36 needs, resource capabilities and capacities, and expressed public
37 interests consistent with authorized project purposes.
- 38 • Goal B: Protect and manage project natural and cultural resources
39 through sustainable environmental stewardship programs.
- 40 • Goal C: Provide public outdoor recreation opportunities that support
41 project purposes and public interests while sustaining project natural
42 resources.
- 43 • Goal D: Recognize the unique qualities, characteristics, and potentials of
44 the project.
- 45 • Goal E: Provide consistency and compatibility with natural objectives and
46 other state and regional goals and programs.

1 Specific resource objectives to accomplish these goals can be found in Chapter
2 3.0 of the 2016 Master Plan.

3
4 The Proposed Action would meet regional goals associated with good
5 stewardship of land and water resources, would meet regional recreation goals, would
6 address identified recreational trends, and would allow for continued use and
7 development of project lands without violating national policies or public laws.

8 **2.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE**

9 Under the No Action Alternative, the USACE would not approve the adoption or
10 implementation of the revised land use classifications, resource management
11 objectives, or the conceptual resource plan in the 2016 Master Plan. Instead the
12 USACE would continue to manage Lavon Lake's natural resources as set forth in the
13 1972 Master Plan. The 1972 Master Plan would continue to provide the only source of
14 comprehensive management guidelines and philosophy. However, the 1972 Master
15 Plan is out of date and does not reflect the current ecological, socio-political, or socio-
16 demographic conditions of Lavon Lake or those that are anticipated to occur through
17 2040. The No Action Alternative, while it does not meet the purpose of or need for the
18 Proposed Action, serves as a benchmark of existing conditions against which Federal
19 actions can be evaluated, and as such, the No Action Alternative is included in this EA,
20 as prescribed by CEQ regulations.

21 **2.2 ALTERNATIVE 2: PROPOSED ACTION**

22 Under the Proposed Action, the USACE proposes to adopt and implement the
23 2016 Master Plan. The 2016 Master Plan would replace the 1972 Master Plan and
24 provide an up-to-date management plan that follows current Federal laws and
25 regulations while sustaining Lavon Lake's natural resources and providing recreational
26 experiences for the next 25 years.

27
28 Lavon Lake was originally constructed in 1953-54 and was modified and
29 enlarged in 1974-75. The modification and enlargement of Lavon Lake required
30 acquisition of additional lands, which brought the total fee simple land base to 37,515
31 acres. In addition to these lands, a total of 849 acres of flowage easement was
32 acquired. Flowage easements grant the Federal government the right to periodically
33 inundate the land during flood management operations. When the pool elevation is at
34 the normal or conservation pool elevation, which is 492.0 feet NGVD for Lavon Lake,
35 the lake has a surface area of 21,400 acres. Approximately 16,115 acres of the
36 USACE-administered land lies above the normal pool from elevation 492.0 feet NGVD
37 to approximately 508.0 feet NGVD. During times of flooding, water is stored in Lavon
38 Lake between the elevations of 492.0 feet and 508.0 feet NGVD. The spillway crest,
39 when all flood gates are closed, is 503.5 feet NGVD. The Federal property boundary
40 line is approximately 155 miles long at an elevation of 492.0 feet NGVD, while the
41 shoreline is approximately 121 miles long.

42
43 The 2016 Master Plan proposes to classify all Federal land lying above elevation
44 492.0 feet NGVD and the existing water surface into management classification
45 categories. These land classification categories would allow uses of Federal property

1 that meet the definition of the assigned category and ensure the protection of natural
2 resources and environmental stewardship while allowing maximum public enjoyment of
3 the lake's resources.

4
5 The proposed land classification categories are defined as follows:
6

- 7 • Project Operations: Lands required for the dam, spillway, switchyard,
8 levees, dikes, offices, maintenance facilities, and other areas used solely
9 for the operation of Lavon Lake.
- 10 • High Density Recreation: Lands developed for the intensive recreational
11 activities for the visiting public including day use and campgrounds.
12 These areas could also be for commercial concessions and quasi-public
13 development.
- 14 • Mitigation: Lands used only for mitigation purposes.
- 15 • Environmentally Sensitive Areas: Areas where scientific, ecological,
16 cultural, or aesthetic features have been identified.
- 17 • MRML: Allows for the designation of a predominant use with the
18 understanding that other compatible uses may also occur on these lands.
 - 19 ○ MRML Low Density Recreation: Lands with minimal development or
20 infrastructure that support passive recreational use (primitive camping,
21 fishing, hunting, trails, wildlife viewing, etc.).
 - 22 ○ MRML Wildlife Management: Lands designated for stewardship of fish
23 and wildlife resources.
 - 24 ○ MRML Vegetative Management: Lands designated for stewardship of
25 forest, prairie, and other native vegetative cover.
 - 26 ○ MRML Future or Inactive Recreation Areas: Areas with site
27 characteristics compatible with potential future recreational
28 development or recreation areas that are closed. These areas will be
29 managed for multiple resources until there is an opportunity to develop
30 or reopen these areas.
- 31 • Water Surface: Allows for surface water zones.
 - 32 ○ Restricted: Water areas restricted for Lavon Lake operations, safety,
33 and security.
 - 34 ○ Designated No-Wake: Water areas to protect environmentally
35 sensitive shoreline areas and recreational water access areas from
36 disturbance and areas to protect public safety.
 - 37 ○ Fish and Wildlife Sanctuary: Annual or seasonal restrictions on areas
38 to protect fish and wildlife species during periods of migration, resting,
39 feeding, nesting, or spawning.
 - 40 ○ Open Recreation: Water areas available for year-round or seasonal
41 water-based recreational use.
42

43 Table 2-1 shows the proposed land classifications and acres proposed for each
44 classification, Table 2-2 shows the water surface classifications, and Table 2-3 provides
45 the justification for the proposed reclassification. USACE regulations define a utility
46 corridor as a parcel of land with fixed boundaries that has been identified in the project
47 Master Plan as being the preferred location for future outgrants (e.g., public utilities,
48 pipelines, etc.) or proposed modifications to existing outgrants suitable to accommodate

1 compatible types of outgrants (see Chapter 6.2 of the 2016 Master Plan for designated
 2 utility corridors).
 3
 4

Table 2-1. Proposed Lavon Lake Land Classifications

1972 Land Classifications	Acres	Proposed New Land Classifications	Acres*
Project Operations	131	Project Operations	508
Recreation – Intensive Use	2,971	High Density Recreation	2,011
Natural Area	527	Environmentally Sensitive Areas	4,319
Recreation – Low Density Use	6,403	MRML – Low Density Recreation	2,468
Wildlife Management	6,574	MRML – Wildlife Management	6,476
		MRML – Vegetation Management	824

5 *Land classification acreages were derived using geographic information system (GIS) technology and
 6 do not reflect the official land acquisition records.
 7 Source: USACE 2016
 8
 9

Table 2-2. Proposed Lavon Lake Water Surface Classifications

Classifications	Acres
Water Surface: Restricted	63
Water Surface: Designated No-wake	42
Water Surface: Open Recreation	21,295
Fish and Wildlife Sanctuary	0

Source: USACE 2016

Table 2-3. Justification for the Proposed Reclassification

Land Classification	Proposed Action Description	Justification
Project Operations	<p>The increase of Project Operations from 131 acres to 508 acres resulted from the following:</p> <ul style="list-style-type: none"> • Conversion of former Recreation – Intensive Use land near the USACE Office • Conversion of Low Density Recreation lands near the east end of the dam • Conversion of a narrow strip of Natural Area along the downstream toe of the dam 	<p>All lands converted to Project Operations have historically been used primarily in support of critical operational requirements related to the primary missions of flood risk management and water conservation. The conversion of 377 acres to Project Operations will have no effect on current or projected public use.</p>
High Density Recreation	<p>Lands under the prior classification of Recreation-Intensive Use were converted to the new and similar classification of High Density Recreation, but total land acreage was reduced from 2,971 acres to 2,011 acres through the following changes:</p> <ul style="list-style-type: none"> • Two park areas under the prior Recreation – Intensive Use 	<p>The four park areas that were converted to other, more appropriate classifications had never been developed and are not suitable for future development. Small portions of parks were converted due to shoreline erosion and the associated loss in acreage or, in the case of conversion to Environmentally Sensitive Areas, to recognize significant ecological value of the</p>

10
 11
 12

Table 2-3, continued

Land Classification	Proposed Action Description	Justification
High Density Recreation, continued	<p>classification were converted to MRML – Low Density Recreation</p> <ul style="list-style-type: none"> Two park areas under the prior Recreation – Intensive Use classification were converted to MRML – Wildlife Management Small portions of several areas under the prior Recreation – Intensive Use classification were converted to MRML – Low Density Recreation, Wildlife Management, or Environmentally Sensitive Areas 	lands. The conversion of these lands will have no effect on current or projected public use.
Environmentally Sensitive Areas	<p>The classification of 4,319 acres as Environmentally Sensitive Areas resulted from the following land classification changes:</p> <ul style="list-style-type: none"> All lands under the prior classification of Natural Area were converted to Environmentally Sensitive Areas, with the exception of a small portion converted to Project Operations and a small portion converted to MRML – Wildlife Management Several parcels under the prior classification of Low Density Recreation were converted to Environmentally Sensitive Areas, including lands along Wilson Creek, White Rock Creek, George Creek, and the rolling prairies between Collin Park and Brockdale Park Large parcels of land under the prior classification of Operations – Wildlife were converted to Environmentally Sensitive Areas 	<p>These classification changes were necessary for two reasons: (1) change in nomenclature from Natural Area to Environmentally Sensitive Areas and (2) recognition of areas with the highest ecological value. Included were areas of high-value bottomland hardwood forest, riparian forest, and native prairie. These conversions were supported by public comment and recommendations from the USFWS and TPWD. The conversion of these lands will have no effect on current or projected public use. Lands classified as Environmentally Sensitive Areas are given the highest order of protection among the land classifications.</p>
MRML – Low Density Recreation	<p>The definition of the prior classification of Low Density Use is very comparable to the definition of the current classification of MRML – Low Density Recreation. Land classification changes resulted in a net reduction of these acres from 6,403 acres to the current 2,468 acres because:</p> <ul style="list-style-type: none"> Several parcels of land under the prior classification of Low 	<p>The change from Low Density Use to Environmentally Sensitive Areas was necessary to recognize the high ecological and scenic values of the land in question and was supported by public comment and recommendations from USFWS and TPWD. The change to MRML – Wildlife or Vegetation Management was needed to better reflect historic management and how these lands will be managed in the future.</p>

Table 2-3, continued

Land Classification	Proposed Action Description	Justification
MRML – Low Density Recreation, continued	<p>Density Recreation were converted to Environmentally Sensitive Areas</p> <ul style="list-style-type: none"> • Several parcels were converted to MRML – Wildlife Management or Vegetation Management • Several small portions of parks under the prior classification of Recreation – Intensive Use were converted to MRML – Low Density Recreation 	<p>The small portion of park areas converted to MRML – Low Density Recreation was necessary because these small parcels were never developed and are not suitable for future development due to limited size, exposure to shoreline erosion, or low elevation resulting in frequent inundation. The conversion of these lands will have no effect on current or projected public use.</p>
MRML – Wildlife or Vegetation Management	<p>The classification of 6,476 acres to MRML – Wildlife Management and 824 acres to MRML – Vegetation Management resulted from the following changes:</p> <ul style="list-style-type: none"> • Lands under the prior classification of Operations – Wildlife Management were converted to MRML – Wildlife Management or to Environmentally Sensitive Areas • Several parcels of land under the prior classification of Operations – Low Density Use were converted to MRML – Wildlife Management or to MRML – Vegetation 	<p>The change from the prior Operations – Wildlife Management classification to MRML – Wildlife Management was a simple change to the current nomenclature. The change to Environmentally Sensitive Areas was needed to reflect the high ecological value of the land in question.</p> <p>The change from the prior classification of Operations – Low Density Use to MRML – Wildlife or Vegetation Management was needed to better reflect historic management patterns and future management. The conversion of these lands will have no effect on current or projected public use.</p>
Water Surface	<p>The classification of 21,400 acres of water surface of the lake at the conservation pool elevation may resulted from the following four changes:</p> <ul style="list-style-type: none"> • 63 acres of Restricted water surface at Lavon Lake including a designated strip of water surface along the northern side of the tainter gate structure of Lavon Dam, small restricted areas near the two North Texas Municipal Water District (NTMWD) water intake structures, the discharge channel for the Garland Power Station, and designated swimming beaches • 42 acres of Designated No-Wake areas including approximately 5 acres at the entry point for each of the two 	<p>Restricted water surface are areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes.</p> <p>Designated No-Wake areas are intended to protect environmentally sensitive shorelines and improve boating safety near key recreational water access areas such as boat ramps.</p> <p>USACE coordinated with TPWD during preparation of the 2016 Master Plan, and this coordination resulted in a determination that no permanent Fish and Wildlife Sanctuary is currently needed at Lavon Lake.</p>

Table 2-3, continued

Land Classification	Proposed Action Description	Justification
Water Surface, continued	existing marinas and an area of approximately 2 acres at each of the 16 public boat ramps on the lake <ul style="list-style-type: none"> • 21,295 acres of Open Recreation including all water surface areas available for year-round or seasonal water-based recreational use, except for Restricted and Designated No-Wake areas • 0 acres of Fish and Wildlife Sanctuary 	

1 Source: USACE 2016

2

3 Project Operations

4 These lands are associated with the dam and spillway structures that are
 5 operated and maintained for the purpose of fulfilling the flood risk management mission
 6 of Lavon Lake. In the 2016 Master Plan, there are 508 acres of lands under this
 7 classification all of which are managed by the USACE. The management plan for the
 8 land included in this classification is to continue providing physical security necessary to
 9 ensure continued operation of the critical operational structures. Public access to these
 10 lands is restricted with the exception of the public fishing platform and parking area
 11 located on the west side of the spillway.

12

13 High Density Recreation

14 In the 2016 Master Plan, lands classified for High Density Recreation are
 15 currently developed for intensive recreational activities and encompass 2,011 acres.
 16 Lavon Lake has 16 distinct parcels included in this classification, with each area having
 17 a unique name. These areas are generally referred to as “Parks”. The off-road bicycle
 18 trails area that is leased to Collin County is referred to by Collin County as Sister Grove
 19 Park, but under the USACE land classification system this area is classified as a Low
 20 Density Recreation area. Depending on available space, funding, and public demand,
 21 lands classified for High Density Recreation may support additional outdoor recreation
 22 development in the future. These areas include access points, day-use areas, and
 23 campgrounds. Commercial concession areas such as marinas and comprehensive
 24 resorts also fall into this classification. These areas have been developed to support
 25 concentrated visitation to the extent that an atmosphere of open space compatible with
 26 the natural resources of Lavon Lake is maintained.

27

28 Four High Density Recreation areas are partially or fully leased to non-Federal
 29 partners referred to as grantees; the USACE operates and manages all park areas that
 30 are not leased to others. Each grantee is responsible for the operation and
 31 maintenance of their leased area; the USACE does not provide direct maintenance
 32 within any of the leased locations, but may occasionally lend support where appropriate.

1 Environmentally Sensitive Areas

2 Eleven distinct land parcels totaling 4,319 acres are designated as
3 Environmentally Sensitive Areas in the 2016 Master Plan. Each of these areas was
4 designated taking into consideration habitat values listed in the 2010 habitat evaluation
5 report (see Appendix D of the 2016 Master Plan), institutional knowledge of project
6 lands, and expressed public interest. The rationale for the Environmentally Sensitive
7 Areas designations is based primarily on high wildlife habitat value and the need to
8 protect these and similar areas as described in planning documents published by
9 TPWD, North Central Texas Council of Governments (NCTCOG), and Collin County
10 Parks and Open Space Program. The habitat evaluation report shows that habitat
11 values of the riparian woodland and bottomland hardwood Environmentally Sensitive
12 Areas range from poor for the wood duck (*Aix sponsa*) to excellent for the Carolina
13 chickadee (*Poecile carolinensis*). In general, the primary factors that prevent the
14 forested Environmentally Sensitive Areas from achieving an overall average score of
15 excellent include the following:

- 16
- 17 • The dominant overstory trees are too young and/or small to meet the
18 needs of cavity nesting species such as the barred owl (*Strix varia*), wood
19 duck, and downy woodpecker (*Picoides pubescens*)
- 20 • The absence or scarcity of hard mast-producing trees, such as oaks
21 (*Quercus* spp.) and pecans (*Carya* spp.) that serve as a winter food
22 source for numerous species
- 23

24 These limiting factors will be overcome as the woodlands age and supplemental
25 plantings are completed.

26

27 MRML

28 MRML are, as the name implies, lands that serve multiple purposes, but that are
29 sub-classified and managed for a predominant use. The following paragraphs describe
30 the various sub-classifications of MRML at Lavon Lake, the number of acres in each
31 sub-classification, and the management plan for these lands.

32

33 MRML – Low Density Recreation

34 These lands are generally narrow parcels of land that are adjacent to private
35 residential developments. Ecologically, most of these lands are blackland prairie sites
36 ranging in value from poor to excellent. Many of the areas have been negatively
37 affected by Johnsongrass (*Sorghum halepense*), eastern redcedar (*Juniperus*
38 *virginiana*), and other aggressive woody species. Small riparian corridors on some
39 areas support good quality riparian hardwood trees and shrubs. Future management of
40 these lands calls for maintaining a healthy, ecologically adapted vegetative cover to
41 reduce erosion and improve aesthetics. Prevention of unauthorized use, such as
42 trespass or encroachments, is an important management objective for all USACE lands,
43 but is especially important for those lands in proximity to private development.
44 Management objectives call for restoration of native prairie conditions where practical.

1 These lands are typically open to the public, including adjacent landowners, for
2 pedestrian traffic and are frequently used by adjacent landowners for access to the
3 shoreline near their homes. Currently, portions of these Low Density Recreation areas
4 are leased to Collin County for the Trinity Trail and Sister Grove Park, an area where
5 trails are maintained for hiking and off-road bicycling. Both areas are currently
6 maintained by volunteers. Adjacent landowners may apply for a permit to mow a
7 meandering path to the shoreline, and if conditions warrant, may apply for a permit to
8 mow a narrow strip along the USACE boundary line as a precaution against wildfire.
9 The general public may use these lands for bank fishing, hiking, and for access to the
10 shoreline. Hunting may be allowed in select areas that are a reasonable and safe
11 distance from adjacent residential properties. Future uses may include additional
12 designated natural surface hike/bike/equestrian trails. The Collin County Regional
13 Trails Master Plan (CCRTMP) describes several trails and trail corridors that would
14 affect MRML – Low Density Recreation. The placement of public trails in areas near
15 residential properties will require public involvement prior to trail design. In the 2016
16 Master Plan, there are 2,468 acres of land designated as MRML – Low Density
17 Recreation at Lavon Lake.

18 MRML – Wildlife Management

20 These lands are generally medium to large parcels that are located in the upper
21 reaches of the major tributaries to Lavon Lake as well as a few other smaller parcels.
22 Typically, these areas are adjacent to, or completely surround, one of the 11 designated
23 Environmentally Sensitive Areas. Future management of these lands calls for
24 managing the habitat to support native, ecologically adapted vegetation which in turn
25 supports native wildlife species. Specific management techniques including, but not
26 limited to placement of nesting structures, construction of water features or brush piles,
27 fencing, and planting of specific food-producing plants may be necessary to support the
28 needs of wildlife Species of Greatest Conservation Need (see Appendix D of the 2016
29 Master Plan for a listing of Species of Greatest Conservation Need). Migratory species,
30 both game and non-game, will generally be given priority over non-migratory species
31 when implementing wildlife management measures. Priority will also be given to the
32 improvement or restoration of existing wetlands, or where topography, soil type, and
33 hydrology are appropriate, the construction of wetlands. Where beneficial to long-term
34 ecological management goals, agricultural leases for grazing or hay production may be
35 employed. In general, any grazing lease would be limited to stocker calf operations and
36 short rotation grazing with lease periods of three to five years.

37
38 Current public use of these lands includes hiking and horseback riding on
39 existing trails, bank fishing, canoeing and kayaking, and hunting. Future public use
40 includes all existing uses and expansion of trail opportunities where feasible. The
41 CCRTMP describes several trails and trail corridors that would affect several areas
42 classified as MRML – Wildlife Management. Some MRML – Wildlife Management may
43 support the establishment of nature centers or environmental learning areas. In the
44 2016 Master Plan, there are 6,476 acres of land designated as MRML – Wildlife
45 Management at Lavon Lake.

1 MRML – Vegetative Management

2 These lands include two parcels on the eastern side of the lake that are large
3 enough to support intensive prairie restoration efforts. These lands are generally on
4 upland sites with blackland soil types that will, with proper management, support native
5 prairie. Future management calls for prescription burning, fencing, removal of some but
6 not all aggressive woody species such as eastern redcedar, mesquite (*Prosopis* spp.)
7 and honey locust (*Gleditsia triacanthos*) and supplemental seeding of desirable native
8 grasses and forbs. In some locations, eradication of invasive Johnsongrass,
9 Bermudagrass (*Cynodon dactylon*), and King Ranch bluestem (*Bothriochloa*
10 *ischaemum*) may require the use of herbicides. Short rotation grazing leases or hay
11 production leases may be employed where deemed beneficial to the establishment of
12 healthy native prairie.

13
14 Current recreational use of these lands includes bank fishing and pedestrian
15 access by adjoining landowners. Hunting is currently allowed on the northern parcel
16 that is located adjacent to and south of Highway 380. Future uses include all existing
17 uses with the possibility of creating multiuse trail opportunities. In the 2016 Master
18 Plan, there are 824 acres of land designated as MRML – Vegetation Management at
19 Lavon Lake.

20
21 Water Surface

22 In accordance with the national USACE policy set forth in Engineer Pamphlet
23 (EP) 1130-2-550, the water surface of the lake at the conservation pool elevation may
24 be classified using the following four classifications:

- 25
26 • Restricted
27 • Designated No-Wake
28 • Fish and Wildlife Sanctuary
29 • Open Recreation
30

31 At the conservation pool elevation of 492.0 feet NGVD, Lavon Lake has a water
32 surface area of 21,400 acres. The following water surface classifications are
33 designated at Lavon Lake:

34
35 *Restricted*

36 Restricted water surface includes those areas where recreational boating is
37 prohibited or restricted for project operations, safety and security purposes. The
38 Restricted water surface at Lavon Lake includes a designated strip of water surface
39 along the northern side of the tainter gate structure of Lavon Dam, small restricted
40 areas near the two NTMWD water intake structures, and the discharge channel for the
41 Garland Power Station. Designated swimming beaches are also classified as
42 Restricted water surface. The total acreage of Restricted water surface is
43 approximately 63 acres. These areas are normally marked with standard U.S. Coast
44 Guard (USCG) regulatory buoys stating that boats are excluded from the area. In some
45 instances, physical barriers may be in place on the water.

1 *Designated No-Wake*

2 Designated No-Wake areas are intended to protect environmentally sensitive
3 shorelines and improve boating safety near key recreational water access areas such
4 as boat ramps. Designated No-Wake areas at Lavon Lake include approximately five
5 acres at the entry point for each of the two existing marinas, and an area of
6 approximately two acres at each of the 16 public boat ramps on Lavon Lake. These
7 areas are typically marked with standard USCG regulatory buoys.

8
9 *Open Recreation*

10 Open Recreation includes all water surface areas available for year-round or
11 seasonal water-based recreational use. With the exception of the Restricted and
12 Designated No-Wake areas described in the above paragraphs, the remaining water
13 surface of approximately 21,295 acres at Lavon Lake water surface is designated as
14 Open Recreation.

15
16 *Fish and Wildlife Sanctuary*

17 This water surface classification applies to areas with annual or seasonal
18 restrictions to protect fish and wildlife species during periods of migration, resting,
19 feeding, nesting, or spawning. Coordination with TPWD during preparation of the 2016
20 Master Plan resulted in a determination that no permanent fish and wildlife sanctuary is
21 needed at Lavon Lake. This determination was based on several factors including the
22 current “no hunting” restriction that applies to the majority of the Lavon Lake water
23 surface, the existence of many privately owned ponds and small lakes throughout the
24 region surrounding Lavon Lake that provide sanctuary areas for waterfowl and
25 shorebirds, and the fact that annual waterfowl counts conducted by TPWD for the past
26 several years have indicated healthy waterfowl populations. Should it become
27 necessary to designate sanctuary areas in the future, such designation can be
28 accomplished as needed on an annual basis taking into account habitat conditions,
29 public use levels, and changing fish and wildlife populations.

30
31 Future management of the water surface includes the maintenance of warning,
32 information, and regulatory buoys, as well as routine water safety patrols during peak
33 use periods. Depending on available funding and appropriate lake conditions, USACE
34 intends to conduct a water-oriented recreation use study to determine the level and type
35 of boating traffic occurring on the lake. The outcome of such a study may include
36 changes in water surface zoning.

37
38 Project Easement Lands

39 Project easement lands are lands on which easement interests were acquired.
40 Fee title was not acquired on these lands, but the easement interests convey to the
41 Federal government certain rights to use or restrict the use of the land for specific
42 purposes. Easement lands are typically classified as Operations Easement, Flowage
43 Easement, and/or Conservation Easement. At Lavon Lake the only easement lands are
44 those lands where a flowage easement was acquired. A flowage easement, in general,
45 grants to the government the perpetual right to temporarily flood or inundate private land

1 during flood risk management operations and to prohibit activities on the flowage
2 easement that would interfere with flood risk management operations, such as
3 placement of fill material or construction of habitable structures. In the 2016 Master
4 Plan, there are 849 acres of land designated as Flowage Easement lands at Lavon
5 Lake.

6 7 Utility Corridors

8 Recent USACE guidance in ER-1130-2-550, Chapter 17, encourages the
9 establishment of designated utility corridors with defined boundaries on project lands as
10 a means to consolidate the placement of utility lines in locations resulting in the least
11 possible environmental impact. The Proposed Action establishes 11 corridors crossing
12 the major arms of Lavon Lake (see Chapter 6.2 in the 2016 Master Plan). Each corridor
13 incorporates and aligns with existing state highways and utility lines easements. Best
14 Management Practices (BMPs) specify that future use of each corridor shall occur,
15 where feasible, within existing, previously disturbed easements and secondarily within a
16 narrow strip of land varying from 25 feet to 100 feet lying parallel to existing easements.
17 Future underground utilities within each corridor shall be installed, where possible, by
18 subsurface boring. The future use of any corridor will require mitigation for the loss of
19 any natural resources in accordance with USACE stipulations.

20
21 Chapter 6.2 in the 2016 Master Plan provides a summary of corridor locations,
22 lengths, and the acreage of project lands included in each corridor that is not already
23 included within an existing easement. The total acreage for the 11 corridors is
24 approximately 172 acres, of which approximately 110 acres is open water with the
25 remaining 62 acres consisting of low-quality grassland and early successional
26 woodland.

27 **2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER** 28 **CONSIDERATION**

29 Other alternatives to the Proposed Action were initially considered as part of the
30 scoping process for this EA. However, none met the purpose of and need for the
31 Proposed Action or the USACE regulations and guidance. Furthermore, no other
32 alternatives addressed public concerns. As such, no other alternatives are being
33 carried forward for analysis in this EA.

1 **SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES**

2 This section of the EA describes the natural and human environments that exist
3 at Lavon Lake and the potential impacts of the No Action Alternative (Alternative 1) and
4 Proposed Action (Alternative 2), outlined in Section 2.0 of this document. Only those
5 issues that have the potential to be affected by any of the alternatives are described,
6 per CEQ guidance (40 CFR § 1501.7 [3]). Some topics are limited in scope due to the
7 lack of direct effect from the Proposed Action on the resource or because that particular
8 resource is not located within the study area. For example, no body of water in the
9 Lavon Lake watershed is designated as a Federally Wild or Scenic River, so this
10 resource will not be discussed.

11
12 Impacts (consequence or effect) can be either beneficial or adverse and can be
13 either directly related to the action or indirectly caused by the action. Direct effects are
14 caused by the action and occur at the same time and place (40 CFR § 1508.8[a]).
15 Indirect effects are caused by the action and are later in time or further removed in
16 distance but are still reasonably foreseeable (40 CFR § 1508.8[b]). As discussed in
17 this section, the alternatives may create temporary (less than 1 year), short-term (up to
18 3 years), long-term (3 to 10 years), or permanent effects following the Master Plan
19 revision.

20
21 Whether an impact is significant depends on the context in which the impact
22 occurs and the intensity of the impact (40 CFR § 1508.27). The context refers to the
23 setting in which the impact occurs and may include society as a whole, the affected
24 region, the affected interests, and the locality. Impacts on each resource can vary in
25 degree or magnitude from a slightly noticeable change to a total change in the
26 environment. For the purpose of this analysis, the intensity of impacts would be
27 classified as negligible, minor, moderate, or major. The intensity thresholds are defined
28 as follows:

- 29
30
- 31 • Negligible: A resource would not be affected or the effects would be at or
32 below the level of detection, and changes would not be of any measurable
33 or perceptible consequence.
 - 34 • Minor: Effects on a resource would be detectable, although the effects
35 would be localized, small, and of little consequence to the sustainability of
36 the resource. Mitigation measures, if needed to offset adverse effects,
37 would be simple and achievable.
 - 38 • Moderate: Effects on a resource would be readily detectable, long-term,
39 localized, and measurable. Mitigation measures, if needed to offset
40 adverse effects, would be extensive and likely achievable.
 - 41 • Major: Effects on a resource would be obvious and long-term, and would
42 have substantial consequences on a regional scale. Mitigation measures
43 to offset the adverse effects would be required and extensive, and
success of the mitigation measures would not be guaranteed.

1 **3.1 LAND USE**

2 The USACE lands above elevation 492.0 feet NGVD presently associated with
3 Lavon Lake are listed in the 1972 Master Plan as follows:

4

- 5 • 131 acres of land managed as Project Operations
- 6 • 527 acres of land managed as Natural Areas
- 7 • 2,971 acres of land managed as Recreation – High Density
- 8 • 6,403 acres of land managed as Recreation – Low Density
- 9 • 6,574 acres of land managed as Wildlife Management

10

11 A total of 16 designated recreation areas and the Stilling Basin Access Point
12 operate as High Density Use Recreation areas at Lavon Lake. These areas include
13 Avalon Park, Bratonia Park, Brockdale Park, Caddo Park (temporarily closed), Clear
14 Lake Park, Collin Park, East Fork Park, Elm Creek Park, Highland Park, Lakeland Park,
15 Lavonia Park, Little Ridge Park, Mallard Park, Pebble Beach Park, Stilling Basin
16 Access, Tickey Creek Park, and Twin Groves Park.

17

18 Two marinas also operate on the lake under a concession lease with the
19 USACE. One of the marinas also operates Collin Park for day use and camping. The
20 USACE operates all other parks. The majority of the USACE park operations and
21 maintenance activities, including mowing, cleaning, building repairs, road repairs, utility
22 repairs, trash removal, and related tasks are accomplished through service contracts.

23

24 Most of the Federal lands associated with Lavon Lake, as well as the majority of
25 Collin County, were long ago converted from tall grass prairie and riparian woodlands to
26 cultivation, pasture, and most recently residential development.

27

28 **3.1.1 Alternative 1: No Action Alternative**

29 The No Action Alternative for Lavon Lake would mean the 1972 Master Plan
30 would not be revised and no new resources analysis resource management objectives,
31 utility corridors, or land use classifications would occur. The operation and maintenance
32 of USACE lands at Lavon Lake would continue as outlined in the existing Master Plan.
33 Although this alternative does not result in a Master Plan that meets current regulations
34 and guidance, there would be no significant impacts on land uses on Project lands.

35

36 **3.1.2 Alternative 2: Proposed Action**

37 The objectives for revising the Lavon Lake Master Plan were to describe current
38 and foreseeable land uses and management priorities taking into account expressed
39 public opinion and USACE policy that have evolved to meet day-to-day operational
40 needs. The changes required for the Proposed Action were developed to recognize
41 and implement regional goals associated with good stewardship of land and water
42 resources that would allow for continued use and development of project lands.
43 Therefore, implementation of the Proposed Action would not result in significant impacts
44 on land uses on Project lands.

45 **3.2 WATER RESOURCES**

46 Surface Water

1 When the pool elevation is at the normal or conservation pool elevation of 492.0
2 feet NGVD, the lake has a surface area of 21,400 acres. Approximately 16,115 acres of
3 USACE-administered land lies above the normal pool from elevation 492.0 feet NGVD
4 to approximately 508.0 NGVD. During times of flooding, water is stored in Lavon Lake
5 between elevation 492.0 feet and 508.0 feet NGVD. The Federal property boundary
6 line is approximately 155 miles long and at elevation 492.0 feet NGVD the shoreline is
7 approximately 121 miles long.

8
9 The release of stored flood water is controlled by the USACE until the normal or
10 conservation pool elevation of 492.0 feet NGVD is achieved. Water stored below an
11 elevation of 492.0 feet is managed for water supply purposes in accordance with
12 contractual agreements between the USACE and the NTMWD. NTMWD withdraws
13 water from the lake through three separate water intake structures located along the
14 southwest shoreline of the lake. To supplement water supply, the NTMWD has the
15 capability to pump water into Lavon Lake from Jim Chapman Lake (Cooper Dam) and
16 Lake Texoma. Recently, invasive zebra mussels (*Dreissena polymorpha*) were found in
17 Lake Texoma thus preventing the direct pumping of Lake Texoma water into Lavon
18 Lake. In addition to the water management responsibilities of the USACE and NTMWD,
19 the City of Garland withdraws water from Lavon Lake through an intake channel near
20 Little Ridge Park. The water withdrawn by Garland is used as cooling water for a steam
21 electric plant and is returned to the lake.

22
23 Lavon Lake is part of the Upper Trinity River watershed in the north-central
24 Texas region. The dam is located on the East Fork of the Trinity River originating in the
25 southern part of Grayson County near Dorchester, Texas, in north-central Texas. The
26 East Fork flows about 110 miles in a southerly direction until it merges with the Trinity
27 River below Dallas. The East Fork joins the main stem at approximately river mile 460
28 of the Trinity River near Rosser, Texas.

29
30 The watershed is generally located north and east of Dallas, Texas, and includes
31 a portion of the Dallas metropolitan area, and the cities of Garland, McKinney, Plano,
32 Richardson and Mesquite. The watershed has a length of about 78 miles along the
33 major axis of its valley and a maximum width of about 30 miles. The East Fork
34 watershed has a drainage area of 1,314 square miles, including 770 square miles
35 above Lavon Lake. Portions of the watershed lie within Collin, Dallas, Fannin, Grayson,
36 Hunt, Kaufman, and Rockwall counties.

1 The East Fork watershed has a multiple stream drainage pattern. Sister Grove,
2 Pilot Grove, and Indian Creeks are major left bank tributaries, and Wilson Creek and
3 Honey Creek are major right bank tributaries that are all located upstream of Lavon
4 Dam. Major downstream right bank tributaries are Muddy Creek, Rowlett Creek, and
5 Duck Creek. There are no major left bank tributaries downstream of Lavon Dam. Lake
6 Ray Hubbard, a water supply reservoir owned and operated by the City of Dallas is
7 located only a few miles downstream from the dam at Lavon Lake.

8
9 In addition, it is notable that in the watershed above Lavon Lake, the U.S.
10 Department of Agriculture Natural Resources Conservation Service (USDA NRCS) has
11 constructed at least 149 water retention structures. These structures retard runoff from
12 approximately 242 square miles. The combined detention capacity of these structures is
13 69,170 acre-feet, but this storage capacity has a limited effect on the inflow to Lavon Lake
14 during major floods. There are no major flood retention reservoirs in the Trinity River
15 watershed above Lavon Lake.

16 17 Hydrology and Groundwater

18 Groundwater in the immediate Lavon Lake area and throughout most of Collin
19 County is present in two aquifers, the Trinity (subcrop) Aquifer, considered to be a major
20 aquifer by the State of Texas, and the more shallow Woodbine (subcrop) Aquifer,
21 considered to be a minor aquifer. Administratively, these aquifers are included in
22 Groundwater Management Area (GMA) 8, as designated by the Texas Water
23 Development Board (TWDB). There are 12 Groundwater Management Districts within
24 GMA 8, including the North Texas Groundwater Conservation District, which
25 encompasses Cooke, Denton, and Collin counties.

26
27 Both the Trinity and the Woodbine aquifers serve a very densely populated area
28 and have been heavily used over the past several decades by numerous municipalities, as
29 well as other public water supply providers. Some of the largest aquifer level declines in
30 Texas have occurred in the Trinity Aquifer in a broad corridor that encompasses and
31 parallels Interstate Highway 35. These declines have ranged from 350 feet to more than
32 1,000 feet. The decline has slowed in recent years due to increasing reliance on surface
33 water for municipal purposes. Refer to Figure 2-3 in the 2016 Master Plan for a map of the
34 Trinity Aquifer in the areas where declines have been significant. All recreational areas
35 operated by the USACE and others at Lavon Lake are connected to municipal or other
36 public water supply providers.

37 38 Water Quality

39 The USACE, U.S. Geological Survey (USGS), and NTMWD conduct water
40 quality testing at Lavon Lake. The most routine testing is conducted by NTMWD, which
41 takes monthly samples at approximately 17 locations. Table 3-1 provides the 17
42 sample locations and notes those sites where fecal coliform, taste, and odor are
43 analyzed. Table 3-2 provides the chemical and biological parameters of the testing.
44 Tables 3-3, 3-4, and 3-5 provide an April 2012 water analysis report for raw and treated
45 water withdrawn from Lavon Lake by NTMWD. The April 2012 time period was
46 selected because the lake elevation was close to the conservation pool elevation during
47 that period.

1
2

Table 3-1. NTMWD Water Quality Sample Locations for Taste, Odor, and Fecal Coliform

Site Number	Site Location	Parameter Sampled
1	Highway 380	-
2	Elm Creek Park	Taste and Odor
6	Pilot Grove Arm	Taste and Odor
7	Raw Water #1	Taste and Odor
8	Raw Water #2	Taste and Odor
9	Brockdale Park	Taste, Odor, and Fecal Coliform
10	Highway 3286/546	Taste, Odor, and Fecal Coliform
11	Wilson Creek Cove	Fecal Coliform
12	East Fork	Fecal Coliform
13	West Arm #1	Fecal Coliform
14	West Arm #2	Fecal Coliform
15	East Arm #1	-
16	East Arm #3	-
17	Raw Water #3	Taste, Odor, and Fecal Coliform

3
4

Table 3-2. Chemical and Biological Parameters Sampled by NTMWD

Parameter Sampled	
<ul style="list-style-type: none"> • Dissolved Oxygen (DO) • Water Temperature • Conductivity • Turbidity • pH • Total Kjeldhal Nitrogen • Ammonia (NH₃) • Nitrite (NO₂⁻) • Nitrate (NO₃) 	<ul style="list-style-type: none"> • Sulfate (SO₄) • Total Dissolved Solids (TDS) • Chlorophyll-A • Chlorides (Cl) • Ortho-Phosphate (PO₄) • Total Suspended Solids (TSS) • Volatile Suspended Solids (VSS) • Total Organic Carbon (TOC) • Phyto Count

5
6
7
8
9

Table 3-3. NTMWD Water Quality Mineral and Alkalinity Analysis from April 2012 for Raw and Treated Water Withdrawn from Lavon Lake using U.S. Environmental Protection Agency (USEPA) and Texas Commission on Environmental Quality (TCEQ) Standards

Mineral Analysis	Standards					
	Raw (mg/L)*	Treated (mg/L)	USEPA Primary (mg/L)	USEPA Secondary (mg/L)	TCEQ Primary (mg/L)	TCEQ Secondary (mg/L)
Residue on Evaporation	232	258		500		1000
Silica (SiO ₂)	3.11	2.90				
Iron (Fe)	0.685	<0.200		0.3		0.3
Calcium (Ca)	52.1	53.8				
Magnesium (Mg)	3.69	3.51				
Sodium (Na)	22.4	32.6				
Potassium (K)	5.23	5.16				
Bicarbonates (HCO ₃)	117	105				
Carbonates (CO ₃)	0	0				
Hydroxides (OH)	0	0				
SO ₄	38.6	69.0		250		
NO ₂	0.0509	<0.0200	1			

Table 3-3, continued

Mineral Analysis	Standards					
	Raw (mg/L)*	Treated (mg/L)	USEPA Primary (mg/L)	USEPA Secondary (mg/L)	TCEQ Primary (mg/L)	TCEQ Secondary (mg/L)
NO ₃	0.999	1.06	10			
Cl	20.1	28.4		250		300
Fluoride (F)	0.284	0.608	4.0	2.0		2.0
PO ₄	0.0720	0.0110				
Total Alkalinity	117	105				
Phenolphthalein Alkalinity	0	0				
Non-CO ₃ Hardness	19.3	43.3				
Total Hardness	136	148				
Langelier Index	-	[+ 0.150]				

* milligrams per liter

1
2
3
4

Table 3-4. NTMWD Water Quality Trace Element Analysis (April 2012) – Raw and Treated Water Withdrawn from Lavon Lake

Trace Element Analysis	Standards					
	Raw (mg/L)	Treated (mg/L)	USEPA Primary (mg/L)	USEPA Secondary (mg/L)	TCEQ Primary (mg/L)	TCEQ Secondary (mg/L)
Arsenic (As)	<0.00500	<0.00500	0.01		0.01	
Barium (Ba)	0.0528	0.0432	2		2	
Cadmium (Cd)	<0.00100	<0.00100	0.005		0.005	
Chromium (Cr)	<0.00500	<0.00500	0.1		0.1	
Copper (Cu)	0.0267	0.186	1.3		1.3	1.0
Fe	0.685	<0.200		0.3		
Lead (Pb)	<0.00100	<0.00100	0.15		0.15	
Manganese (Mn)	0.0232	<0.00100		0.5		0.05
Mercury (Hg)	<0.000100	<0.000100	0.002		0.002	
Nickel (Ni)	0.00399	0.00547				
Selenium (Se)	0.00106	<0.00100	0.05		0.05	
Silver (Ag)	<0.00100	<0.00100		0.10		0.1
Zinc (Zn)	0.00651	<0.00500		5		5

5
6
7

Table 3-5. NTMWD Water Quality Other Analysis (April 2012) – Raw and Treated Water Withdrawn from Lavon Lake

Analysis	Standards					
	Raw	Treated	USEPA Primary	USEPA Secondary	TCEQ Primary	TCEQ Secondary
Chlorine Residual (mg/L)	-	3.23	4.0		4.0	
Total Coliform (Present/Absent)	-	A	A		A	
pH @ 25°	8.07	7.75		6.5-8.5		>7.0
Specific Conductance (Umhos) ¹	369	443				
Turbidity (NTU) ²	15.0	0.0999	0.3		0.3	
Threshold Odor Number	EARTHY	ND				3

8
9

¹Umhos = micromhos

²NTU = Nephelometric Turbidity Units

1 In summary, water quality at Lavon Lake can be characterized as generally good.
2 Water quality is not static and can change over time as a result of changes in the
3 landscape and human activity within the watershed. Lavon Lake, with a drainage area
4 of approximately 770 square miles, receives significant runoff from agricultural row crop
5 production and suburban land. Water testing over the years has indicated elevated
6 levels of nitrate at times which may result in algal blooms in the lake. Common sources
7 of nitrate loading include runoff of applied fertilizer from agricultural fields. Having a
8 well-vegetated buffer along the shoreline of the lake can have a positive impact on
9 nutrient loading by absorbing nutrients before they reach the water body. However, the
10 primary source of nutrient loading is from activities taking place throughout the
11 watershed in areas remote from USACE-managed lands. Any attempt to reduce
12 nutrient loading from the watershed would require the cooperation of many
13 governmental entities and private landowners.
14

15 As with many reservoirs in Texas, warm summer temperatures can cause lake
16 stratification resulting in very low levels of DO in deeper areas of the lake. This causes
17 displacement of fish and other aquatic organisms to less deep parts of the lake where
18 DO levels remain at sufficient levels.
19

20 **3.2.1 Alternative 1: No Action Alternative**

21 There would be no short- or long-term, minor, moderate or major, beneficial, or
22 adverse impacts on water resources as a result of implementing the No Action
23 Alternative, since there would be no change to the existing Master Plan.
24

25 **3.2.2 Alternative 2: Proposed Action**

26 The reclassifications, resource management objectives, and resource plan
27 required for the Proposed Action would allow land management and land uses to be
28 compatible with the goals of good stewardship of water resources; therefore, there
29 would be no significant adverse impacts on water supply or quality. With
30 implementation of the 2016 Master Plan beneficial impacts on water quality could occur.
31 For instance, the reclassifications proposed in the 2016 Master Plan include 4,319
32 acres as Environmentally Sensitive Areas. Included as Environmentally Sensitive were
33 areas of high-value bottomland hardwood and riparian forest, and areas supporting
34 high-value native prairie communities, all of which can act as ecological buffers
35 capturing sediment, removing nutrients, and improving water quality.

36 **3.3 CLIMATE**

37 The climate of Collin County is warm, temperate, subtropical, and humid, with hot
38 summers and mild winters. Occasional extreme temperatures occur in winter and
39 summer months but are of short duration. The average low and high temperatures
40 range from 36 degrees Fahrenheit (°F) in January to 96°F in July. The lowest minimum
41 recorded temperature is 1°F in 1989, and the highest maximum recorded temperature is
42 112°F in 1980.
43

44 The average frost-free period is 287 days, but this can vary significantly from
45 year to year. The average first freeze occurs in mid-November, and the average last
46 freeze occurs in late March. Annual precipitation within the county averages 33.7
47 inches per year and is fairly evenly distributed throughout the year, with the highest

1 rainfall typically occurring in April and May. Snow seldom falls and is an insignificant
2 source of moisture. Relative humidity ranges from 38 percent to 93 percent with the
3 driest period around late July and the most humid period in early May. The prevailing
4 surface winds are southeasterly, with strong winds from the north-northwest occurring
5 frequently in winter months. In a typical year, wind speeds vary from zero to 17 miles
6 per hour (mph) and rarely exceed 25 mph.

8 **3.3.1 Alternative 1: No Action Alternative**

9 The No Action Alternative does not involve any activities that would contribute to
10 changes in existing conditions. There would be no short- or long-term, minor, moderate
11 or major, beneficial, or adverse impacts on climate as a result of implementing the No
12 Action Alternative.

14 **3.3.2 Alternative 2: Proposed Action**

15 Revision of the Lavon Lake Master Plan would have no impact on the climate of
16 the study area. There would be no short- or long-term, minor, moderate or major,
17 beneficial, or adverse impacts on climate as a result of implementing the No Action
18 Alternative.

20 **3.4 CLIMATE CHANGE AND GREENHOUSE GASES**

21 CEQ drafted guidelines for determining meaningful greenhouse gas (GHG)
22 decision-making analysis. The CEQ guidance states that if a project would be
23 reasonably anticipated to cause direct emissions of 25,000 U.S. tons or more of carbon
24 dioxide (CO₂)-equivalent (CO₂e) GHG emissions per year, the project should be
25 considered in a qualitative and quantitative manner in NEPA reporting (CEQ 2014).
26 CEQ proposes this as an indicator of a minimum level of GHG emissions that may
27 warrant some description in the appropriate NEPA analysis for agency actions involving
28 direct emissions of GHG (CEQ 2014).

29
30 According to the most recent estimating tools from the U.S. Environmental
31 Protection Agency (USEPA), there are five GHG contributors within Collin County, one
32 of which, Roy Olinger Power Plant, is located adjacent to Lavon Lake (USEPA 2016).
33 The general operations and recreation facilities associated with Lavon Lake do not
34 approach the proposed reportable limits. Lavon Lake does have management plans in
35 place such as routine equipment maintenance, holistic vegetative management plans,
36 natural resource management plans, and public education and outreach programs to
37 protect regional natural resources from GHG impacts. In addition, USACE will continue
38 monitoring programs as required to meet applicable laws and policies.

39
40 Two Executive Orders (EOs), EO 13514 and EO 13653, as well as the
41 President's Climate Action Plan (CAP), set forth requirements to be met by Federal
42 agencies. These requirements range from preparing general preparedness plans to
43 meeting specific goals to conserve energy and reduce GHG emissions. The USACE
44 has prepared an Adaptation Plan in response to the EOs and CAP. The Adaptation
45 Plan includes the following USACE policy statement:

1 *It is the policy of USACE to integrate climate change preparedness and*
2 *resilience planning and actions in all activities for the purpose of*
3 *enhancing the resilience of our built and natural water-resource*
4 *infrastructure and the effectiveness of our military support mission, and to*
5 *reduce the potential vulnerabilities of that infrastructure and those*
6 *missions to the effects of climate change and variability.*
7

8 The USACE manages project lands and recreational programs to advance broad
9 national climate change mitigation goals, including but not limited to climate change
10 resilience and carbon sequestration, as set forth in EO 13653, EO 13693, and related
11 USACE policy.
12

13 **3.4.1 Alternative 1: No Action Alternative**

14 The No Action Alternative does not involve any activities that would contribute to
15 changes in existing conditions. There would be no short- or long-term, minor, moderate
16 or major, beneficial, or adverse impacts on climate change or contributions to GHG
17 emissions as a result of implementing the No Action Alternative.
18

19 **3.4.2 Alternative 2: Proposed Action**

20 Under the Proposed Action, current Lavon Lake project management plans and
21 monitoring programs would not be changed. There would be no short- or long-term,
22 minor, moderate or major, beneficial, or adverse impacts on climate change or
23 contributions to GHG emissions as a result of implementing the 2016 Master Plan. In
24 the event that GHG emission issues become significant enough to impact the current
25 operations at Lavon Lake, the 2016 Master Plan and all associated documents would
26 be reviewed and revised as necessary.

27 **3.5 AIR QUALITY**

28 National Ambient Air Quality Standards (NAAQS) have been established by the
29 USEPA, Office of Air Quality Planning and Standards (OAQPS), for six criteria
30 pollutants that are deemed to potentially impact human health and the environment.
31 These include 1) carbon monoxide (CO); 2) Pb; 3) nitrogen dioxide (NO₂); 4) ozone
32 (O₃); 5) particulate matter <10 microns (PM₁₀); and 6) sulfur dioxide (SO₂). Ground
33 level or "bad" O₃ is not emitted directly into the air, but is created by chemical reactions
34 between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the
35 presence of sunlight. Emissions from industrial facilities and electric utilities, motor
36 vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources
37 of NO_x and VOC (USEPA 2011).
38

39 In 2012, the USEPA designated 10 counties (Collin, Dallas, Denton, Ellis,
40 Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise) in north-central Texas as in
41 nonattainment for the pollutant O₃ in accordance with the 1997 eight-hour O₃ NAAQS.
42 These standards are designed to protect human and environmental health, and ground-
43 level O₃ is monitored and targeted for reductions due to its potentially harmful effects.
44 Four main sources of O₃-causing emissions include on-road mobile sources like cars
45 and trucks, non-road mobile sources like construction equipment, point sources like
46 electricity-generating utilities and industrial boilers, and area sources like solvent use
47 and agriculture.

1
2 Development of an air quality plan, known as the State Implementation Plan
3 (SIP), is required for all nonattainment areas in order to demonstrate how O₃ will be
4 reduced to levels compliant with the NAAQS. The SIP for the Dallas-Fort Worth
5 nonattainment area, in which the lake is located, includes programs to get older cars off
6 the road, technologies to clean up vehicles already on the road, and education
7 programs so that citizens can do their part in improving air quality in north-central
8 Texas.

9
10 In conducting routine operations and maintenance activities at Lavon Lake, the
11 USACE will comply with all Federal, state, and local laws governing air quality and will
12 implement BMPs to protect air quality. Prescribed fire is a useful land management tool
13 for improving native prairie and certain forested areas and will be conducted in
14 accordance with the Texas Administrative Code, Section 111.211(1). Statutory
15 requirements governing prescribed fire and other types of outdoor burning are explained
16 in the TCEQ publication "Outdoor Burning in Texas" available on the TCEQ website.
17 USACE guidance for wildland fire management is set forth in EP 1130-2-540.

18 19 **3.5.1 Alternative 1: No Action Alternative**

20 There would be no short- or long-term, minor, moderate or major, beneficial, or
21 adverse impacts on air quality as a result of implementing the No Action Alternative,
22 since there would be no change to the existing Master Plan.

23 24 **3.5.2 Alternative 2: Proposed Action**

25 Existing operation and management of Lavon Lake is compliant with the Clean
26 Air Act and would not change with implementation of the revised land use classifications
27 in the 2016 Master Plan. No short- or long-term, minor, moderate or major, beneficial,
28 or adverse impacts on air quality would occur as a result of implementing the proposed
29 revisions to the Lavon Lake Master Plan.

30 **3.6 TOPOGRAPHY, GEOLOGY, AND SOILS**

31 Topography

32 Lavon Lake is located in north-central Texas entirely within Collin County on the
33 East Fork of the Trinity River. The lake is split into two arms, the East Fork of the Trinity
34 River to the west, and Pilot/Sister Grove Creeks to the east. The topography of the
35 area varies from gently rolling in the upper portion of the watershed to generally flat in
36 the lower portion. The gently undulating slightly rolling upland areas have historically
37 been intensely cultivated. The study area lies within the West Gulf Coastal Plains
38 section of the Coastal Plains physiographic province. The floodplain of the East Fork of
39 the Trinity River has an average width of two miles and is confined between valley walls
40 that rise fairly steeply to terrace flats and rolling uplands.

41
42 The main body of the impounded water at elevation 492.0 feet (top of
43 conservation pool storage) has a maximum length of 12 miles and a maximum width of
44 4.75 miles. Maximum depth at conservation pool is approximately 45 feet and the
45 average depth is 18 feet. The water level fluctuates about 7.1 feet annually. The
46 elevation of the terrain at Lavon Lake ranges from 430 feet at the bottom of the

- 1 inundated East Fork river channel, to approximately 675 feet NGVD in the surrounding
- 2 hill tops.

1 Geology

2 Lavon Lake is underlain by an eastward and southeastward-dipping series of
3 Upper Cretaceous marine sedimentary rocks, overlain locally by Pleistocene fluvial
4 terrace deposits of recent floodplain alluvium. Change in the strike of beds from north
5 to east across Collin County may be in response to deposition of Cretaceous units over
6 now-buried, plunging folds of the Ouachita or Arbuckle mountain systems.

7
8 Shoreline geology of Lavon Lake consists primarily of fluvial terrace deposits,
9 gravel, sand, and silt. Alluvium floodplain and channel deposits of sand, silt, clay, and
10 gravel are located in stream channels flowing into Lake Lavon. Small areas near the
11 confluence of these stream channels and the lake show deposits of Wolfe City Sand.
12 Between one and four miles east of the lake and south of Elm Creek/Tom Bean Creek
13 the geology is predominantly Pecan Gap Chalk, with small pockets of Marlbrook Marl.

14
15 Soils

16 Soils in the Lavon Lake area can be generally characterized as heavy clays and
17 clay loams in the Houston Black and Trinity-Frio associations. Widespread farming
18 activity in the watershed has resulted in moderately higher deposition of sediment in
19 Lavon Lake than was estimated during the initial lake project planning and design.

20
21 Six soil associations have been identified and mapped within Collin County.
22 Soils of the Houston Black-Austin association occur primarily on rocks of the Austin
23 group. These deep clayey soils are found on gently sloping to sloping uplands over
24 argillaceous marl and chalk. The Houston Black-Houston soils are associated with the
25 Ozan and Marlbrook formations. These deep clayey soils occur on gently sloping to
26 sloping uplands over calcareous clays and minor limestone units. Soils formed on the
27 Pleistocene fluvial terrace deposits belong to the Houston Black-Burleson
28 association. These deep, clayey soils occur on nearly level to gently sloping stream
29 terraces.

30
31 The deep clayey and loamy soils of the nearly level floodplains belong to the
32 Trinity-Frio Association and are developed on recent alluvium. The eroded, deep,
33 clayey soils of the Ferris-Houston Association occur on sloping to strongly sloping
34 uplands. These soils were developed on Pecan Gap Chalk and Wolfe City Formation,
35 consisting of fine grained calcareous sand, silt, and chalky limestone. The Wilson-
36 Burleson soils are associated with the Eagle Ford formation. These deep, loamy and
37 clayey soils occur on nearly level to gently sloping uplands are underlain by gypsum-
38 bearing shale.

39
40 These soil types are representative of the Texas Blackland Prairie Ecoregion
41 tallgrass prairie community of soils associated with floodplains, stream terraces, and
42 uplands along this portion of the Trinity River floodplain. This community is
43 characterized by deeper soils underlain at rather shallow depths by dense, hard, clayey
44 material. This "claypan" restricts air and water movements, as well as root penetration.

45
46 The floodplain areas with slopes of less than one percent consist of Frio and
47 Trinity soils these are deep, calcareous, and clayey with high fertility and water holding

1 capacity. These clayey soils have a high shrink/swell capacity and develop large cracks
2 during dry weather.

3
4 The upland areas are gently sloping to rolling and consist of Houston clay, Altoga
5 silt clay, Burleson clay, and Lewisville silt clay. These soils are deep and calcareous
6 with moderately high water holding capacity. Soil texture ranges from clay to silt clay
7 loam. The clayey soils shrink and crack during dry periods. Moderate to severe sheet
8 and gully erosion is present on areas where vegetation has been removed.

9 10 Prime Farmland

11 The Farmland Protection Policy Act (FPPA) of 1980 and 1995 requires Federal
12 agencies to minimize the extent to which their Federal programs contribute to the
13 unnecessary and irreversible conversion of farmland to non-agricultural uses. Prime
14 Farmland is one of several kinds of important farmland defined by the USDA NRCS.
15 Prime Farmland is land that has the best combination of physical and chemical
16 characteristics for producing food, feed, forage, fiber, and oilseed crops, and is suitable
17 for cropland, pastureland, rangeland, or forestland. It is not suited to urban or water
18 use. It has the soil quality, growing season, and moisture supply needed to
19 economically produce sustained high yields of crops when treated and managed,
20 including water management, according to acceptable farming methods (USDA NRCS
21 2007). Prime Farmland is defined in the Federal Register, Vol. 6, Parts 400-699,
22 January 1, 2001, Section 657.5(a). Approximately 25,700 acres in Collin County meet
23 the requirements for Prime Farmland, with several hundreds of acres of Prime Farmland
24 adjacent to Lavon Lake.

25 26 Sedimentation and Shoreline Erosion

27
28 During the planning of the original Lavon Dam, the USDA NRCS estimated that
29 the annual rate of sediment deposition in the lake would be 1.23 acre-feet per square
30 mile of drainage area. At this rate, the average annual deposition would be 956 acre-
31 feet. Based on this estimate a total of 47,800 acre-feet of storage space was provided
32 in Lavon Lake to accommodate sediment deposition for a period of 50 years.

33
34 In November 1959, six years after the dam was completed, a sediment survey
35 was completed revealing a deposition rate of 1.92 acre-feet per square mile of drainage
36 area and an average annual deposition rate of about 1,415 acre-feet. In October 1965,
37 a second sediment survey was completed at Lavon Lake. This survey revealed an
38 even greater sediment deposition rate of 2.03 acre-feet per square mile of drainage
39 area and an average annual deposition rate of about 1,496 acre-feet.

40
41 The 1959 and 1965 sediment surveys were conducted when the top of
42 conservation pool was at elevation 472.0 feet NGVD and the top of flood control was at
43 elevation 490.0 feet NGVD. The results of both surveys showed that the rate of
44 sedimentation was higher than initially estimated. The high rate of sedimentation may
45 be due in part to the amount of clay in the watershed and the relatively high percentage
46 of land in the watershed that is in agricultural production. The USDA NRCS water
47 retention structures in the watershed undoubtedly retained some sediment over the
48 years but the tendency of colloidal suspended clay to stay in suspension for extended

1 periods of time has probably contributed to the higher than anticipated accumulation of
2 sediment in Lavon Lake.

3
4 In May 1970, the top of conservation pool at Lavon Dam was raised from
5 elevation 472.0 feet to 492.0 feet NGVD. The estimated 100-year sediment load was
6 increased to 92,600 acre-feet below elevation 492.0 feet NGVD. A sedimentation
7 resurvey has not been conducted at Lavon Lake since the conservation pool was
8 raised.

9
10 Shoreline erosion at Lavon Lake can be severe during times of high pool
11 elevations. During the record flood pool elevations of 1990-91, and again more recently
12 in 2015, significant shoreline erosion occurred in many of the designated recreation
13 areas. Damage to park facilities and roads required extensive repair. Shorelines
14 exposed to significant wind and wave action required protection in the form of riprap and
15 other treatments.

16 17 **3.6.1 Alternative 1: No Action Alternative**

18 The No Action Alternative does not involve any activities that would contribute to
19 changes in existing conditions, so there would be no short- or long-term, minor,
20 moderate or major, beneficial, or adverse impacts on topography, geology, soils, Prime
21 Farmland, sedimentation, or shoreline erosion as a result of implementing the No Action
22 Alternative.

23 24 **3.6.2 Alternative 2: Proposed Action**

25 Topography, geology, soils, Prime Farmland, sedimentation, and shoreline
26 erosion were considered during the refining process of land reclassifications for the
27 2016 Master Plan. Lands under the prior classification of Recreation-Intensive Use
28 were converted to the new and similar classification of High Density Recreation, but
29 total acreage was reduced from 2,971 acres to 2,011 acres. This reduction is partly
30 because of the loss of acreage due to shoreline erosion at several parks. The
31 conversion of these lands and loss of acreage due to shoreline erosion would have no
32 effect on current or projected public use.

33
34 Soil-disturbing activities associated with land management, public recreation
35 area maintenance, out-granted recreation area maintenance and improvements, and
36 other routine operation and maintenance activities would be assessed individually as
37 they arise. Therefore, under the Proposed Action, there would be no short- or long-
38 term, minor, moderate or major, beneficial, or adverse impacts on topography, geology,
39 soils, Prime Farmland, sedimentation, and shoreline erosion as a result of implementing
40 the 2016 Master Plan.

41 **3.7 NATURAL RESOURCES**

42 In preparation for revision of the Lavon Lake Master Plan, the USACE requested
43 the assistance of the USFWS to describe existing wildlife habitat conditions on project
44 lands. A team of USFWS and USACE biologists conducted field work from July 12-28,
45 2010, and the report was completed later that year. The fieldwork consisted of
46 identifying major habitat types on project lands and collecting data at 154 sample
47 locations randomly selected throughout the major habitat types. Developed recreation

1 areas and the main body of the lake were excluded from the study. Data collection was
2 done using the Habitat Evaluation Procedures (HEP) developed by the USFWS.
3 Habitat types identified included bottomland hardwood (9,490 acres), herbaceous
4 wetlands (526 acres) and grassland (6,771 acres). The report is included as Appendix
5 D of the 2016 Master Plan.

6
7 The Texas Conservation Action Plan (TCAP) 2012 and the accompanying Texas
8 Blackland Prairies Ecoregion Handbook (Handbook), published by TPWD in August
9 2012, were used extensively in the preparation of the 2016 Master Plan. The TCAP
10 and Handbook were invaluable in identifying Species of Greatest Conservation Need
11 (SGCN), rare plant communities, regional conservation issues, and a suite of
12 conservation actions needed to reduce negative effects on SGCN and rare plant
13 communities. The TCAP and Handbook were especially valuable in preparing the Land
14 Classifications and Resource Objectives in the 2016 Master Plan.

15 Vegetation

16
17 The ecoregion that spans the entire vicinity of Lavon Lake is the Texas Blackland
18 Prairie Ecoregion (TBPR ecoregion). This prairie community forms a belt across Texas
19 and was dominated by tallgrass prairies on uplands prior to the now-established row
20 crop agriculture and suburban development. The intense suburban and agricultural
21 development has almost completely annihilated all vestiges of tallgrass prairie. As
22 noted in the TCAP, less than 5,000 acres of scattered patches of Texas Blackland
23 Prairie remain out of the 12 million acres that once existed. Intact Texas Blackland
24 Prairie remains predominantly as a treeless rolling prairie of bunch and short grasses;
25 however, hardwoods such as elm species (*Ulmus* spp.), hackberry (*Celtis occidentalis*),
26 pecan (*Carya illinoensis*), and oak species occur along streams and bottomlands.
27 Groundcover consists of such native grasses as buffalograss (*Bouteloua dactyloides*),
28 various bluestems (*Adropogon* spp.), and grama grasses (*Bouteloua* spp.) combined
29 with various forbs and vines.

30
31 Collin County lies in the Texan biotic province, a transitional zone between the
32 forested Austroriparian province to the east and the grassland provinces (Kansan and
33 Balconian) to the west. While the region exhibits a combination of eastern forest and
34 western prairie flora and fauna, the bottomlands are primarily Austroriparian species.
35 Stream bottoms were often wooded with bur oak (*Quercus macrocarpa*), Shumard oak
36 (*Quercus shumardii*), hackberry, elm, ash (*Fraxinus* spp.), eastern cottonwood (*Populus*
37 *deltoides*), and pecan. There are, however, hardwoods such as elm, hackberry, pecan,
38 oak, and Bois d'Arc (*Maclura pomifera*) occurring along streams. Brushy species such
39 as honey mesquite (*Prosopis glandulosa*) and eastern redcedar have invaded many
40 portions of the grasslands as a result of the minimization of natural and man-made fires.

41
42 The TBPR ecoregion is perhaps the most critically threatened in the state. It lies
43 along one of the most development-intensive and populated areas in Texas, the
44 Interstate 35 corridor that stretches through Dallas, Waco, Temple, Austin (eastern
45 portions), San Marcos, New Braunfels, and San Antonio. Gently rolling to mostly flat,
46 this region is easily developed and has few barriers to development like the adjacent
47 ecoregions, which require clearing, leveling, and geotechnical work. Historically, the
48 region was a vast tallgrass prairie of little bluestem (*Schizachyrium scoparium*), big

1 bluestem (*Andropogon gerardii*), yellow Indian grass (*Sorghastrum nutans*), tall
 2 dropseed (*Sporobolus compositus*), eastern gamagrass (*Tripsacum dactyloides*), and
 3 many forbs, such as asters (*Aster* spp.), clovers (*Trifolium* spp.), and black-eyed Susan
 4 (*Rudbeckia* spp.), which supported wide-ranging abundant herds of bison (*Bison bison*)
 5 and pronghorn (*Antilocapra americana*), greater prairie-chickens (*Tympanuchus*
 6 *cupido*), and ocelot (*Leopardus pardalis*). Within the TBPR ecoregion, the TCAP lists
 7 several rare plant communities (Table 3-6).

8
 9 **Table 3-6. Rare Plant Communities within the TBPR Ecoregion**

Common Name	State Rank
Bur Oak–Shumard Oak <i>Mixed Bottomland Forest</i>	S3? – Vulnerable (“?” denotes inexact rank)
Eastern Grama grass –Switch grass <i>Floodplain Herbaceous Vegetation</i>	S1 – Critically Imperiled
Eastern Grama grass–Switch grass–Yellow Indian grass– Michaelmas-Daisy <i>Herbaceous Vegetation</i>	S1 – Critically Imperiled
Silveus Dropseed – Longspike Tridens <i>Herbaceous Vegetation</i>	S1S2 – Critically Imperiled and Imperiled
Silveus Dropseed – Mead’s Sedge <i>Herbaceous Vegetation</i>	S1 – Critically Imperiled
Southern Elm – Chinquapin Oak <i>Forest</i>	S1S2? – Critically Imperiled and Imperiled (Inexact rank)
Upper West Gulf Coastal Plain Dry <i>Calcareous (Blackland) Prairie</i>	S1S2 – Critically Imperiled and Imperiled
<i>Vertisol Blackland Prairie</i>	S1S2 – Critically Imperiled and Imperiled

10
 11 Determining the presence or absence and extent of these communities requires
 12 careful field investigations that will be accomplished at Lavon Lake as time and funding
 13 permits. A few relic patches of tallgrass prairie, as well as a few acres of Southern Elm
 14 – Chinquapin Oak Forest and Bur Oak – Shumard Oak Bottomland Forest, are known
 15 to exist at Lavon Lake and efforts to restore and expand these areas are included in the
 16 resource objectives described in this Plan. Crosscutting this prairie were dense
 17 meandering bands of riparian hardwoods (composed primarily of bur oak, Shumard oak,
 18 sugar hackberry, elm, ash, eastern cottonwood, and pecan) along broad floodplains.
 19 Rare vertisol blackland prairie communities are known to exist in small pockets at Lavon
 20 Lake (Photograph 3-1).

21
 22 The current dominant canopy species along creeks in the study area include
 23 pecan, black willow (*Salix nigra*), cedar elm (*Ulmus crassifolia*), and eastern
 24 cottonwood. The dominant sapling/shrub species within both areas include young tree
 25 species, buttonbush (*Cephalanthus occidentalis*), flameleaf sumac (*Rhus lanceolata*),
 26 and roughleaf dogwood (*Cornus drummondii*). Finally, herbaceous species near the
 27 aquatic resources were dominated by wild rye (*Elymus* spp.), coralberry
 28 (*Symphoricarpos orbiculatus*), smartweed (*Polygonum* spp.), cocklebur (*Xanthium*
 29 *strumarium*), inland sea oats (*Chasmanthium latifolium*), cattail (*Typha latifolia*), sedge
 30 (*Carex* spp.), and the herbaceous species within the upland areas are dominated by
 31 giant ragweed (*Ambrosia trifida*), Bermudagrass, and perennial ryegrass (*Lolium*
 32 *perenne*). However, there are still remnants of native prairie that support little bluestem

1 (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum*
2 *nutans*), tall dropseed (*Sporobolus compositus*), goldenrod (*Solidago* sp.), and cut-leaf
3 daisy (*Erigeron compositus*). Invasive species such as King Ranch bluestem
4 (*Bothriochloa ischaemum* var. *songarica*), Johnsongrass, and broomweeds are now
5 common in many portions of the grasslands.
6



7
8 **Photograph 3-1. Rare vertisol blackland prairie community at East Fork Park**
9 **(Photograph taken in July 2015).**

10
11 Wetlands

12 In accordance with national USACE policy, wetlands at operational projects are
13 inventoried using the protocol established by USFWS in their *Classification of Wetlands*
14 *and Deepwater Habitats of the United States*. The current USACE inventory for Lavon
15 Lake indicates there are 526 acres of emergent wetlands located in shallow shoreline
16 areas in the upper reaches of the main tributaries. The National Wetland Inventory
17 (NWI) maps prepared by the USFWS and available in the Wetland Mapper tool on the
18 USFWS website, show these and more emergent wetlands, as well as a significant
19 acreage of forest/shrubland and freshwater pond wetlands in the upper reaches of the
20 main tributaries to Lavon Lake. However, as explained by the USFWS regarding use of
21 the NWI map data, the data represents reconnaissance level mapping using high
22 altitude imagery. The actual presence and boundaries of wetlands shown on NWI maps
23 requires verification through detailed, on-the-ground inspection. During preparation of
24 the 2010 Habitat Evaluation Report (See Appendix D), on-site inspection of USACE
25 lands indicated that most of the wetlands described using the Wetland Mapper tool do
26 not exist on the ground. Most of the “freshwater pond” and “forested” wetlands shown
27 by the Wetland Mapper tool are actually open water of the lake or tracts of bottomland
28 hardwood forest.. USACE is aware that the acreage of NWI wetlands at Lavon Lake
29 exceeds, to some extent, the 526 acres of known wetlands, and as time and funding

1 permits, USACE intends to verify the NWI data to determine the full extent of wetlands
2 at Lavon Lake.

3
4 Fisheries and Wildlife Resources

5 A variety of mammals are known to inhabit the study area and/or surrounding
6 land. These include opossum (*Didelphis virginiana*), cave myotis (*Myotis velifer*),
7 beaver (*Castor canadensis*), nutria (*Myocastor coypus*), plains pocket gopher (*Geomys*
8 *bursarius*), eastern flying squirrel (*Glaucomys volans*), eastern gray squirrel (*Sciurus*
9 *carolinensis*), fox squirrel (*Sciurus niger*), California jackrabbit (*Lepus californicus*),
10 eastern cottontail (*Sylvilagus floridanus*), white-tailed deer (*Odocoileus virginianus*),
11 nine-banded armadillo (*Dasypus novemcinctus*), raccoon (*Procyon lotor*), mink (*Mustela*
12 *vison*), spotted skunk (*Spilogale putorius*), red fox (*Vulpes vulpes*), coyote (*Canis*
13 *latrans*), and bobcat (*Lynx rufus*). Many of these species have been able to tolerate
14 urbanization, while species that formerly inhabited the region, such as black bear (*Ursus*
15 *americanus*), gray and red wolves (*Canis lupus* and *Canis rufus*, respectively), mountain
16 lion (*Felis concolor*), river otter (*Lutra canadensis*), and bison, were extirpated from the
17 area due to hunting, trapping, or behavioral intolerance to human activity.

18
19 The study area is used by both resident and migratory birds, reptiles, and
20 amphibian species that are tolerant of human activity. Resident passerines use the
21 wooded areas along the forks, main stem, and tributaries of the East Fork of the Trinity
22 River for nesting, for foraging, and as a dispersion corridor. The more heavily impacted
23 woodlands upstream and downstream of the study area are most likely used by a
24 variety of migratory and resident passerine, owl, and hawk species which may disperse
25 from the less impacted study area. Some common resident bird species that may be
26 observed in the study area are sparrows (various species), northern mockingbird
27 (*Mimus polyglottos*), American robin (*Turdus migratorius*), northern cardinal (*Cardinalis*
28 *cardinalis*), blue jay (*Cyanocitta cristata*), common grackle (*Quiscalus quiscula*), scissor-
29 tailed flycatcher (*Tyrannus forficatus*), barred owl (*Strix varia*), common crow (*Corvus*
30 *brachyrhynchos*), American kestrel (*Falco sparverius*), Carolina chickadee (*Poecile*
31 *carolinensis*), and red-tailed hawk (*Buteo jamaicensis*). The species more intolerant to
32 human activity have declined, while the more tolerant species have flourished. A large
33 number of bird species utilize the stream bottomlands in Collin County, and species
34 such as the house sparrow (*Passer domesticus*), great-tailed grackle (*Quiscalus*
35 *mexicanus*), common crow, and European starling (*Sturnus vulgaris*) dominate the more
36 urbanized areas.

37
38 Common reptile species documented near the study area include lizards and
39 various snakes, such as the copperhead (*Agkistodon contortrix*), cottonmouth
40 (*Agkistodon piscivorus*), bullsnake (*Pituophis melanoleucus sayi*), and diamondback
41 rattlesnake (*Crotalus atrox*). Amphibians, including turtles and frogs, are seen
42 occasionally.

43
44 The common fish species known to be in Lavon Lake and its tributaries include
45 various species of bass (*Micropterus* spp.), bluegill (*Lepomis macrochirus*), gar
46 (*Atractosteus spatula*), shad (*Dorsoma* spp.), white crappie (*Pomoxis annularis*),
47 channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), freshwater drum

1 (*Aplodinotus grunniens*), carp (*Aplodinotus grunniens*), and suckers (Family
2 Catostomidae). Freshwater mussels common to the Upper Trinity drainage are giant
3 floater (*Pyganodon grandis*), Texas liliput (*Toxolasma texasiensis*), southern mapleleaf
4 (*Quadrula apiculata*), and pink papershell (*Potamilus ohiensis*).
5

6 **3.7.1 Alternative 1: No Action Alternative**

7 The No Action Alternative does not involve any activities that would contribute to
8 changes in existing conditions; therefore, no short- or long-term, major, moderate or
9 minor, beneficial, or adverse impacts on natural resources would be anticipated as a
10 result of implementing the No Action Alternative.

1 **3.7.2 Alternative 2: Proposed Action**

2 The reclassifications, resource management objectives, and resource plan
3 required for the Proposed Action would allow land management and land uses to be
4 compatible with the goals of good stewardship of natural resources. The Proposed
5 Action would allow project lands to continue supporting the USFWS and the TPWD
6 missions associated with wildlife conservation and implementation of operational
7 practices that would protect and enhance wildlife and fishery populations. In addition,
8 the Proposed Action would be compatible with conservation principles and measures to
9 protect migratory birds as mandated by EO 13186.

10
11 The reclassifications proposed in the 2016 Master Plan include 4,319 acres as
12 Environmentally Sensitive Areas. Under this reclassification, several land parcels that
13 were previously classified as Recreation – Low Density Use would be converted to
14 Environmentally Sensitive Areas in order to recognize those areas having the highest
15 ecological value and to ensure they are given the highest order of protection among
16 possible land classifications. Included as Environmentally Sensitive were areas of high-
17 value bottomland hardwood and riparian forest, and areas supporting high-value native
18 prairie communities. The reclassification of lands also resulted in the classification of
19 7,300 acres as MRML – Wildlife and Vegetation Management. The conversion of these
20 lands was supported by public comment and recommendations from the USFWS and
21 TPWD.

22
23 Furthermore, the utility corridors at Lavon Lake were designated to avoid and
24 minimize impacts on current natural resources by future actions by selecting corridors
25 with lesser quality habitats and that would avoid continued fragmentation of habitats.

26
27 The conversion of these lands to Environmentally Sensitive Areas and MRML –
28 Wildlife and Vegetation Management will have no effect on current or projected public
29 use. However, long-term, beneficial impacts on natural resources could occur as a
30 result of implementing the 2016 Master Plan.

31 **3.8 THREATENED AND ENDANGERED SPECIES**

32 In accordance with the Trust Resources Report generated by the USFWS web-
33 based Information for Planning and Conservation tool, there are two Federally listed
34 endangered species and two threatened species that potentially occur at Lavon Lake.
35 The four species, all birds, are listed in Table 3-7. The Trust Resources Report,
36 included as part of the 2016 Master Plan as Appendix E, also lists several Birds of
37 Conservation Concern. The bald eagle (*Haliaeetus leucocephalus*) has the potential to
38 occur at Lavon Lake and was formerly listed by the USFWS as an endangered or
39 threatened species. Although recently delisted, the bald eagle is provided specific
40 protections under the Bald and Golden Eagle Protection Act (16 USC 668-668c).

41
42 Designated critical habitat is not present for any of the Federally listed threatened
43 or endangered species within the study area. Additionally, none of the Federally listed
44 species have been observed during on-site investigations. The whooping crane (*Grus*
45 *americana*) and interior least tern (*Sterna antillarum athalassos*) are known to migrate
46 through, but not nest at Lavon Lake. However, the bald eagle has been known to nest

1 on the East Fork of the Trinity River downstream of Lavon Lake and at nearby lakes in
2 the region such as Bardwell Lake and Benbrook Lake.

3
4 In addition to the Federally listed species for Lavon Lake, TPWD maintains lists
5 by Ecoregion for SGCN. The list for the TBPR Ecoregion is available in Appendix F of
6 the 2016 Master Plan and provides both the Federal and State listing status, as well as
7 a global and state abundance rank for approximately 150 species of plants and animals.
8 The list also provides general habitat requirements for each of the species on the list.
9 The white-faced ibis (*Plegadis chihi*) and wood stork (*Mycteria americana*) are migratory
10 birds that breed along the Texas coast, and there is a likelihood of both species being
11 present at Lavon Lake during migration. Habitat preferred by other state-listed species
12 included in the list, such as the Texas horned lizard (*Phrynosoma cornutum*) and the
13 timber/canebrake rattlesnake (*Crotalus horridus*), was not observed within the study
14 area; therefore, the likelihood of observing these species within the study area is low.
15 Many of the other species on the list, particularly migratory songbirds, are known to
16 utilize habitat at Lavon Lake on a regular basis and are considered in management
17 plans.

18
19 **Table 3-7. Federally-Listed Endangered and Threatened Species with**
20 **Potential to Occur at Lavon Lake**

Common Name	Scientific Name	Federal Status	State Status
Piping Plover	<i>Charadrius melodus</i>	Threatened	Threatened
Whooping Crane	<i>Grus americana</i>	Endangered	Endangered
Interior Least Tern	<i>Sterna antillarum athalassos</i>	Endangered	Endangered
Red Knot	<i>Calidris canufus rufa</i>	Threatened (for wind projects only)	Not Listed

21
22 **3.8.1 Alternative 1: No Action Alternative**

23 The No Action Alternative does not involve any activities that would contribute to
24 changes in existing conditions; therefore, no short- or long-term, major, moderate or
25 minor, beneficial, or adverse impacts on threatened and endangered species would be
26 anticipated as a result of implementing the No Action Alternative.

27
28 **3.8.2 Alternative 2: Proposed Action**

29 Under the Proposed Action, the USACE would continue cooperative
30 management plans with the USFWS and TPWD to preserve, enhance, and protect
31 wildlife habitat resources. To further management opportunities and beneficially impact
32 habitat diversity, the reclassifications proposed in the 2016 Master Plan include 4,319
33 acres as Environmentally Sensitive Areas and 7,300 acres as MRML – Wildlife and
34 Vegetation Management. Under this reclassification, several land parcels that were
35 previously classified as Recreation – Low Density Use were converted to
36 Environmentally Sensitive Areas in order to recognize those areas having the highest
37 ecological value and to ensure they are given the highest order of protection among
38 possible land classifications. Included as Environmentally Sensitive were areas of high-
39 value bottomland hardwood and riparian forest, and areas supporting high-value native
40 prairie communities. The conversion of these lands was supported by public comment
41 and recommendations from the USFWS and TPWD. In addition, the establishment of

1 11 strategically located utility corridors will serve to reduce future loss of natural
2 resources that could potentially occur from placement of utility lines on project lands.

3 The conversion of these lands and utility corridors will have no effect on current
4 or projected public use. However, long-term, beneficial impacts on natural resources
5 could occur as a result of implementing the revised land use classifications and utility
6 corridors in the 2016 Master Plan. Any future activities which could potentially result in
7 impacts on Federally listed species shall be coordinated with USFWS through Section 7
8 of the Endangered Species Act (ESA).

9 **3.9 INVASIVE SPECIES**

10 Several non-native invasive species have been documented at Lavon Lake.
11 Zebra mussels have garnered the most visibility given Lavon Lake's importance as a
12 water supply and outdoor recreation asset. Zebra mussels can have a detrimental
13 effect on water control structures, raw water facilities, and the general health and
14 productivity of the aquatic environment. A reproducing zebra mussel population has
15 been documented in one of the tributaries (Sister Grove Creek) that feeds into Lavon
16 Lake, and isolated adult individuals have been found on recreational vessels over the
17 last few years. Attempts to eradicate zebra mussels in Sister Grove Creek exhibited
18 limited success, as live but stressed individuals remained post- treatment. No
19 reproducing population has been documented within Lavon Lake, but given the
20 proximity of established zebra mussel populations and a robust recreation footprint
21 facilitating boat traffic, the risk of establishment remains high for the foreseeable future.
22

23 Feral hogs (*Sus scrofa*) continue to have a presence at differing levels
24 throughout the year given food availability and the abundance of cover afforded by
25 bottomland hardwoods around Lavon Lake. Signs of land degradation, conversion of
26 the understory plant community, and accelerated soil instability have all been
27 documented and are assumed to continue in natural resource and park areas around
28 the lake. Lavon Lake does have an active hunting program, with feral hogs being one
29 of the animals allowed for harvesting.
30

31 Other nuisance species that impact the health and productivity of the natural
32 resources at Lavon Lake include exotic Johnsongrass and native eastern redcedar.
33 Both species are prolific and can out-compete more desirable native species, further
34 degrading prairie components that were historically the dominant vegetation type in the
35 Texas Blackland Prairies.
36

37 The emerald ash borer (EAB) (*Agrilus planipennis*) is another invasive species of
38 concern that has not been detected in the area, but has slowly moved east across North
39 America and has been detected near the east Texas border. The EAB is native to Asia
40 and was first recorded in North America in 2002. The EAB specifically utilizes true ash
41 species to complete its life cycle. Female emerald ash borers lay their eggs on the
42 surface of ash trees, and when the eggs hatch the larvae burrow into the tree, feeding
43 and developing into adult beetles. At maturity, the beetle leaves the host tree and the
44 cycle is repeated. This feeding activity kills the tree within a few years. Lavon Lake has
45 considerable acreage where green ash (*Fraxinus pennsylvanica*) is a dominant or co-
46 dominant species. All stands of green ash commonly found in the upper Trinity River
47 watershed would be in jeopardy if the EAB spreads to the area.

1 **3.9.1 Alternative 1: No Action Alternative**

2 The No Action Alternative does not involve any activities that would contribute to
3 changes in existing conditions, so Lavon Lake would continue to be managed according
4 to the existing invasive species management practices. There would be no short- or
5 long-term, minor, moderate or major, beneficial, or adverse impacts from invasive
6 species as a result of implementing the No Action Alternative.
7

8 **3.9.2 Alternative 2: Proposed Action**

9 The land reclassifications, resource management objectives, and resource plan
10 required to revise the Lavon Lake Master Plan are compatible with the lake's invasive
11 species management practices. Therefore, invasive species would continue to be
12 managed, and no significant adverse impacts on resources would occur as a result of
13 implementing the 2016 Master Plan.

14 **3.10 MINERAL AND TIMBER RESOURCES**

15 The Texas Railroad Commission database shows very little mineral extraction
16 activity in Collin County and virtually no activity in the immediate area of Lavon Lake. A
17 few dry exploratory oil and gas holes are shown several miles north and east of the
18 lake. This is in sharp contrast to the significant oil and gas drilling and production
19 activity approximately 25 miles west of Lavon Lake in the natural gas rich Barnett Shale
20 area of Denton County. Most of the minerals underlying Federal land at Lavon Lake are
21 privately owned with the exception of the immediate area underlying the Lavon Lake
22 Dam and a few other isolated tracts. In general terms, during the land acquisition
23 process for the Lavon Lake project, the mineral estate underlying the dam was
24 purchased by the Federal government as a precautionary measure to protect the
25 integrity of the dam structure.
26

27 Currently, with few exceptions, the stipulations used in the USACE, Fort Worth
28 District, do not allow surface occupancy of Federal lands for the extraction of Federally
29 owned minerals. Exploration and extraction of privately owned minerals may, in some
30 cases, be allowed to occur on Federal lands at Lavon Lake in so far as the integrity of
31 the dam and related facilities are not at risk and every precaution is taken to reduce the
32 risk of pollution and other environmental damage to the lands and waters of the lake.
33 The bottomland forests of the main tributaries of Lavon Lake have high value as wildlife
34 habitat, but do not have significant value as commercial timber. This is due in part to
35 the location being approximately 100 miles west of any appreciable timber resources
36 that support a viable forest products industry, and secondarily to the lack of tree species
37 and sizes with high commercial timber value.
38

39 **3.10.1 Alternative 1: No Action Alternative**

40 The No Action Alternative does not involve any activities that would contribute to
41 changes in existing conditions, so mineral and timber resources at Lavon Lake would
42 continue to be managed according to the existing management practices. There would
43 be no short- or long-term, minor, moderate or major, beneficial, or adverse impacts on
44 mineral or timber resources as a result of implementing the No Action Alternative.

1 **3.10.2 Alternative 2: Proposed Action**

2 The land reclassifications, resource management objectives, and resource plan
3 proposed in the 2016 Master Plan are compatible with Lavon Lake’s mineral and timber
4 management practices. Therefore, these resources would continue to be managed,
5 and no significant adverse impacts on resources would occur as a result of
6 implementing the 2016 Master Plan. Should oil and gas exploration ever occur within
7 Lavon Lake’s Federally-owned mineral estate, the leasing of the minerals would be
8 administered by the Bureau of Land Management, U.S. Department of the Interior. Any
9 leasing of the minerals would be subject to stipulations imposed by the USACE.

10 **3.11 CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES**

11 Cultural History Sequence

12 *Prehistoric*

13
14 The earliest well-documented evidence of human occupation in north-central
15 Texas dates to about 12,000 years before present (B.P.). Prehistory is divided
16 generally into three broad time periods: Paleo-Indian (12,000-8,500 B.P.), Archaic
17 (8,500-1,250 B.P.), and Late Prehistoric (1,250-300 B.P.).

18
19 Evidence for Paleo-Indian period occupation is relatively rare in the Lavon Lake
20 area, and is known primarily from distinctive projectile point styles dating to this time
21 period found in surface collections or in mixed multi-component sites. It is likely that
22 intact Paleo-Indian camp sites may be buried deeply beneath Holocene floodplain
23 alluvium, as was the case with the Aubrey Clovis site on the Elm Fork Trinity River.
24 Evidence suggests that the region was occupied by small groups of highly mobile
25 hunter-gatherers that traveled over very large territories. Traditionally thought of as big-
26 game hunters of mammoth and bison, more recent evidence indicates that Paleo-
27 Indians exploited a much broader range of animal and plant resources.

28
29 The Archaic period is divided into Early (8,500-6,000 B.P.), Middle (6,000-3,500
30 B.P.), and Late (3,500-1,250 B.P.) sub-periods. During this long time period, a
31 generalized hunting and gathering subsistence strategy is indicated. Trends through
32 time suggest increasing population density and decreasing group mobility within smaller
33 territories. Sites with Late Archaic components are well represented in the Lavon Lake
34 area and in north-central Texas generally. The large circular depressions known as
35 “Wylie pit features” were first identified at Lavon Lake and had long been attributed to
36 the subsequent Late Prehistoric period. However, more recent investigations of two
37 such features elsewhere in the Trinity River drainage showed that their original
38 construction dated to the Late Archaic. A similar Late Archaic age is assumed for the
39 initial construction of these features at Lavon Lake.

40
41 The Late Prehistoric Period is marked by the presence of the bow and arrow and
42 pottery. During the early portion of this time span, subsistence strategies remained
43 similar to those of the preceding Late Archaic. By around 800 B.P., there is limited
44 evidence for maize horticulture and more sedentary occupations in some North Central
45 Texas sites. After around 600 B.P., there is widespread evidence for an increase in
46 bison hunting. Pottery from Lavon Lake sites includes plain and decorated grog-

1 tempered specimens in the Caddo ceramic tradition. It is unclear whether this pottery
2 was made locally or represents trade with East Texas Caddo groups. Plain, shell-
3 tempered pottery is also found at Lavon Lake sites and is thought to show connections
4 with southern plains groups to the north and west. This shell-tempered pottery is
5 generally thought to date to the late portion of the Late Prehistoric period (after circa
6 600 B.P.) when bison hunting became more important.

7 8 *Historic*

9
10 Local tradition holds that Native Americans of the Caddo Nation inhabited the
11 Lavon Lake area prior to the arrival of the first white settlers in the early 1840s. The
12 majority of these early settlers were farmers operating small family farms growing
13 mainly wheat and corn. When Collin County was created out of Fannin County in 1846,
14 the estimated population was only 150. The population grew slowly between the 1840s
15 and 1870s. The arrival of the railroads in the early 1870s allowed farmers access to
16 markets and led to a major increase in the number of farms. Cotton farming became an
17 important agricultural activity in the Texas Blackland Prairie region and tenant farming
18 was a major social institution. No historic period resources were recorded by the
19 surveys conducted prior to the initial construction or the subsequent pool raise of Lavon
20 Lake. Most of the historic resources at Lavon Lake are expected to be the remains of
21 house sites and farmsteads dating from the late nineteenth century through the mid-
22 twentieth century.

23 24 Previous Investigations

25 Archaeological investigations at Lavon Lake were initially conducted between
26 1948 and 1950 by the River Basin Surveys. During that period, 25 sites were recorded,
27 two sites were tested, and one site (the Hogge Bridge Site) was excavated extensively.
28 Plans to enlarge the lake led to another survey in 1964 by the Texas Archaeological
29 Salvage Project, during which 12 new sites were recorded and 17 known sites were
30 revisited. In 1969, four sites affected by the lake's enlargement were tested, one of
31 which (Sister Grove Creek site) was excavated in 1974 by Southern Methodist
32 University. Limited survey work since the mid-1970s has added to the number of known
33 archaeological sites.

34 35 Recorded Cultural Resources

36 Currently, 47 archaeological sites have been recorded at Lavon Lake. One of
37 these sites (Sister Grove Creek) is listed on the National Register of Historic Places
38 (NRHP). The remaining 46 sites have not yet been evaluated for NRHP eligibility. Only
39 about 300 acres of Lavon Lake property have been inventoried to current survey
40 standards.

41 42 Cultural Resources Management at Lavon Lake

43 The cultural resources surveys of the 1970s and earlier were not systematic and
44 are not considered adequate by current standards. As such, and dependent on funding,
45 a Cultural Resources Management Plan (CRMP) for Lavon Lake property would be
46 developed and incorporated into the Operational Management Plan in accordance with

1 EP 1130-2-540. The purpose of the CRMP would be to provide a comprehensive
2 program to direct the historic preservation activities and objectives at Lavon Lake.
3 Completion of a full inventory of cultural resources at Lavon Lake is a long-term
4 objective that is needed for compliance with Section 110 of the National Historic
5 Preservation Act (NHPA). All currently known and newly recorded sites would be
6 evaluated to determine their eligibility for the NRHP.

7
8 In accordance with Section 106 of the NHPA, any proposed ground-disturbing
9 activities or projects, such as those described in the 2016 Master Plan or as may be
10 proposed in the future by others for right-of-way easements, would require cultural
11 resource surveys to locate and evaluate historic and prehistoric resources. Resources
12 determined eligible for the NRHP must be protected from proposed project impacts, or
13 the impacts must be mitigated. All future cultural resource investigations at Lavon Lake
14 would be coordinated with the Texas State Historic Preservation Officer (SHPO) and
15 Federally recognized Tribes to ensure compliance with the NHPA, the Archaeological
16 Resources Protection Act, and the Native American Graves Protection and Repatriation
17 Act.

18 19 **3.11.1 Alternative 1: No Action Alternative**

20 There would be no additional short- or long-term, minor, moderate or major,
21 beneficial, or adverse impacts on cultural, historical, and archaeological resources as a
22 result of implementing the No Action Alternative, as there would be no changes to the
23 existing Master Plan.

24 25 **3.11.2 Alternative 2: Proposed Action**

26 Impacts on cultural, historical, and archaeological resources were considered
27 during the refinement processes of land reclassifications. Based on previous surveys at
28 Lavon Lake, the required reclassifications, proposed utility corridors, resource
29 management objectives, and resource plan would not change current cultural resource
30 management plans or alter areas where these resources exist. All future activities,
31 including designation of additional utility corridors, would be coordinated with the SHPO
32 and Federally recognized Tribes to ensure compliance with Section 106 of the NHPA,
33 the Archaeological Resources Protection Act, and the Native American Graves
34 Protection and Repatriation Act. Therefore, no significant adverse impacts on cultural,
35 historical, or archaeological resources would occur as a result of implementing the 2016
36 Master Plan.

37 **3.12 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE**

38 The zone of interest for this socioeconomic analysis consists of Collin, Dallas,
39 Denton, Fannin, Grayson, Hunt, and Rockwall counties in Texas. Lavon Lake lies
40 completely within Collin County, which is a county located north of Dallas, at the far
41 northeastern corner of the Dallas-Fort Worth metropolitan area. The remaining counties
42 in the zone of interest are those that are adjacent to Collin County.

43 44 *Population*

45
46 The total population for the zone of interest in 2014 was 4.49 million (Table 3-8).
47 The majority (approximately 56 percent) of the population resides in Dallas County

1 (Table 3-8). Collin County is the second most populated county in the zone of interest,
 2 with approximately 20 percent of the zone of interest's population (Table 3-8).
 3
 4

Table 3-8. Population Estimates for the Zone of Interest

Geographical Area	2000 Population Estimate	2014 Population Estimate	2040 Population Projection
Texas	20,851,820	26,956,958	36,550,595
Collin County	491,675	885,241	1,496,177
Dallas County	2,218,899	2,518,638	3,086,679
Denton County	432,976	753,363	1,242,750
Fannin County	31,242	33,752	39,458
Grayson County	110,595	123,534	142,177
Hunt County	76,596	88,493	119,853
Rockwall County	43,080	87,809	146,334
Zone of Interest Total	3,405,063	4,490,830	6,273,428

5 Source: U.S. Census Bureau, American Fact Finder (2000, 2014 Estimate); Texas State Data
 6 Center 2014, The University of Texas at San Antonio (2040 Projections)
 7

8 The population in the zone of interest makes up approximately 17 percent of the
 9 total population of the State of Texas. From 2014 to 2040, the population in the zone of
 10 interest is expected to increase to approximately 6.3 million, with an annual growth rate
 11 of 1.3 percent per year. By comparison, the population of the State of Texas is
 12 projected to increase at an annual rate of 1.2 percent per year, well above the expected
 13 national growth rate of 0.7 percent per year. During this time frame, Collin County and
 14 Rockwall County are the only two counties in the zone of interest with a projected
 15 annual growth rate higher than the State of Texas, with a projected growth rate of two
 16 percent each (see Table 3-8).
 17

18 The distribution of the population among gender is approximately 49.2 percent
 19 male and 50.7 percent female in the zone of interest, which is very similar to the overall
 20 gender distribution in Texas (Table 3-9). The female population is slightly higher than
 21 the male population in all counties in the zone of interest except Fannin County.
 22
 23

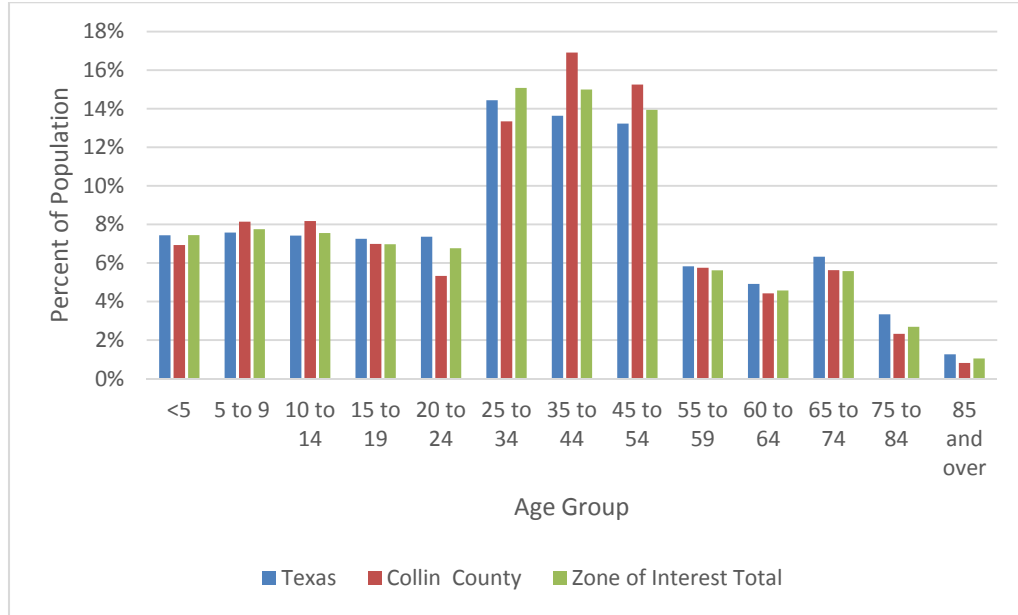
Table 3-9. 2014 Population Estimates by Gender

Geographical Area	Male	Female
Texas	13,382,386	13,574,572
Collin County	434,591	450,650
Dallas County	1,241,277	1,277,361
Denton County	370,582	382,781
Fannin County	17,889	15,863
Grayson County	60,296	63,238
Hunt County	43,718	44,775
Rockwall County	43,019	44,790
Zone of Interest Total	2,211,372	2,279,458

24 Source: U.S. Census Bureau, American Fact Finder (2014 Estimate)
 25

26 The distribution by age group is similar among the counties, zone of interest, and
 27 the State of Texas overall in terms of percentage of the population. The largest age

1 groups in the zone of interest are the 25 to 34 group and the 35 to 44 group, which each
 2 make up approximately 15 percent of the zone of interest population. Collin County, in
 3 which the lake lies, has a slightly larger population of residents ages 35 to 54 than both
 4 the zone of interest and the State of Texas, and a slighter smaller population of
 5 individuals ages 20 to 34 (Figure 3-1).
 6



7 **Figure 3-1. 2014 Percent of Population by Age Group**

8
 9
 10 The race and ethnicity of the population in the zone of interest is approximately
 11 45 percent White, 16 percent Black or African American, 29 percent Hispanic or Latino,
 12 seven percent Asian, and two percent two or more races (Table 3-10). Other ethnicities
 13 account for less than two percent each of the population. By comparison, the Hispanic
 14 or Latino population in Texas is nearly 10 percent higher than the zone of interest.
 15 When comparing Collin County to the zone of interest, the White population is 18
 16 percent higher, the Black or African American population is seven percent lower, the
 17 Asian population is five percent higher, and the Hispanic or Latino population is 14
 18 percent lower (Figure 3-2).
 19
 20

Table 3-10. Population Estimate by Race and Ethnicity

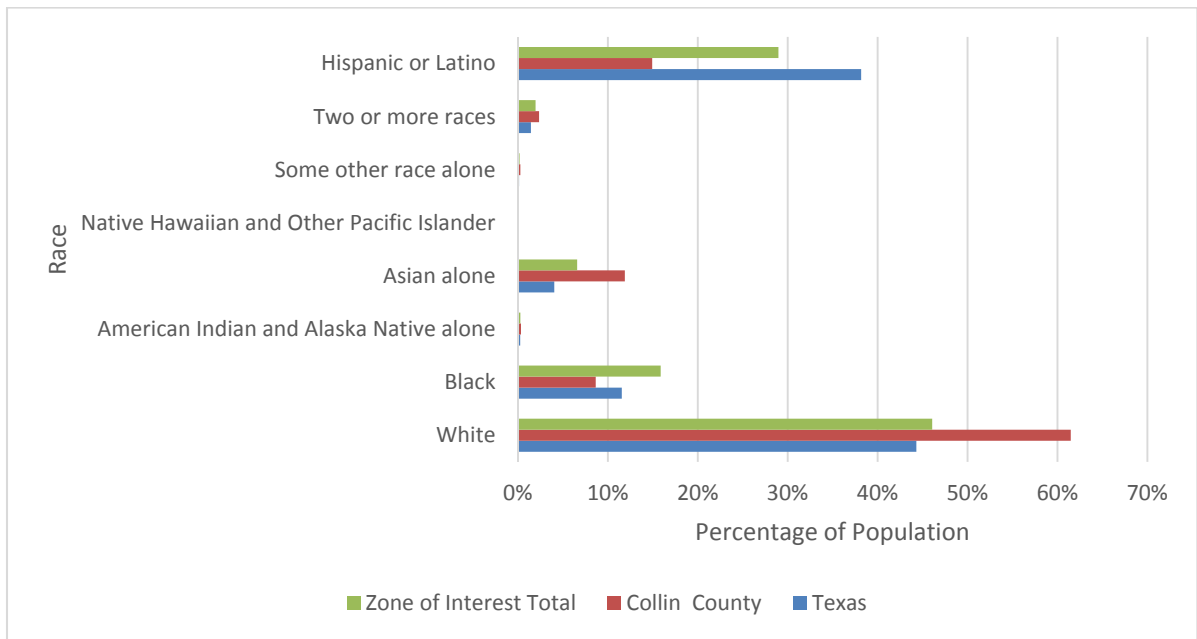
Geographic Area	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Two or more races	Hispanic
Texas	11,735,074	3,161,811	88,539	1,177,410	21,807	360,977	10,411,340
Collin County	534,565	81,151	3,668	112,930	554	18,735	133,638
Dallas County	782,674	560,538	7,406	145,333	1,045	32,166	989,476
Denton County	465,191	68,643	3,466	57,091	557	15,053	143,362
Fannin County	26,811	2,266	311	173	8	634	3,549
Grayson County	94,847	7,289	1,732	1,350	53	2,705	15,558

Table 3-10, continued

Geographic Area	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Two or more races	Hispanic
Hunt County	64,955	7,085	573	1,187	116	1,360	13,217
Rockwall County	63,710	5,049	389	2,355	61	1,353	14,892
Zone of Interest Total	2,032,753	732,021	17,545	320,419	2,394	72,006	1,313,692

1
2

Source: U.S. Census Bureau, American Fact Finder (2014 Estimate)



3
4
5
6

Figure 3-2. Population Estimate by Ethnicity

Education and Employment

7 Table 3-11 displays the highest level of education attained by the population
8 ages 25 and over in both Texas and the zone of interest. In the zone of interest, eight
9 percent of the population has less than a 9th grade education; eight percent has
10 between a 9th and 12th grade education; 22 percent has a high school diploma or
11 equivalent; 21 percent has some college and no degree; 6 percent has an Associate's
12 degree; 23 percent has a Bachelor's degree; and 12 percent has a graduate or
13 professional degree. These percentages are similar to those for the State of Texas,
14 though the zone of interest has a slightly larger population that has received a higher
15 level diploma. In Texas, 9 percent of the population has less than a 9th grade
16 education; another nine percent has between a 9th and 12th grade education; 25 percent
17 has at least a high school diploma or equivalent; 23 percent has some college; six
18 percent has an Associate's degree; 18 percent has a Bachelor's degree; and nine
19 percent has a graduate or professional degree. In Collin County, 32 percent of the
20 population ages 25 and over has at least a Bachelor's degree (Table 3-11).

Table 3-11. 2014 Population and Estimate of Highest Level of Educational Attainment for Individuals 25 Years of Age and Older

Geographic Area	Highest Level of Educational Attainment							
	Population 25 years and over	Less than 9th Grade	9th to 12th Grade, no Diploma	High School Graduate (includes equivalency)	Some College, no Degree	Associate's Degree	Bachelor's Degree	Graduate or Professional Degree
Texas	16,426,730	1,519,482	1,505,854	4,145,289	3,726,610	1,079,891	2,948,330	1,501,274
Collin County	539,347	17,434	17,977	84,066	112,979	40,314	173,951	92,626
Dallas County	1,541,324	175,753	168,456	357,261	311,877	85,131	285,669	157,177
Denton County	448,049	16,588	19,475	85,093	108,036	35,347	126,892	56,618
Fannin County	23,574	1,510	2,761	8,179	5,897	1,551	2,416	1,260
Grayson County	81,569	3,879	6,965	25,524	22,025	6,717	10,821	5,638
Hunt County	57,178	3,364	6,358	19,714	14,064	3,708	6,498	3,472
Rockwall County	53,527	1,985	2,457	11,703	13,579	4,142	13,514	6,147
Zone of Interest Total	2,744,568	220,513	224,449	591,540	588,457	176,910	619,761	322,938

Source: U.S. Census Bureau, American Fact Finder (2014 Estimate)

1 Employment by sector is presented in Figure 3-3. The largest percentage in the zone of
 2 interest is employed in the educational services, and health care and social assistance
 3 sector. The civilian labor force in the zone of interest accounts for approximately 17.8
 4 percent of the civilian labor force of the State of Texas (Table 3-12). The
 5 unemployment rate of the zone of interest was 7.6 percent in 2014, which was
 6 comparable to the unemployment rate of the State of Texas. The 2014 unemployment
 7 rates in Dallas, Fannin, Grayson, and Hunt counties were higher than that of the state,
 8 while the unemployment rates in Collin, Denton, and Rockwall counties were lower.
 9

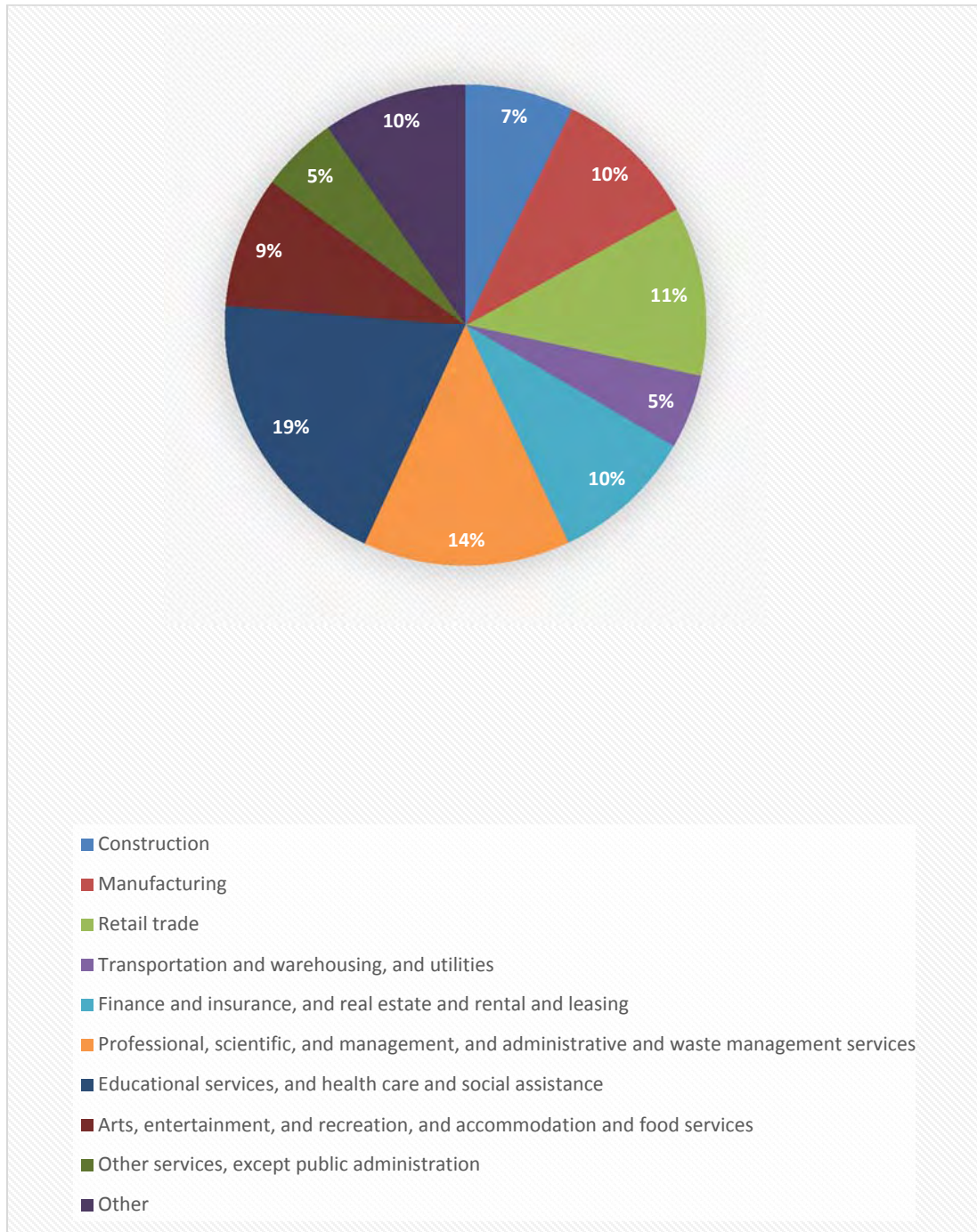


Figure 3-3. 2014 Annual Average Employment by Sector
 (Figure Source: USCAE 2016)

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Table 3-12. 2014 Annual Averages for Labor Force, Employment, and Unemployment Rates

Geographic Area	Civilian Labor Force	Number Employed	Number Unemployed	Unemployment Rate
Texas	12,791,590	11,809,010	982,580	7.7 percent
Collin County	454,649	429,486	25,163	5.5 percent
Dallas County	1,269,810	1,161,634	108,176	8.5 percent
Denton County	398,807	373,978	24,829	6.2 percent
Fannin County	14,384	13,197	1,187	8.3 percent
Grayson County	58,610	53,283	5,327	9.1 percent
Hunt County	40,580	35,749	4,831	11.9 percent
Rockwall County	42,976	40,068	2,908	6.8 percent
Zone of Interest Total	2,279,816	2,107,395	172,421	7.6 percent

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Source: U.S. Census Bureau, American Fact Finder (2014 Estimate)

Households and Income

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Table 3-13 displays the number of households and average household sizes as of the 2010 census. There were approximately 8.9 million households in the State of Texas, with an average household size of 2.75 persons. There are approximately 1.5 million households in the zone of interest, with an average household size of 2.76 persons (Table 3-13).

Table 3-13. 2010 Household and Household Size Estimates

Geographic Area	Total Households	Average Household Size
Texas	8,922,933	2.75
Collin County	283,759	2.74
Dallas County	855,960	2.73
Denton County	240,289	2.71
Fannin County	12,149	2.53
Grayson County	46,905	2.53
Hunt County	32,076	2.63
Rockwall County	26,448	2.94
Zone of Interest Total	1,497,586	2.76

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Source: U.S. Census Bureau, American Fact Finder (2010 Estimate)

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As shown in Table 3-14, the median household income varies greatly within the zone of interest. The median household incomes in Dallas, Fannin, Grayson, and Hunt counties are slightly lower than the median household income of the state, while the median incomes are substantially higher than the state in Collin, Denton, and Rockwall counties (Table 3-14). Collin County has the second highest median household income when compared with the other counties within the zone of interest. Per capita income in the zone of interest is \$30,605, which is greater than that of Texas at \$26,513 (Table 3-14).

1

Table 3-14. 2014 Median and Per Capita Income

Geographic Area	Median Household Income	Per Capita Income
Texas	\$52,576	\$26,513
Collin County	\$84,233	\$38,575
Dallas County	\$49,925	\$27,195
Denton County	\$74,662	\$34,528
Fannin County	\$44,432	\$20,784
Grayson County	\$47,631	\$24,614
Hunt County	\$44,898	\$22,446
Rockwall County	\$86,597	\$34,850
Zone of Interest Total	N/A	\$30,605

Source: U.S. Census Bureau, American Fact Finder (2014 Estimate)

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As shown in Table 3-15, the percentage of the population in the zone of interest whose incomes in 2014 were below the poverty level in the last 12 months is lower than in the State of Texas as a whole. Hunt and Dallas counties have the highest percentage of the population living below the poverty level, followed by Fannin County, Grayson County, Denton County, Collin County, and Rockwall County.

Table 3-15. Percent of Families and People Whose Income in the Past 12 Months is Below the Poverty Level (2014)

Geographic Area	All Persons	All Families
Texas	17.7 percent	13.7 percent
Collin County	7.9 percent	5.8 percent
Dallas County	19.3 percent	15.9 percent
Denton County	8.9 percent	5.8 percent
Fannin County	17.7 percent	13.1 percent
Grayson County	15.8 percent	11.6 percent
Hunt County	19.6 percent	14.8 percent
Rockwall County	6.3 percent	5.3 percent
Zone of Interest Total	15.0 percent	N/A

Source: U.S. Census Bureau, American Fact Finder (2014 Estimate)

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Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by President Clinton on February 11, 1994. It was intended to ensure that proposed Federal actions do not have disproportionately high and adverse human health and environmental effects on minority and low-income populations and to ensure greater public participation by minority and low-income populations. It required each agency to develop an agency-wide environmental justice strategy. A Presidential Transmittal Memorandum issued with the EO states that “each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 USC section 4321, et seq.”

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1 EO 12898 does not provide guidelines as to how to determine concentrations of
2 minority or low-income populations. However, analysis of demographic data on race
3 and ethnicity and poverty provides information on minority and low-income populations
4 that could be affected by the proposed actions. The U.S. Census reports numbers of
5 minority individuals and the American Community Survey provides the most recent
6 poverty estimates available. Minority populations are those persons who identify
7 themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native,
8 Pacific Islander, or Other. Poverty status is used to define low-income. Poverty is
9 defined as the number of people with income below poverty level, which was \$24,230
10 for a family of four in 2014, according to the U.S. Census Bureau. A potential
11 disproportionate impact may occur when the minority in the study area exceeds 50
12 percent or when the percent minority and/or low-income in the study area are
13 meaningfully greater than those in the region.
14

15 Collin County is relatively low minority and low poverty compared to the zone of
16 interest, Texas, and the U.S. Collin County's population is 39.6 percent minority, which
17 is below 50 percent and substantially below the minority populations of the zone of
18 interest and the State of Texas, which are 55 and 56.5 percent minority, respectively.
19 The poverty rate in Collin County is 7.9 percent, which is approximately half the poverty
20 rate in the zone of interest (15.0 percent) and the U.S. (15.4 percent) and less than half
21 the poverty rate for the State of Texas (17.6 percent).
22

23 Protection of Children

24 EO 13045 requires each Federal agency "to identify and assess environmental
25 health risks and safety risks that may disproportionately affect children" and "ensure that
26 its policies, programs, activities, and standards address disproportionate risks to
27 children that result from environmental health risks or safety risks." This EO was
28 prompted by the recognition that children, still undergoing physiological growth and
29 development, are more sensitive to adverse environmental health and safety risks than
30 adults. The potential for impacts on the health and safety of children is greater where
31 projects are located near residential areas. The U.S. Census estimates that persons
32 under 18 years of age account for 27 percent of the population of Collin County in 2014.
33

34 **3.12.1 Alternative 1: No Action Alternative**

35 There would be no short- or long-term, minor, moderate or major, beneficial, or
36 adverse impacts on socioeconomic resources as a result of implementing the No Action
37 Alternative, as there would be no changes to the existing Master Plan.
38

39 **3.12.2 Alternative 2: Proposed Action**

40 Lavon Lake is beneficial to the local economy through indirect job creation and
41 local spending by visitors, offers a variety of free recreation opportunities, and uses
42 innovative maintenance and planning programs to minimize usage fees. The land
43 reclassifications, resource management objectives, and resource plan reflect changes
44 in land management and land uses that have occurred since 1972 and projected to until
45 2040. Therefore, no adverse impacts on area economic stability or environmental
46 justice populations would result from the revision of the Lavon Lake Master Plan.

1 **3.13 RECREATION**

2 The primary area having a significant influence on the public use and management
 3 of Lavon Lake includes all of Collin County and portions of the adjoining counties of Dallas,
 4 Denton, Grayson, Fannin, Hunt, and Rockwall. The majority of visitors to Lavon Lake
 5 come from within a 100-mile radius of the lake area. Lavon Lake visitors are a diverse
 6 group ranging from campers who utilize the campgrounds around the lake, full-time and
 7 part-time residents of housing developments that border the lake, hunters who utilize the
 8 lands managed for wildlife, day-users who picnic in the private and Federally operated
 9 parks, fishermen, recreational boaters, marina customers, pedestrian and bicycle trail
 10 users, and many other user groups.

11
 12 The peak visitation months on Lavon Lake are April through September, when 88
 13 percent of visits occur. July is the highest visitation month and accounts for 18 to 20
 14 percent of the annual total. Approximately 90 percent of visits to recreation areas occur
 15 in USACE-managed recreation areas. The remaining visitation takes place onto
 16 USACE lands that have been leased to marina operators and to Collin County. Lavon
 17 Lake experiences an unknown amount of dispersed recreation visits from adjacent
 18 landowners walking on to USACE lands, hunters and fishermen parking at
 19 undesignated/unmonitored access points, and trail users parking at trailheads that are
 20 not monitored. One indication of dispersed use is the number of USACE-issued hunting
 21 permits for Lavon Lake. In the hunting seasons of 2012-2014, annual hunting permits
 22 issued by the USACE ranged from 1,700 to 2,000. Permits are valid for the entire
 23 hunting season, and many hunters make several trips during the season.

24
 25 At the national level, the USACE is currently preparing computerized visitation
 26 models/programs that will estimate the level of dispersed visitation at all USACE lakes.
 27 Table 3-16 provides the Fiscal Year 2012 report on the number of total recreation visits
 28 to each designated High Density Use Recreation area at Lavon Lake. More recent data
 29 are unavailable as a result of a nationwide revision of the procedures for collecting and
 30 reporting visitation data.

31
 32 **Table 3-16. Fiscal Year 2012 Visitation for the 16 Designated Recreation Areas**
 33 **and Stilling Basin Access Point at Lavon Lake**

Recreation Area	Total Visits
Avalon Park	30,113
Bratonia Park	8,741
Brockdale Park	29,606
Caddo Park (temporarily closed)	0
Clear Lake Park	38,065
Collin Park	168,149
East Fork Park	124,456
Elm Creek Park	11,239
Highland Park	21,029
Lakeland Park	13,259
Lavonia Park	50,155
Little Ridge Park	15,971

Table 3-16, continued

Recreation Area	Total Visits
Mallard Park	52,511
Pebble Beach Park	9,937
Stilling Basin Access	102,641
Tickey Creek Park	27,788
Twin Groves Park	5,986

1
2 Recreational use at Lavon Lake continues to evolve, but day-use activities
3 primarily include swimming, picnicking, fishing, and boating, as well as overnight camping,
4 and are the principal activities pursued by most visitors. As of the date of this EA, the most
5 recent summer where the lake elevation was close to the normal or conservation pool
6 elevation was 2012. Using 2012 data generated by the National Recreation Reservation
7 Service (NRRS), there were 11,346 camping permits issued at Lavon Lake in 2012. For
8 the three campgrounds participating in the NRRS (Clear Lake Park, East Fork Park, and
9 Lavonia Park), the campers making those reservations originated from nearby counties as
10 shown in Table 3-17. For Lavonia and East Fork Parks, campers are originating primarily
11 from cities to the south and west including Wylie, Plano, Richardson, McKinney, Garland,
12 and Dallas. For Clear Lake Park, campers originate primarily from Princeton and
13 McKinney. No data are available that would show where day-use visitors are coming
14 from, but the USACE believes it is safe to assume that, like campers, more than 90
15 percent of day-users at Lavon Lake are originating from the nearby cities listed above.
16

**Table 3-17. County of Origin for Registered Campers in 2012
(Percent of total registered campers within each listed park)**

Camping Area	Collin County	Dallas County	Rockwall County
Clear Lake Park	71	20	2
East Fork Park	47	35	9
Lavonia Park	49	26	10

19
20 While visitation in designated recreation areas remains strong, there is an
21 unknown, but considerably high level of recreation use originating from the many
22 subdivisions that share a common boundary with the USACE lands at Lavon Lake.
23 Adjacent landowners are allowed pedestrian access to the shoreline throughout most of
24 the lake area, with the exception of developed parks and prohibited access areas, such
25 as near the dam or water intake structures. This easy access to the shoreline results in
26 dispersed recreation use, such as bank fishing, hiking, and nature study.
27

28 The Texas Outdoor Recreation Plan – 2012 (TORP), published by the TPWD,
29 was developed using results from web surveys to garner public input on the outdoor
30 recreational needs of Texans. The TORP demonstrated that Lavon Lake is the largest
31 and most important outdoor recreation venue in Collin County, Texas. Of the 27,309
32 recreation-conservation acres designated for Collin County in the TORP, approximately
33 16,000 of those acres are USACE lands at Lavon Lake that lie above the normal pool of
34 the lake.

1 While traditional camping, picnicking, and power boating at Lavon Lake continue
 2 to be very popular, the TORP revealed that Texas residents have a strong desire for a
 3 broad array of passive-use recreation activities that have potential for expansion on
 4 Federal lands at Lavon Lake. Furthermore, public comment received during the
 5 preparation of the 2016 Master Plan indicates a strong interest in equestrian, biking,
 6 and hiking trails.

7
 8 Designated High Density Recreation Areas, Uses, and Facilities

9 Outdoor recreation at Lavon Lake generally falls within two broad categories of
 10 land or water-based recreation. Land-based recreation opportunities, activities, areas
 11 and facilities that typically occur on, or adjacent to, USACE land and water include, but
 12 are not limited to, camping, hiking, swimming, hunting, fishing, horseback riding,
 13 picnicking, geocaching, wildlife/bird viewing, and sightseeing. Land-based recreation
 14 areas include campgrounds, day-use areas, overlooks, trails, and wildlife management
 15 areas (Table 3-18). Facility types typically found within these recreation areas include
 16 campsites, picnic sites, restrooms, shower facilities, boat ramps, and courtesy docks
 17 (Table 3-18). These recreation areas are managed by several entities including the
 18 USACE, county government, and private/commercial concessionaires.

19
 20 **Table 3-18. Designated High Density Recreation Areas and**
 21 **Facilities at Lavon Lake**

Park Name	Acres Above Normal Pool	Type of Use	Boat Ramp	Operator	Number of Campsites Or Picnic Sites
Avalon Park	60	Day Use	Yes-4 Lane	USACE	56 Picnic Sites
Bratonia Park	138	Day Use	Yes-2 Lane	USACE	NA
Brockdale Park	114	Day Use	Yes-4 Lane	USACE	NA
Caddo Park	515	Day Use	Yes-4 Lane	USACE	13 Picnic Sites
Clear Lake Park	88	Camping	Yes-8 Lane	USACE	23 Camp Sites; 18 Picnic Sites
Collin Park	160	Camping	Yes	Lessee	61 Camp Sites
East Fork Park	106	Camping and Day Use	Yes- 8 Lane	USACE & Lessees	62 Camp Sites; 27 Picnic Sites
Elm Creek Park	189	Day Use	Yes- 2 Lane	USACE	NA
Highland Park	131	Day Use	Yes- 4 Lane	USACE	NA
Lakeland Park	105	Camping	Yes- 4 Lane	USACE	32 Camp Sites (Tent)
Lavonia Park	126	Camping and Day Use	Yes- 8 Lane	USACE	53 Camp Sites; 51 Picnic Sites
Little Ridge Park	45	Day Use	Yes- 4 Lane	USACE	28 Picnic Sites
Mallard Park	81	Day Use	Yes- 4 Lane	USACE	10 Picnic Sites
Pebble Beach Park	35	Day Use	Yes- 4 Lane	USACE	21 Picnic Sites
Ticky Creek Park	38	Day Use	Yes- 4 Lane	USACE	16 Picnic Sites
Twin Groves Park	115	Day Use	Yes- 4 Lane	USACE	NA

22
 23 Water-Use Recreation

24 Management of the water surface for recreational purposes at Lavon Lake rests
 25 primarily with the USACE, but close coordination is maintained with TPWD and Collin
 26 County Sheriff's Office with respect to enforcement of rules and regulations that apply to

1 boating. Marina concessionaires are also important stakeholders in water-based
2 recreation management. Water-based outdoor recreation includes, but is not limited to
3 fishing, boating, swimming, water skiing, scuba diving, seaplane operations, and
4 kayaking.

5 6 Recreational Carrying Capacity

7 Recreational carrying capacity is considered by the USACE to ensure that
8 visitors have a high-quality and safe recreational experience, and that natural resources
9 are not irreparably damaged. An example of a carrying capacity consideration at Lavon
10 Lake is the management of public hunting on USACE lands wherein hunting activity
11 may be restricted by species or by area, depending on population or habitat conditions.

12
13 In 2002, the USACE, Fort Worth District, adopted a policy governing water-
14 related recreation development that has the potential to affect the degree of boating
15 traffic on the water surface of all the District's lakes. The USACE has determined that
16 the number of existing parking spaces and slips at Lavon Lake as of the date of this EA
17 has the potential to exceed the target capacity and may have already exceeded the
18 target. In view of this potential, the USACE would require a comprehensive water-
19 related recreation use study prior to making a decision to approve or deny a proposal
20 for additional slips or boat ramp parking spaces at Lavon Lake.

21 22 **3.13.1 Alternative 1: No Action Alternative**

23 Under the No Action Alternative, there would be no short- or long-term, minor,
24 moderate or major, beneficial, or adverse impacts on recreational resources, as there
25 would be no changes to the existing Master Plan.

26 27 **3.13.2 Alternative 2: Proposed Action**

28 Lavon Lake is beneficial to the local visitors and also offers a variety of free
29 recreation opportunities. Even though the amount of acreage available for High Density
30 Recreation and Low Density Recreation would decrease with implementation of the
31 revised land use classifications in the 2016 Master Plan, these land reclassifications
32 reflect changes in land management and land uses that have occurred since 1972 at
33 Lavon Lake. The conversion of these lands would have no effect on current or
34 projected public use. Therefore, no adverse impacts on area recreational resources
35 would result from the revision of the Lavon Lake Master Plan.

36 **3.14 AESTHETICS**

37 Lavon Lake proper and surrounding Federal lands offer public, open space
38 values and scenic vistas that are unique in Collin County. The aesthetic qualities
39 inherent in Lavon Lake are recognized by the NCTCOG in their North Texas 2050 vision
40 document and in the Collin County Parks and Open Space Program Strategic Plan.
41 The NCTCOG vision document stresses that "business as usual" with regard to a
42 rapidly expanding population and the continuation of low density housing developments
43 within the 16-county NCTCOG area, which includes Collin County and adjacent Denton,
44 Dallas, Rockwall and Hunt counties will result in a lower quality of life for the regions
45 citizens. The "business as usual" future would result in the loss of approximately
46 900,000 acres of agricultural land as well as substantial acreage of natural habitat and

1 would add significantly to traffic congestion. The NCTCOG vision document
2 recommends the adoption of several policies that would work toward a better quality of
3 life for the region. One of the policy areas that relates directly to Lavon Lake is focused
4 on Natural Areas and includes the following statement:

5
6 *“The purpose of this policy area is to preserve and protect open spaces,*
7 *public parks, greenways, lake shores, significant views, stands of trees,*
8 *and floodplains. The development that occurs near these natural features*
9 *is planned with these important environmental features in mind. Retaining*
10 *and managing the natural assets that are at the heart of these areas is the*
11 *goal.”*

12
13 The Collin County Parks and Open Space Strategic Plan stresses the importance
14 of parks and open space and the need for more land dedicated to these purposes going
15 into the future. The following is a quote from the Strategic Plan that relates directly to
16 Lavon Lake:

17
18 *“...the parks and open space system should reflect sustainable financial,*
19 *cultural, and environmental objectives that promote the conservation of*
20 *natural and human resources for current and future citizens.”*

21 22 **3.14.1 Alternative 1: No Action Alternative**

23 There would be no short- or long-term, minor, moderate or major, beneficial, or
24 adverse impacts on aesthetics as a result of implementing the No Action Alternative, as
25 there would be no changes to the existing Master Plan.

26 27 **3.14.2 Alternative 2: Proposed Action**

28 Lavon Lake currently plays a pivotal role in availability of parks and open space
29 in Collin County. Even though the amount of acreage available for High Density
30 Recreation and Low Density Recreation would decrease with implementation of the
31 revised land use classifications in the 2016 Master Plan, these land reclassifications
32 reflect changes in land management and land uses that have occurred since 1972 at
33 Lavon Lake. The conversion of these lands would have no effect on current or
34 projected public use. Furthermore, the increase in the acreage of land classified as
35 Environmentally Sensitive Areas would protect lands that are aesthetically pleasing at
36 Lavon Lake and limit future development. Therefore, no adverse impacts on aesthetics
37 would result from implementation of the revised land use classifications in the 2016
38 Master Plan.

39 **3.15 HAZARDOUS MATERIALS AND SOLID WASTE**

40 This section describes existing conditions within the Lavon Lake study area with
41 regard to potential environmental contamination and the sources of releases to the
42 environment. Lavon Lake does not presently experience any particular contamination
43 issues or have major contamination contributors. Contaminants could enter the Lavon
44 Lake environment via air or water pathways. The highways and roads, railroads, and oil
45 and gas pipelines in the vicinity could also provide sources of contaminants to the study
46 area. Illegal trash dumping on project lands by individuals and businesses is a

1 persistent problem. USACE and area law enforcement officials work cooperatively to
2 apprehend those responsible for illegal trash dumping.

3
4 **3.15.1 Alternative 1: No Action Alternative**

5 There would be no short- or long-term, minor, moderate or major, beneficial, or
6 adverse impacts on hazardous, toxic, or radioactive wastes as a result of implementing
7 the No Action Alternative, as there would be no changes to the existing Master Plan.

8
9 **3.15.2 Alternative 2: Proposed Action**

10 The land reclassifications required to revise the Master Plan would be compatible
11 with Lavon Lake hazardous and toxic waste management practices. Therefore, no
12 short- or long-term, minor, moderate or major, beneficial, or adverse impacts due to
13 hazardous, toxic, or radioactive wastes would occur as a result of implementing the
14 revised land use classifications, resource management objectives, and resource plan in
15 the 2016 Master Plan.

16 **3.16 HEALTH AND SAFETY**

17 Lavon Lake's authorized purposes include flood control, water supply, water
18 quality, and recreation. The USACE, with assistance from the TPWD, has established
19 public outreach programs to educate the public on water safety and conservation of
20 natural resources. In addition to the water safety outreach programs, the USACE has
21 established recreation management practices to protect the public. These include safe
22 boating and swimming regulations, safe hunting regulations, and speed limit and
23 pedestrian signs for park roads. Lavon Lake also has solid waste management plans in
24 place for camping and day-use areas. Lavon Lake personnel are in place to enforce
25 these policies, rules, and regulations during normal park hours.

26
27 **3.16.1 Alternative 1: No Action Alternative**

28 Under the No Action Alternative, the 1972 Master Plan would not be revised. No
29 significant adverse impacts on human health or safety would be anticipated.

30
31 **3.16.2 Alternative 2: Proposed Action**

32 Under the Proposed Action, the proposed revisions to the Lavon Lake Master
33 Plan would be compatible with project safety management plans. The revised
34 classifications of Restricted water surface and Designated No-Wake areas would
35 improve boating safety near key recreational water access areas such as boat ramps.
36 The Project would continue to have reporting guidelines in place should water quality
37 become a threat to public health. Existing regulations and safety programs throughout
38 the Lavon Lake study area would continue to be enforced to ensure public safety.
39 There would be no short- or long-term, minor, moderate or major, adverse impacts on
40 public health and safety as a result of implementing the Proposed Action.

1 **SECTION 4: CUMULATIVE IMPACTS**

2 The CEQ defines cumulative impacts as “the impact on the environment which
3 results from the incremental impact of the action when added to other past, present and
4 reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or
5 person undertakes such other actions” (40 CFR § 1508.7). Cumulative impacts can
6 result from individually minor but collectively significant actions taking place over a
7 period of time by various agencies (Federal, state, or local) or individuals. CEQ
8 guidance on cumulative impacts requires the definition of the scope of the other actions
9 and their interrelationship with the Proposed Action (CEQ 1997). The scope must
10 consider geographic and temporal overlaps with the Proposed Action and all other
11 actions occurring within the zone of interest. Informed decision making is served by
12 consideration of cumulative impacts resulting from activities that are proposed, under
13 construction, recently completed, or anticipated to be implemented in the reasonably
14 foreseeable future. This cumulative impacts analysis summarizes expected
15 environmental impacts from the combined impacts of past, current, and reasonably
16 foreseeable future activities affecting any part of the human or natural environments
17 impacted by the Proposed Action.

18 **4.1 PAST IMPACTS WITHIN THE ZONE OF INTEREST**

19 Lavon Lake was originally constructed in 1953-54 and was modified and
20 enlarged in 1974-75. The modification and enlargement of Lavon Lake required
21 acquisition of additional lands bringing the total fee simple land base to 37,515 acres.
22 In addition to these lands, a total of 849 acres of flowage easement was also acquired.
23 In the watershed above Lavon Lake, the USDA NRCS has constructed at least 149 water
24 retention structures. In more recent years, Collin County’s increasing population has
25 resulted in an expansion of urbanized area, with residential development consisting of a
26 variety of housing types and increased non-residential development ranging from retail
27 to manufacturing.

28 **4.2 CURRENT AND REASONABLY FORESEEABLE PROJECTS WITHIN AND**
29 **NEAR THE ZONE OF INTEREST**

30 Future management of the 849 acres of Flowage Easement Lands at Lavon Lake
31 includes routine inspection of these areas to ensure that the Government’s rights
32 specified in the easement deeds are protected. In almost all cases, the Government
33 acquired the right to prevent placement of fill material or habitable structures on the
34 easement area. Placement of any structure that may interfere with the USACE flood
35 risk management and water conservation missions may also be prohibited.

36
37 USACE policy encourages the establishment of designated corridors on project
38 lands, where feasible, to serve as the preferred location for future outgrants such as
39 easements for roads or utility lines. After obtaining public input and examining the
40 location of existing roads and utility lines on project lands, the USACE determined that
41 only utility corridors would be designated at Lavon Lake. Because USACE policy in EP
42 1130-2-550, Chapter 17, states that project lands will generally be available only for
43 roads that are considered regional arteries or freeways, and all current regional and

1 county mobility plans include no proposals for regional arterials crossing USACE land at
2 Lavon Lake, there is no need for designation of roadway corridors. Future use of these
3 corridors, where the corridor is limited to an existing easement, would in most cases
4 require prior approval of those entities that have legal rights to the easement.
5

6 The CCRTMP describes several future trails and trail corridors at Lavon Lake
7 with uses that could include additional designated natural surface hike, bike, and
8 equestrian trails. Future regional and county mobility plans that call for widening of
9 existing roadways across USACE lands will be addressed on a case-by-case basis.
10 Significant local road expansion or construction projects that could be anticipated to
11 take place within the zone of interest during the planning horizon of the 2016 Master
12 Plan include U.S. or State Highways and Farm to Market (FM) roads maintained by the
13 Texas Department of Transportation (TxDOT), county roads maintained by Collin
14 County, or municipal roads maintained by the cities of Wylie, St. Paul, Lucas, Lowry
15 Crossing, Princeton, Farmersville, or Lavon.
16

17 Most of the principal roadways mentioned above would likely be widened in the
18 coming years to accommodate the projected significant growth in Collin County
19 population. In addition to the Collin County Mobility Plan, the 2035 Metropolitan
20 Transportation Plan (MTP) published by the NCTCOG addresses the major, controlled
21 access, regional arterial freeways and tollways constructed and operated by TxDOT or
22 the North Texas Tollway Authority. The MTP includes planned and envisioned
23 roadways near Lavon Lake, but none that would directly impact USACE-managed lands
24 or the water surface. However, any major freeway or tollway constructed near Lavon
25 Lake would likely cause increased residential and commercial development.

26 **4.3 ANALYSIS OF CUMULATIVE IMPACTS**

27 Impacts on each resource were analyzed according to how other actions and
28 projects within the zone of interest might be affected by the No Action Alternative and
29 Proposed Action. Impacts can vary in degree or magnitude from a slightly noticeable
30 change to a total change in the environment. For the purpose of this analysis the
31 intensity of impacts will be classified as negligible, minor, moderate, or major. These
32 intensity thresholds were previously defined in Section 3.0. Collin County is the fastest
33 growing county in Texas, population growth and development are expected to continue
34 in the vicinity of Lavon Lake and cumulative adverse impacts on resources could be
35 expected when added to the impacts of activities associated with the Proposed Action.
36 A summary of the anticipated cumulative impacts on each resource is presented below.
37

38 **4.3.1 Land Use**

39 A major impact would occur if any action is inconsistent with adopted land use
40 plans or if an action would substantially alter those resources required for, supporting,
41 or benefiting the current use. Land use around Lavon Lake has experienced major
42 developmental change in the past several years with the large increase in the
43 population in the Collin County. Under the No Action Alternative, land use would not
44 change. Although the Proposed Action would result in the reclassification of project
45 lands, the reclassifications were developed to enhance regional goals associated with
46 good stewardship of land and water resources that would allow for continued use and
47 development of project lands. Therefore, cumulative impacts on land use within the

1 area surrounding Lavon Lake, when combined with past and proposed actions in the
2 region, are anticipated to be minimal.

3 4 **4.3.2 Water Resources**

5 A major impact would occur if any action is inconsistent with adopted water
6 surface classifications, water use plans, or if an action would substantially alter those
7 resources required for, supporting, or benefiting the current use. When considering
8 watershed restoration activities, operations agreements, and updates to local
9 conservation and drought emergency plans, beneficial, long-term cumulative impacts
10 will be experienced as a result of the increased ability to meet water supply demands in
11 the basin, as well as benefiting aquatic resources.

12
13 Other activities surrounding Lavon Lake, such as the addition of future utility lines
14 in corridors, which would require boring beneath streams in most cases to avoid
15 impacts, have been identified as having the potential to contribute directly to the
16 cumulative impacts on water quality; however, water quality monitoring will continue to
17 be used to assess any changes in these conditions. Due to the large increase in the
18 population of Collin County and the future population projections, cumulative impacts on
19 water supply would likely be experienced in the future as water demands increase in the
20 study area. However, the cumulative impacts on water quality from the Proposed
21 Action at Lavon Lake are anticipated to be negligible when combined with past and
22 proposed actions in the area.

23 24 **4.3.3 Climate**

25 The Proposed Action would neither affect nor be affected by the climate.
26 Therefore, implementation of the revised land use classifications in the 2016 Master
27 Plan, when combined with other existing and proposed projects in the region, would not
28 result in major cumulative impacts on the climate.

29 30 **4.3.4 Climate Change and GHG**

31 Under the Proposed Action, current Lavon Lake project management plans and
32 monitoring programs would not be changed. In the event that GHG emission issues
33 become significant enough to impact the current operations at Lavon Lake, the 2016
34 Master Plan and all associated documents would be reviewed and revised as
35 necessary. Therefore, implementation of the 2016 Master Plan, when combined with
36 other existing and proposed projects in the region, would not result in major cumulative
37 impacts on climate change or GHG.

38 39 **4.3.5 Air Quality**

40 For the area surrounding Lavon Lake, activities that could add to air emissions in
41 the area are likely few and minor in nature. The Proposed Action would not adversely
42 impact air quality within the area. Vehicle traffic along park and area roadways and
43 routine daily activities in nearby communities contribute to current and future emission
44 sources. Seasonal prescribed burning on Lavon Lake lands would have minor,
45 negative impacts on air quality through elevated ground-level O₃ and particulate matter
46 concentrations; however, these seasonal burns are generally scheduled so that impacts
47 are minimized. Minor improvements to the communities in the Lavon Lake area, such
48 as construction of new business buildings and highway improvement projects could also
49 contribute to minor future emissions. In addition, with a growing population in Collin

1 County, more vehicles on the road, and presumably more visitors to Lavon Lake, there
2 could be cumulative impacts on air quality in the study area.

3 4 **4.3.6 Topography, Geology, and Soils**

5 A major impact would occur if the action exacerbates or promotes long-term
6 erosion, if the soils are inappropriate for the proposed construction and would create a
7 risk to life or property, or if there would be a substantial reduction in agricultural
8 production or loss of Prime Farmland soils. Cumulative impacts on topography,
9 geology, and soils within the area surrounding Lavon Lake, when combined with past
10 and proposed actions in the region, are anticipated to be minimal.

11
12 Land use around Lavon Lake has changed in the past several years. Given the
13 projected population growth and vast acreage of Prime Farmland in Collin County, there
14 could be cumulative impacts on Prime Farmland in the study area. However, the
15 cumulative impacts on Prime Farmland from the Proposed Action at Lavon Lake are
16 anticipated to be negligible when combined with past and proposed actions in the area.

17 18 **4.3.7 Natural Resources**

19 The Proposed Action, especially the revised land classifications and
20 establishment of utility corridors, would allow land management and land uses to be
21 compatible with the goals of good stewardship of natural resources. The Proposed
22 Action would allow project lands to continue supporting the USFWS and the TPWD
23 missions associated with wildlife conservation and implementation of operational
24 practices that would protect and enhance wildlife and fishery populations. In addition,
25 the Proposed Action would be compatible with conservation principles and measures to
26 protect migratory birds as mandated by EO 13186. Long-term, beneficial impacts on
27 natural resources could occur as a result of implementing the reclassifications outlined
28 in the 2016 Master Plan. Therefore, implementation of the 2016 Master Plan, when
29 combined with other existing and proposed projects in the region, would result in minor
30 beneficial cumulative impacts on natural resources in the Lavon Lake area.

31 32 **4.3.8 Threatened and Endangered Species**

33 A major impact on protected species would occur if any action resulted in a
34 jeopardy opinion for any endangered, threatened, or rare species. Under the Proposed
35 Action, the USACE would continue cooperative management plans with the USFWS
36 and TPWD to preserve, enhance, and protect wildlife habitat resources. To further
37 management opportunities and beneficially impact habitat diversity, the reclassifications
38 proposed in the 2016 Master Plan include 4,319 acres as Environmentally Sensitive
39 Areas. The conversion of these lands was supported by public comment and
40 recommendations from the USFWS and TPWD. Long-term, beneficial impacts on
41 natural resources could occur as a result of implementing the reclassifications outlined
42 in the 2016 Master Plan. Therefore, implementation of the revised land use
43 classifications in the 2016 Master Plan, when combined with other existing and
44 proposed projects in the region, would result in minor to moderate beneficial cumulative
45 impacts on natural resources, which may also have beneficially impacts on threatened
46 and endangered species, in the Lavon Lake area.

1 **4.3.9 Invasive Species**

2 Zebra mussels are present at Lavon Lake. Potential adverse impacts include
3 infestation of other water bodies through equipment that is not properly cleaned and
4 movement of water and sediment infested with zebra mussels. Additional current and
5 future activities such as recreational boating and other in-lake operation and
6 maintenance activities could result in the transport of zebra mussels to other water
7 bodies. Continued information and education, as well as construction permit
8 requirements, will help reduce the potential transport of these invasive species.

9
10 Feral hogs continue to have a presence at differing levels throughout the year
11 given food availability and the abundance of cover afforded by bottomland hardwoods
12 around Lavon Lake; however, Lavon Lake does have an active hunting program with
13 feral hogs being one of the animals allowed for harvesting. Other nuisance species that
14 impact the health and productivity of the natural resources at Lavon Lake include exotic
15 Johnsongrass and native eastern redcedar. The EAB, although not yet detected in the
16 area, is another invasive species of concern since Lavon Lake has considerable
17 acreage where green ash is a dominant or co-dominant species. All stands of green
18 ash commonly found in the upper Trinity River watershed would be in jeopardy in the
19 future if EAB spreads to the area.

20
21 Future plans for the control of invasive species at Lavon Lake may include
22 grazing, tree removal and herbicide application. Implementing BMPs would help to
23 control the introduction and distribution of invasive species, ensuring that
24 implementation of the revised land use classifications in the 2016 Master Plan would not
25 contribute to the overall cumulative impacts related to invasive species.

26
27 **4.3.10 Mineral and Timber Resources**

28 Currently, with few exceptions, the stipulations used in the USACE, Fort Worth
29 District, do not allow surface occupancy of Federal lands for the extraction of Federally
30 owned minerals. Exploration and extraction of privately owned minerals may, in some
31 cases, be allowed to occur on Federal lands at Lavon Lake in the future as long as the
32 integrity of the dam and related facilities are not at risk and every precaution is taken to
33 reduce the risk of pollution and other environmental damage to the lands and waters of
34 the lake. The bottomland forests of the main tributaries of Lavon Lake have high value
35 as wildlife habitat, but do not have significant value as commercial timber. Although
36 mineral and timber resource extraction may increase in the Lavon Lake area in the
37 future, cumulative impacts on these resources from implementation of the revised land
38 use classifications in the 2016 Master Plan, when combined with past and proposed
39 actions in the region, are anticipated to be negligible.

40
41 **4.3.11 Cultural, Historical, and Archaeological Resources**

42 The Proposed Action would not affect cultural resources or historic properties.
43 Therefore, this action, when combined with other existing and proposed projects in the
44 region, would not result in major cumulative impacts on cultural resources or historic
45 properties.

46
47 **4.3.12 Socioeconomics and Environmental Justice**

48 The Proposed Action would not result in the displacement of persons (minority,
49 low-income, children, or otherwise) as a result of implementing the revised land

1 classifications. Therefore, the effects of the Proposed Action on environmental justice
2 and the protection of children, when combined with other ongoing and proposed
3 projects in the Lavon Lake area, would not be considered a major cumulative effect.

4 5 **4.3.13 Recreation**

6 Lavon Lake is beneficial to the local visitors and also offers a variety of free
7 recreation opportunities. The majority of recreational users at Lavon Lake come from
8 within a 100-mile radius of the lake area. The 2012 TORP demonstrated that Lavon
9 Lake is the largest and most important outdoor recreation venue in Collin County,
10 Texas. Some of the popular recreation activities at Lavon Lake are, on a national basis,
11 either static or declining in participation. For example, camping activity, power boating,
12 hunting, and fishing have experienced small to moderate declines in recent years. In contrast
13 to these declines, significant increases in hiking, walking, sightseeing, wildlife viewing and
14 canoeing/kayaking have occurred in recent years.

15
16 Even though the amount of acreage available for High Density Recreation and
17 Low Density Recreation would decrease with implementation of the revised land use
18 classifications in the 2016 Master Plan, these land reclassifications reflect changes in
19 land management and land uses that have occurred since 1972 at Lavon Lake. The
20 conversion of these lands would have no effect on current or projected public use. Collin
21 County's Parks and Open Space Strategic Plan provides guidance for new parks and
22 open space resources on up to 7,400 acres of existing municipally owned parks and
23 open spaces in order to provide recreational opportunities to the county's growing
24 population. Therefore, the Proposed Action, when combined with other existing and
25 proposed projects in the region, would result in minor to moderate beneficial cumulative
26 impacts on area recreational resources.

27 28 **4.3.14 Aesthetics**

29 Actions that cause the permanent loss of the characteristics that make an area
30 visually unique or sensitive would be considered to cause a major impact. No major
31 impacts on visual resources would occur from implementation of the revised land use
32 classifications in the 2016 Master Plan. The Proposed Action, in conjunction with other
33 projects in the region, would result in minor beneficial cumulative impacts on the visual
34 resources in the Lavon Lake area, with the reclassification of Environmentally Sensitive
35 Areas and their aesthetic appeal at Lavon Lake.

36 37 **4.3.15 Hazardous Materials and Solid Waste**

38 Major impacts would occur if an action creates a public hazard, if a project is
39 implemented in an area that is considered a hazardous waste site that poses health
40 risks, or if the action would impair the implementation of an adopted emergency
41 response or evacuation plan. No hazardous material or solid waste concerns would be
42 expected with implementation of the 2016 Master Plan; therefore, when combined with
43 other ongoing and proposed projects in the Lavon Lake area, there would be no major
44 cumulative effects on hazardous materials and solid waste.

45 46 **4.3.16 Health and Safety**

47 No health or safety risks would be created by the Proposed Action. The effects
48 of implementing the 2016 Master Plan, when combined with other ongoing and

1 proposed projects in the Lavon Lake area, would not be considered a major cumulative
2 effect. The revised classifications of Restricted water surface and Designated No-Wake
3 areas would improve boating safety near key recreational water access areas such as
4 boat ramps and would result in minor, beneficial effects in the study area.

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1 **SECTION 5: COMPLIANCE WITH ENVIRONMENTAL LAWS**

2 This EA has been prepared to satisfy the requirements of all applicable
3 environmental laws and regulations, and has been prepared in accordance with the
4 CEQ’s implementing regulations for NEPA, 40 CFR Parts 1500 – 1508, and the USACE
5 ER 200-2-2, *Environmental Quality: Procedures for Implementing NEPA*. The revision
6 of the Master Plan is consistent with the USACE’s Environmental Operating Principles.
7 The following is a list of applicable environmental laws and regulations that were
8 considered in the planning of this project and the status of compliance with each:
9

10 Fish and Wildlife Coordination Act of 1958, as amended – Because no
11 construction or change in operation of the reservoir is proposed, there is no plan to
12 coordinate under the Act; however, information provided by USFWS and TPWD on fish
13 and wildlife resources has been utilized in the development of this assessment.
14

15 ESA of 1973, as amended – Current lists of threatened or endangered species
16 were compiled for the revision of the Master Plan. There will be no adverse impact on
17 threatened or endangered species resulting from the revision of the Master Plan.
18

19 EO 13186 (Migratory Bird Habitat Protection) – Sections 3a and 3e of EO 13186
20 direct Federal agencies to evaluate the impacts of their actions on migratory birds, with
21 emphasis on species of concern, and inform the USFWS of potential negative impacts
22 on migratory birds. The Master Plan revision will not result in adverse impacts on
23 migratory bird habitat and may result in beneficial impacts as larger areas of habitat for
24 migratory birds are protected as Environmentally Sensitive Areas.
25

26 Migratory Bird Treaty Act (MBTA) – The MBTA of 1918 extends Federal
27 protection to migratory bird species. The nonregulated “take” of migratory birds is
28 prohibited under this act in a manner similar to the prohibition of “take” of threatened
29 and endangered species under the ESA. The timing of resource management activities
30 would be coordinated to avoid impacts on migratory and nesting birds.
31

32 Clean Water Act of 1977 – The Proposed Action is in compliance with all state
33 and Federal Clean Water Act regulations and requirements and is regularly monitored
34 by the USACE and TCEQ for water quality. A state water quality certification pursuant
35 to Section 401 of the Clean Water Act is not required for the Master Plan revision.
36 However, any future utilities occupying the proposed utility corridors would be required
37 to comply with all Clean Water Act requirements. There will be no change in the
38 existing management of the reservoir that would impact water quality.
39

40 NHPA of 1966, as amended – Compliance with the NHPA of 1966, as amended,
41 requires identification of all properties in the study area listed in, or eligible for listing in,
42 the NRHP. All surveys and site salvages were coordinated with the Texas SHPO.
43 Known sites are mapped and avoided by maintenance activities. Areas that have not
44 undergone cultural resources surveys or evaluations will need to do so prior to any
45 earthmoving or other potentially impactful activities.

1 Clean Air Act of 1977 – The USEPA established nationwide air quality standards
2 to protect public health and welfare. Existing operation and management of the
3 reservoir is compliant with the Clean Air Act and will not change with the Master Plan
4 revision.

5
6 FPPA of 1980 and 1995 – The FPPA’s purpose is to minimize the extent to which
7 Federal programs contribute to the unnecessary and irreversible conversion of farmland
8 to non-agricultural uses. Prime Farmland is present adjacent to Lavon Lake. The
9 Proposed Action would not impact Prime Farmland present on Lavon Lake project
10 lands.

11
12 EO 11990, Protection of Wetlands – EO 11990 requires Federal agencies to
13 minimize the destruction, loss, or degradation of wetlands, and to preserve and
14 enhance the natural and beneficial values of wetlands in executing Federal projects.
15 The Proposed Action complies with EO 11990.

16
17 EO 11988, Floodplain Management – This EO directs Federal agencies to
18 evaluate the potential impacts of proposed actions in floodplains. The operation and
19 management of the existing project complies with EO 11988.

20
21 CEQ Memorandum dated August 11, 1980, Prime or Unique Farmlands – Prime
22 Farmland is land that has the best combination of physical and chemical characteristics
23 for producing food, feed, forage, fiber, and oilseed crops, and is also available for these
24 uses. The Proposed Action would not impact Prime Farmland present on Lavon Lake
25 project lands.

26
27 EO 12898, Environmental Justice – This EO directs Federal agencies to achieve
28 environmental justice to the greatest extent practicable and permitted by law, and
29 consistent with the principles set forth in the report on the National Performance
30 Review. Agencies are required to identify and address, as appropriate,
31 disproportionately high and adverse human health or environmental effects of its
32 programs, policies, and activities on minority populations and low-income populations.
33 The revision of the Master Plan will not result in a disproportionate adverse impact on
34 minority or low-income population groups.

1 **SECTION 6: IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF**
2 **RESOURCES**

3 NEPA requires that Federal agencies identify “any irreversible and irretrievable
4 commitments of resources which would be involved in the Proposed Action should it be
5 implemented” (42 USC § 4332). An irreversible commitment of resources occurs when
6 the primary or secondary impacts of an action result in the loss of future options for a
7 resource. Usually, this is when the action affects the use of a nonrenewable resource
8 or it affects a renewable resource that takes a long time to renew. The impacts from
9 implementing the 2016 Master Plan would not be considered an irreversible
10 commitment because much of the land could be converted back to prior use at a future
11 date.

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1 **SECTION 7: PUBLIC AND AGENCY COORDINATION**

2 In accordance with 40 CFR §§1501.7, 1503, and 1506.6, the USACE initiated
3 public involvement and agency scoping activities to solicit input on the 2016 Master
4 Plan revision process, as well as identify reclassification proposals, and identify
5 significant issues related to the Proposed Action (see Appendix A). The first action was
6 a public meeting on March 10, 2015, at the City of Wylie Recreation Center in Wylie,
7 Texas, to provide an avenue for the public and agency stakeholders to ask questions
8 and provide comments. The Fort Worth District placed commercial advertisements on
9 the USACE webpage, social media, and ads published in the local news outlets on
10 multiple dates during the two weeks prior to the public meeting. Appendix A includes
11 the notices published in the local newspaper, the agency coordination letters, and the
12 distribution list for the coordination letters. Please refer to Section 7.1 of the 2016
13 Master Plan for a summary of comments received at the public meeting. The EA was
14 coordinated with agencies having legislative and administrative responsibilities for
15 environmental protection. Copies of the correspondence from the agencies that
16 provided comments and planning assistance for preparation of the EA are in Appendix
17 A.

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1 **SECTION 9: ACRONYMS/ABBREVIATIONS**

2	2016 Master Plan	2016 Lavon Lake Master Plan
3	°F	degrees Fahrenheit
4		
5	Ag	silver
6	As	arsenic
7		
8	Ba	barium
9	BMPs	Best Management Practices
10	B.P.	before present
11		
12	Ca	calcium
13	CAP	Climate Action Plan
14	CCRTMP	Collin County Regional Trails Master Plan
15	Cd	cadmium
16	CEQ	Council on Environmental Quality
17	CFR	Code of Federal Regulations
18	cfs	cubic feet per second
19	Cl	chlorides
20	CO	carbon monoxide
21	CO ₂	carbon dioxide
22	CO ₂ e	carbon dioxide-equivalent
23	CO ₃	carbonates
24	Cr	chromium
25	CRMP	Cultural Resources Management Plan
26	Cu	copper
27		
28	DO	dissolved oxygen
29		
30	EA	Environmental Assessment
31	EAB	Emerald ash borer
32	EIS	Environmental Impact Statement
33	EO	Executive Order
34	EP	Engineer Pamphlet
35	ESA	Endangered Species Act
36		
37	Fe	iron
38	Fl	fluoride
39	FM	Farm to Market
40	FPPA	Farmland Protection Policy Act
41		
42	GHG	greenhouse gas
43	GMA	Groundwater Management Area

1	Handbook	Texas Blackland Prairies Ecoregion Handbook
2	HEP	Habitat Evaluation Procedures
3	HCO ₃	bicarbonates
4	Hg	mercury
5		
6	K	potassium
7		
8	MBTA	Migratory Bird Treaty Act
9	Mg	magnesium
10	mg/L	milligrams per liter
11	Mn	manganese
12	mph	miles per hour
13	MRML	Multiple Resource Management Lands
14	MTP	Metropolitan Transportation Plan
15		
16	Na	sodium
17	NAAQS	National Ambient Air Quality Standards
18	NCTCOG	North Central Texas Council of Governments
19	NEPA	National Environmental Policy Act
20	NGVD	National Geodetic Vertical Datum
21	NH ₃	ammonia
22	NHPA	National Historic Preservation Act
23	Ni	nickel
24	NO ₂ ⁻	nitrite
25	NO ₂	nitrogen dioxide
26	NO ₃	nitrate
27	NO _x	oxides of nitrogen
28	NRCS	Natural Resources Conservation Service
29	NRHP	National Register of Historic Places
30	NRRS	National Recreation Reservation Service
31	NTMWD	North Texas Municipal Water District
32	NTTA	North Texas Tollway Authority
33	NWI	National Wetland Inventory
34		
35	O ₃	ozone
36	OAQPS	Office of Air Quality Planning and Standards
37	OH	hydroxides
38		
39	Pb	lead
40	PL	Public Law
41	PM ₁₀	particulate matter less than 10 microns
42	PO ₄	ortho-phosphate
43		
44	RPEC	Regional Planning and Environmental Center
45	Se	selenium
46	SGCN	Species of Greatest Conservation Need
47	SHPO	State Historic Preservation Officer
48	SIP	State Implementation Plan

1	SiO ₂	silica
2	SO ₂	sulfur dioxide
3	SO ₄	sulfate
4	TBPR ecoregion	Texas Blackland Prairie Ecoregion
5	TCAP	Texas Conservation Action Plan
6	TCEQ	Texas Commission on Environmental Quality
7	TDS	total dissolved solids
8	TOC	total organic carbon
9	TORP	Texas Outdoor Recreation Plan – 2012
10	TPWD	Texas Parks and Wildlife Department
11	TSS	total suspended solids
12	TWDB	Texas Water Development Board
13	TxDOT	Texas Department of Transportation
14		
15	U.S.	United States
16	USACE	U.S. Army Corps of Engineers
17	USC	U.S. Code
18	USCG	U.S. Coast Guard
19	USDA	U.S. Department of Agriculture
20	USEPA	U.S. Environmental Protection Agency
21	USFWS	U.S. Fish and Wildlife Service
22	USGS	U.S. Geological Survey
23		
24	VOC	volatile organic compounds
25	VSS	volatile suspended solids
26		
27	Zn	zinc

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Appendix C – Prior Design Memoranda

APPENDIX B – PRIOR DESIGN MEMORANDA

- Definite Project Report on Lavon Dam and Reservoir July 1946
- Design Memorandum No. 1A - Hydrology
 - Part A - Hydrology-Lavon Reservoir Modification June 1965
 - Part B - Hydrology-East Fork Channel Improvement August 1965
- Design Memorandum No. 2 - Availability of Materials September 1965
 - Real Estate (additional reservoir land) February 1958
- Design Memorandum No 2C - Updated Master Plan - Cost Data June 1961
- Report of Sedimentation - Lavon Dam June 1961
- Design Memorandum No. 3 – Real Estate
 - Part 1 - Real Estate for Reservoir Area April 1966
 - Part 2 - Lands for Construction Area April 1966
- Design Memorandum No. 4 - Relocations
 - Part 1 - Railroads (A.T. & S.F. Railway) December 1965
 - Supplement No. 1 May 1968
- Design Memorandum No. 5 - General Reservoir
 - Part 1 - Reservoir February 1966
- Design Memorandum No. 6, 6A - Recreation
- - Preliminary Master Plan February 1966
- Design Memorandum No. 7- Sedimentation and Degradation Ranges June 1966
- Design Memorandum No. 8 - Embankment and Spillway July 1966
 - Supplement No. 1 November 1966
 - Supplement No. 2 August 1967
- Design Memorandum No. 9 - Relocations (Collin County Roads) November 1966
 - Supplement No. 1 May 1967
 - Supplement No. 2 July 1968
 - Supplement No. 3 June 1969
- Design Memorandum No. 10 - Relocations – State Highway No. 24 April 1967
- Design Memorandum No. 11 - Relocations - State Highway No. 78 March 1967
- Design Memorandum No. 12 – General – Channel and Levees December 1967
 - Supplement No. 1 March 1969
- Design Memorandum No. 13 – Master Plan (Resv. Management) March 1969
 - Updated Master Plan (Lavon Lake Modification) May 1972
- Design Memorandum No. 14 – Relocations
 - Texas State Highway No. FM 546 November 1967
- Design Memorandum No. 15 – Relocations

- Texas State Highway No. FM 982 February 1969
- Design Memorandum No. 16 – Relocations
 - Southwestern Bell Telephone Company June 1968
- Design Memorandum No. 17 – Relocations
 - Texas State Highway No. FM 1377 and
 - Texas State Highway No. FM 2756 January 1969
- Design Memorandum No. 18
 - South Access Road September 1970
- Design Memorandum No. 19 - Relocations – Electric Transmission Lines
 - Texas Power and Light Company
 - Community Public Service Company, Inc. October 1968
 - Supplement No. 1 November 1970
- Design Memorandum No. 20 – Reservoir Clearing March 1968
- Design Memorandum No. 23 Relocations
 - Farmers Electric Cooperative Inc. December 1970
- Design Memorandum No. 25 Relocations
 - Grayson-Collin Electric Cooperative, Inc.
- Design Memorandum No. 26 Relocations
 - Texas Power and Light Company February 1972
- Design Memorandum No. 27 Relocations
 - Community Public Service Company, Inc. July 1971
- Design Memorandum No. 28 Relocations
 - Wylie Northeast Water Supply Corporation September 1970
- Design Memorandum No. 29 Relocations
 - Culleoka Water Supply Corporation April 1971
- Design Memorandum No. 30 Relocations
 - Milligan Water Supply Corporation November 1970
- Design Memorandum No. 32 Relocations
 - Lavon Water Supply Corporation April 1971
- Recreational Development Plan for the Handicapped April 1971
- Design Memorandum No. 33 Relocations
 - Garland Power and Light Company June 1971
- Design Memorandum No. 34 Relocations
 - Lone Star Gas Company October 1971
- Design Memorandum No. 35 Relocations
 - North Texas Municipal Water District's 14-inch water line July 1972
- Lavon Lake – Report of Sedimentation June 1975
- Design Memorandum No. 37
 - Relocation of Collin County Road No. 115 June 1976

- Lavon Reservoir – Operations and Maintenance Manual FWDP 1130-2-9
- Updated July 1962
September 1975
- Lavon Lake – Water Quality Report July 1982
- Lavon Lake – Flood Emergency Plan May 1988
- Lavon Lake – Water Quality Report June 1999

Appendix D – 2010 Habitat Evaluation Report

**EXISTING HABITAT CONDITIONS FOR THE
USACE LAVON LAKE MASTER PLAN UPDATE
COLLIN COUNTY, TEXAS**

INTRODUCTION

The purpose of this report is to describe existing fish and wildlife resources within the Lavon Lake Corps property study area in Collin County, Texas and to recommend preliminary measures for resource protection. This planning assistance is provided to the U.S. Army Corps of Engineers (Corps), pursuant to the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). This information does not represent a final report of the Secretary of the Interior within the meaning of Section 2(b) of the FWCA. It is being provided to assist the Corps in preparation of a Master Plan Update for Lavon Lake, and no specific federal authorization initiated this study.

STUDY AREA

Location

The environmental study area consists of the entire Corps property surrounding Lavon Lake. Spatial data provided by the Corps indicate that the study area encompasses approximately 37,485 acres located within Collin County, Texas and lying within the Trinity River Basin. Approximately 16,787 terrestrial acres of the study area were evaluated for wildlife habitat suitability.

This reservoir is located in north Texas on the East Fork of the Trinity River adjacent to State Highway 78. Started in 1948 and completed in 1953, the lake was designed for flood control, conservation storage, and recreational use. Its construction assisted in preventing seasonal flooding of rich bottomland in southeastern Collin County and stimulated land development along the shores of the lake.

Climate, Topography, and Ecology

The climate of Collin County is moderate humid subtropical with hot summers and mild winters, with an occasional front of extremely cold temperatures. The average low and high temperatures range from 36°F in January to 96°F in July. The lowest minimum recorded temperature is 1°F in 1989 and the highest maximum 112°F in 1980. Annual precipitation within the county averages 33.7 inches per year. The terrain consists of gently rolling hills generally sloping to the east and southeast.

The study area is located in the Blackland Prairie ecological area of Texas (Gould 1962) and is within the identically-named Blackland Prairie natural vegetational area (Diggs et al. 1999). Historically, the area was predominantly tall grass prairie with trees along watercourses,

sometimes scattered on the prairie or concentrated in certain areas possibly as a result of locally favorable soil conditions or topography. Fire was probably an important factor in maintenance of the original prairie vegetation and had a major impact on the community structure (Strickland & Fox 1993). Tall grass prairie fires, intensely hot, would have been stopped only by the lack of dry fuel or a change in topography. Even streambank vegetation was susceptible during dry years. The end result was that trees were rare even along some stream banks, and prairie margins probably extended somewhat beyond the limits of the soil types usually associated with prairie (Hayward & Yelderman 1991). There is considerable variation in the tall grass prairie communities of the Blacklands (Diamond & Smeins 1993) and disagreement about specific community types (Simpson & Pease 1995). However, common dominant grasses of this tall grass prairie ecosystem include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), switch grass (*Panicum virgatum*), eastern gramma grass (*Tripsacum dactyloides*), tall dropseed (*Sporobolus compositus*), Texas cup grass (*Eriochloa sericea*), Florida paspalum (*Paspalum floridanum*), and long-spike tridens (*Tridens strictus*) (Collins et al. 1975). As a whole, most of the Blackland Prairie is a complex mosaic of tall grass communities; an example of this can be seen in northern Grayson County where four of the community types discussed above can be seen within a few miles (Diggs et al. 1999).

With the exception of preserves, small remnants, or native hay meadows, almost nothing remains of the original Blackland Prairie communities. Conversion of the Blackland Prairie for agriculture was the most significant cause of the destruction of this ecosystem, with only marginal, steeply sloped land not rapidly brought under cultivation. High prices for cotton and grains eventually resulted in the cultivation of these areas as well. Once stripped of protective grass, these areas eroded rapidly with disastrous effects. Given the relatively high rainfall and continuing suppression of fire by humans, native trees and shrubs (e.g. eastern red cedar (*Juniperus virginiana*) and cedar elm (*Ulmus crassifolia*), as well as introduced species are able to invade and eventually take over areas that were formerly prairie (Diggs et al. 1999).

Soil-types within the study area are composed largely of the Trinity-Frio, Eddy-Stephen-Austin, Silawa-Silstid-Bastil, and Austin-Houston Black representing the Tallgrass Prairie Community of soils associated with floodplains, stream terraces, and uplands along this portion of the Trinity River floodplain. This community is characterized by deeper soils underlain at rather shallow depths by dense, hard, clayey material. This “claypan” restricts air and water movements, as well as root penetration. It is typically dominated by warm-season, perennial tallgrasses, with warm-season, perennial midgrasses filling most of the remaining species composition. The warm-season, perennial forb component varies between 5 and 15 % depending on climatic patterns and local precipitation. Historically, woody species made up a minor component of the community, 5% or less (USDA 2009). The tree species noted most often in the study area during data collection were green ash (*Fraxinus pennsylvanica*), pecan (*Carya illinoensis*), black willow (*Salix nigra*), American elm (*Ulmus americana*), hackberry (*Celtis occidentalis*), cedar elm, red mulberry (*Morus rubra*), and bur oak (*Quercus macrocarpa*). Although past agriculture practices have brought upland characteristics to portions of the study area, historically more of it was likely dominated by additional bottomland hardwood forest.

The study area is used by both resident and migratory wildlife species that are tolerant of human

activity. Small mammals and migratory and resident passerines use the wooded areas along the forks, mainstem and tributaries of the river for nesting, foraging and as a dispersion corridor. The more heavily impacted woodlands upstream and downstream of the study area are most likely used by a variety of migratory and resident passerine, owl, and hawk species which may disperse from the less impacted study area. Some common resident bird species that may be observed in the study area are sparrows (various species), northern mockingbird (*Mimus polyglottos*), American robin (*Turdus migratorius*), northern cardinal (*Cardinalis cardinalis*), blue jay (*Cyanocitta cristata*), common grackle (*Quiscalus quiscula*), scissor-tailed flycatcher (*Tyrannus forficatus*), barred owl (*Strix varia*), common crow (*Corvus brachyrhynchos*), American kestrel (*Falco sparverius*), Carolina chickadee (*Parus carolinensis*), and red-tailed hawk (*Buteo jamaicensis*). Mammal species that may utilize appropriate habitats in the study area include raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), eastern cottontail (*Sylvilagus floridanus*), fox squirrel (*Sciurus niger*), and small rodents. Various species of frogs and turtles may be found in less impacted reaches of the river, while lizards and snakes may also persist in viable terrestrial areas within the study area. A list of floral and faunal species that were observed during field investigations in the study area is included on each site observation sheet in Appendix A.

EXISTING TERRESTRIAL HABITATS AND WILDLIFE RESOURCES

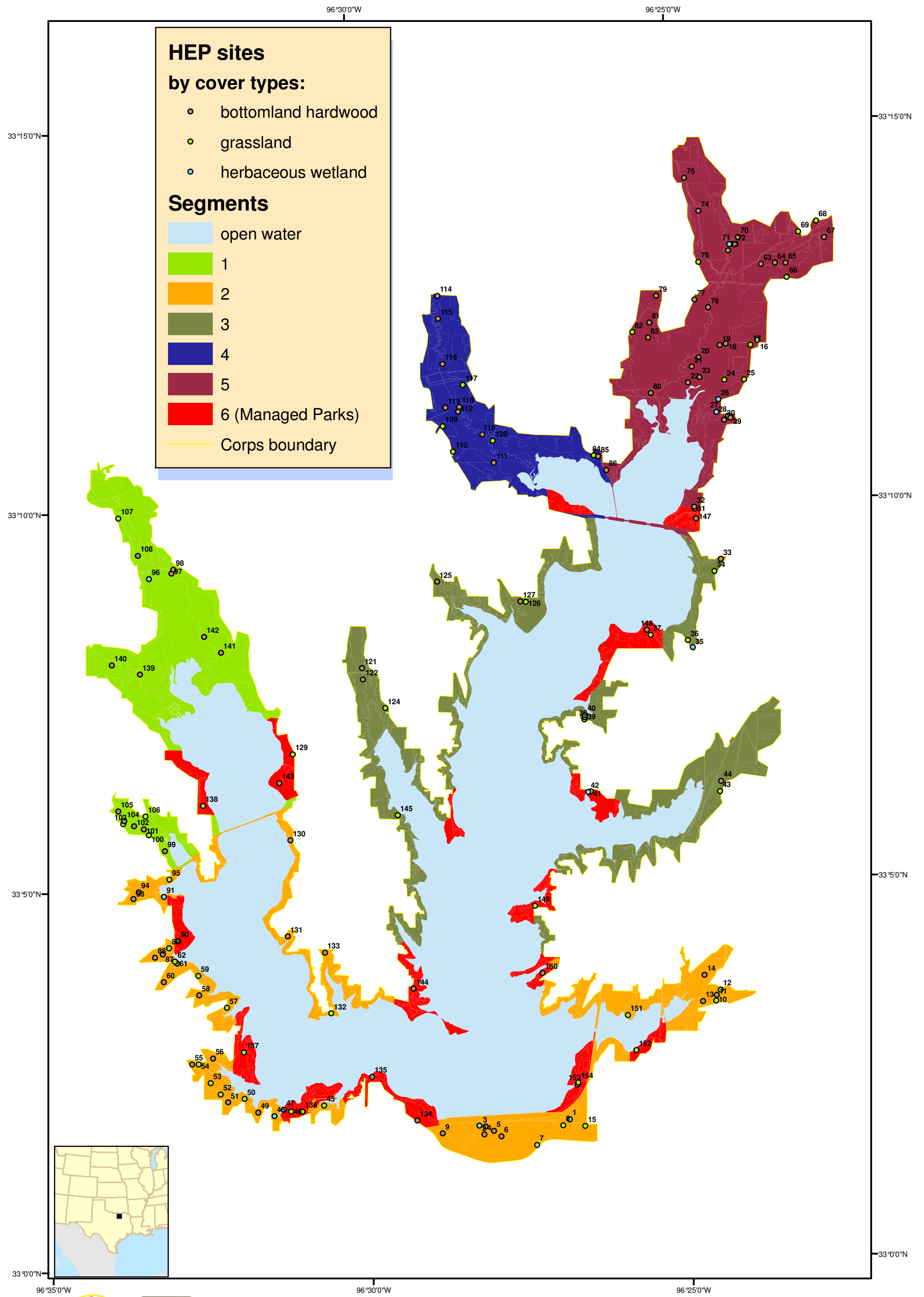
Habitat Evaluation Methods

An interagency team composed of Corps, TPWD, and Service personnel was convened to conduct a habitat evaluation of the study area. The Service's *Habitat Evaluation Procedures* (HEP) (U.S. Fish and Wildlife Service 1980) were used to analyze and describe the various existing habitats in the study area.

The biologist team collected field data on July 12 – 28, 2010. One hundred and fifty-four survey sites were randomly selected within the three terrestrial habitat types delineated in the study area: bottomland hardwoods, grasslands, and herbaceous wetlands. Figure 1 displays the locations of the data sites that were recorded using a Trimble GeoTX handheld unit. These sites are also depicted on aerial maps in Appendix E and their geographical locations are listed in Appendix F. Spatial data depicting habitat cover types utilized in the analysis and evaluation which were provided by the Corps are illustrated in Figure 2.

Ten wildlife indicator species were selected to represent the wildlife communities that use the three habitats evaluated. The raccoon, fox squirrel, Carolina chickadee, barred owl, downy woodpecker (*Picoides pubescens*), and wood duck (*Aix sponsa*) were selected to represent those species that use bottomland hardwoods. Species selected for herbaceous wetland habitat suitability evaluation included green heron (*Butorides virescens*), raccoon, and wood duck. The eastern meadowlark (*Sturnella magna*), eastern cottontail, and American kestrel were selected to represent the wildlife communities in grasslands.

HEP requires the use of Habitat Suitability Index (HSI) models developed for each indicator species that best represent groups of species that use the habitats. The HEP models contain a list



U.S. Fish & Wildlife Service

Arlington, Texas, Ecological Services Field Office
 Projection: UTM Zone 14N, NAD 1983, GRS 1980
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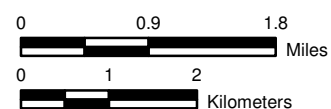
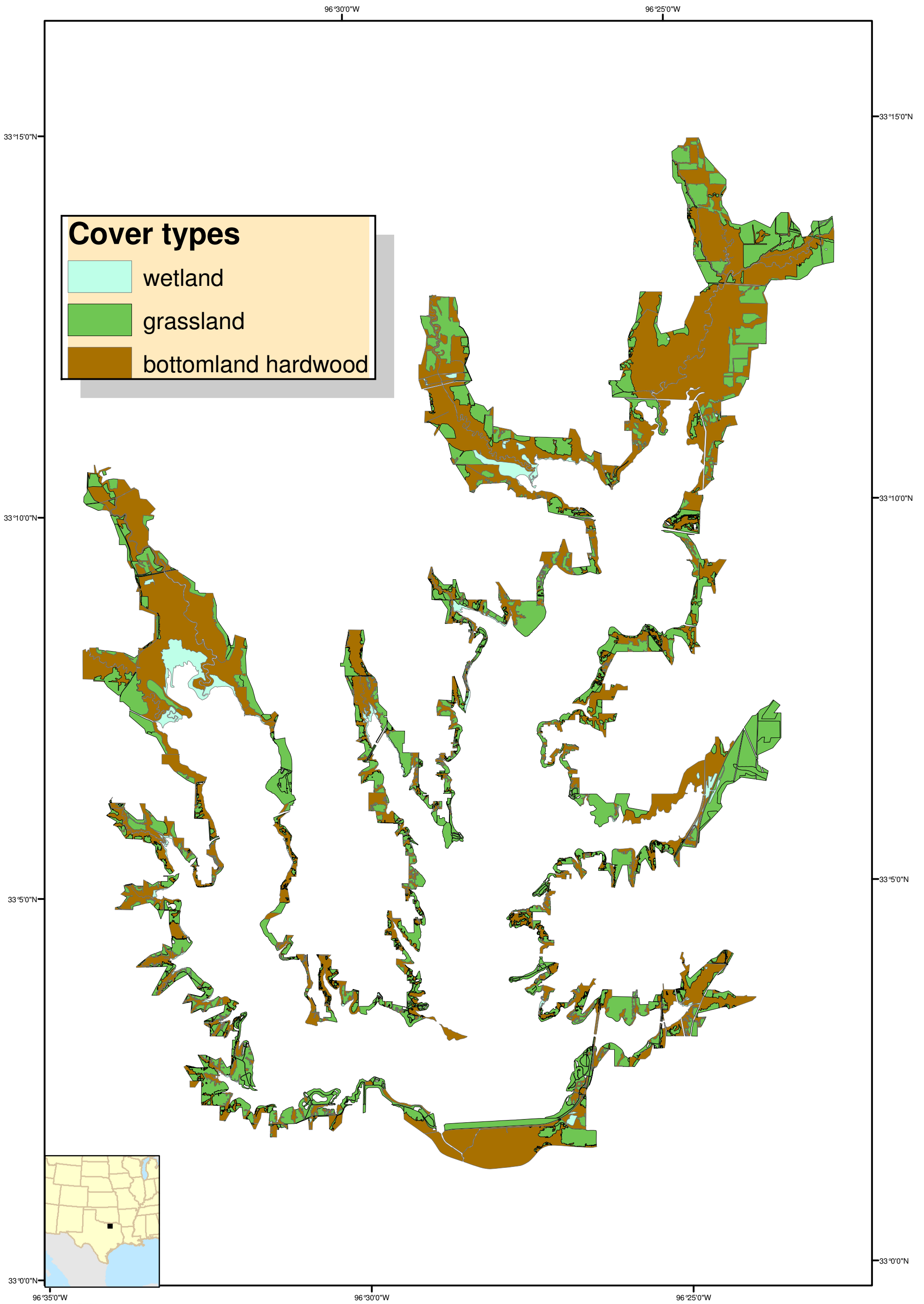


Figure 1: Lavon Lake study area segments and HEP data sites



U.S. Fish & Wildlife Service

Arlington, Texas, Ecological Services Field Office
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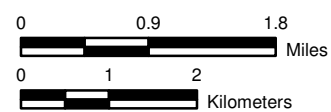


Figure 2: Lavon Lake study area habitat cover types

of structural habitat composition variables that are contained in optimum habitat. All variables for each species representing each habitat are compiled and measured in the field (Appendix C). Nineteen variables were compiled for the bottomland hardwoods (C -1 through C -9). There were 14 grassland habitat variables (C -10 through C -14), and 12 herbaceous wetland variables (C -15 through C -16). These variables were measured or estimated within a tenth-acre data site within the habitat they represent. They are used as indicators of habitat condition or value.

Baseline habitat conditions are expressed as a numeric function (HSI value) ranging from 0.0 to 1.0, where 0.0 represents no suitable habitat for an indicator species and 1.0 represents optimum conditions for the species. HSI values ranging from 0.01 to 0.24 are considered “poor” habitat, 0.25 to 0.49 are considered “below average” habitat, 0.50 to 0.69 are “average” habitat, 0.70 to 0.89 are “good” habitat, and 0.90 to 1.00 are considered “excellent” habitat. Habitat Units are calculated by multiplying the HSI for each habitat by the amount of acres of the same habitat.

A complete list of plant species observed during the surveys is included in Appendix A. Appendix B includes the individual site observation sheets that contain a physical description of each site and a list of plants and animals observed at the site. Appendix D contains photographs taken in each compass direction from the center of each survey site.

Habitat Descriptions and Suitability Index Values

The study area was divided into six evaluation segments which were independently analyzed for habitat suitability in order to assess possible differences in their existing conditions. Existing habitat conditions across these groupings were expected to vary due to differences in topography and past impacts. This targeted approach is intended to better illustrate the likely impact of future project alternatives on habitat values within these differing reaches.

The project’s study area, which corresponds to the Lavon Lake Corps boundary, contains approximately 20,698 acres of urban development, roads, and open water which were excluded from evaluation for terrestrial wildlife habitat suitability. There are three terrestrial wildlife habitats types evaluated within the remaining study area: bottomland hardwoods, grasslands, and herbaceous wetlands. The average HSI value for each habitat within the study area ranged from 0.45 (below average) for herbaceous wetlands within segment 6 (managed parks) to 0.75 (good) for grasslands in both segment 3 and segment 5.

The following are the preliminary findings and tables containing the Habitat Suitability Indices (HSI) for the three habitats per evaluation area per species. Table 4 contains a summary of the existing habitat acres, HSIs, and Habitat Units (HU). Preliminary planning recommendations for these habitats are included at the end of this evaluation.

Bottomland Hardwood

The HEP defines the bottomland hardwood cover type as wetland areas dominated by deciduous trees, usually along streams, and that are occasionally flooded. In optimum conditions, this cover type provides food, cover, nesting habitat, and living space to riparian forest dependent

species. Large trees are important as nesting habitat for the fox squirrel, wood duck, and barred owl, and escape cover for raccoons, wood ducks, and passerines. Large mast producing trees and shrubs provide food for the fox squirrel. Brush piles and snags provide necessary food, cover, and shelter for the raccoon and passerines. The close proximity to water is important for the raccoon and wood duck. Riparian forest habitats are essential in maintaining biodiversity and providing important wildlife travel corridors.

Located primarily along the Trinity River and its inflows, many of these woodlands are periodically flooded and are predominately composed of green ash, American elm, cedar elm, pecan, black willow, and box elder. Other trees species present include bur oak, red mulberry, and sugar hackberry.

Bottomland hardwoods in Segment 3 were valued in the higher range of below average habitat. Those in all other segments scored average habitat values (Table 1). Segments 4 and 5 contained the largest patches of intact, mature bottomland hardwood forest concentrated along streambanks.

Table 1. HSI Values for Bottomland Hardwood Habitat per Indicator Species within the Lavon Lake study area segments.

Indicator Species	Bottomland Hardwood Evaluation Areas					
	Segment 1 1886.05ac	Segment 2 1749.80ac	Segment 3 1489.91ac	Segment 4 1020.11ac	Segment 5 2695.37ac	Managed Parks (6) 648.87ac
Barred owl	0.78	0.70	0.62	0.71	0.76	0.71
Carolina Chickadee	0.95	0.92	0.87	0.92	0.91	0.91
Raccoon	0.76	0.60	0.52	0.67	0.60	0.72
Wood Duck*	0.09	0.13	0.06	0.12	0.07	0.02
Fox Squirrel	0.50	0.19	0.39	0.31	0.40	0.53
Downey Woodpeker	0.48	0.88	0.40	0.53	0.68	0.54
HSI Average	0.59	0.57	0.48	0.54	0.57	0.57
Habitat Units	1119.06	997.39	710.19	554.26	1536.36	369.86

*Multi-habitat Species

The limiting factors for bottomland hardwoods in Segment 1:

- minimal winter and brood cover along the banks for the wood duck
- number of potentially suitable tree cavities too few for wood duck nesting
- minimal winter food (hard mast producing vegetation) available for the fox squirrel
- number of snags >6 inches too few to provide adequate nesting sites for downy woodpecker

The limiting factors for bottomland hardwoods in Segment 2:

- the overstory trees are generally too small to provide preferred raccoon habitat
- minimal winter and brood cover along the banks for the wood duck
- number of potentially suitable tree cavities too few for wood duck
- minimal winter food (hard mast producing vegetation) available for the fox squirrel

The limiting factors for bottomland hardwoods in Segment 3:

- the overstory trees are generally too small to provide preferred raccoon habitat
- minimal winter and brood cover along the banks for the wood duck
- available trees provide minimal nesting opportunities for wood duck
- minimal winter food (hard mast producing vegetation) available for the fox squirrel
- the overstory trees are generally too small to provide preferred fox squirrel habitat
- the overstory trees are generally too small to provide nest sites for barred owl
- number of snags >6 inches too few to provide adequate nesting sites for downy woodpecker

The limiting factors for bottomland hardwoods in Segment 4:

- minimal winter and brood cover along the banks for the wood duck
- number of potentially suitable tree cavities too few for wood duck nesting
- minimal winter food (hard mast producing vegetation) available for the fox squirrel
- the overstory trees are generally too small to provide preferred raccoon habitat
- number of snags >6 inches too few to provide adequate nesting sites for downy woodpecker

The limiting factors for bottomland hardwoods in Segment 5:

- minimal winter and brood cover along the banks for the wood duck
- number of potentially suitable tree cavities too few for wood duck nesting
- minimal winter food (hard mast producing vegetation) available for the fox squirrel
- the overstory trees are generally too small to provide nest sites for barred owl
- the overstory trees are generally too small to provide preferred raccoon habitat
- number of snags >6 inches too few to provide adequate nesting sites for downy woodpecker

The limiting factors for bottomland hardwoods in Segment 6 (Managed Parks):

- minimal winter and brood cover along the banks for the wood duck
- number of potentially suitable tree cavities too few for wood duck nesting

- minimal winter food (hard mast producing vegetation) available for the fox squirrel
- number of snags >6 inches too few to provide adequate nesting sites for downy woodpecker

Herbaceous Wetlands

Herbaceous wetlands are wetland areas dominated by non-woody vegetation. Wetlands provide food and cover for fish, resident and migratory birds, small mammals, invertebrates, and the predators that feed on these species. Wetlands are important nesting habitat for wading birds and waterfowl and are comprised primarily of rushes, sedges, wetland grasses, and aquatic plants located along the edges of waterbodies and creeks, and in seasonally flooded areas. Most of the wetlands evaluated are permanent, but some are likely seasonal.

Segment 6 (managed parks) was valued as below average quality herbaceous wetland habitat. Wetlands in Segments 1, 3, and 5 were valued as average quality habitat while Segments 2 and 4 were found to contain good quality wetland habitat (Table 2).

Table 2. HSI Values for Herbaceous Wetland Habitat per Indicator Species within the Lavon Lake study area segments.

Indicator Species	Herbaceous Wetlands Evaluation Areas					
	Segment 1 243.33ac	Segment 2 47.28ac	Segment 3 99.74ac	Segment 4 119.85ac	Segment 5 6.10ac	Managed Parks (6) 10.42ac
Green Heron	0.50	1.00	0.83	1.00	1.00	0.62
Raccoon	1.00	1.00	1.00	1.00	1.00	0.71
Wood Duck*	0.09	0.13	0.06	0.12	0.07	0.02
HSI Average	0.53	0.71	0.63	0.71	0.69	0.45
Habitat Units	128.96	33.57	62.84	84.69	4.21	4.69

*Multi-habitat Species

The limiting factors for herbaceous wetlands in Segment 1:

- available trees provide minimal nesting opportunities for wood duck
- minimal winter and brood cover along the banks for the wood duck
- lack of woody cover over water surface for green heron
- lack of herbaceous canopy in the littoral zone for green heron

- water generally too deep for green heron foraging

The limiting factors for herbaceous wetlands in Segment 2:

- available trees provide minimal nesting opportunities for wood duck
- minimal winter and brood cover along the banks for the wood duck

The limiting factors for herbaceous wetlands in Segment 3:

- available trees provide minimal nesting opportunities for wood duck
- minimal winter and brood cover along the banks for the wood duck

The limiting factors for herbaceous wetlands in Segment 4:

- available trees provide minimal nesting opportunities for wood duck
- minimal winter and brood cover along the banks for the wood duck

The limiting factors for herbaceous wetlands in Segment 5:

- available trees provide minimal nesting opportunities for wood duck
- minimal winter and brood cover along the banks for the wood duck

The limiting factors for herbaceous wetlands in Segment 6 (Managed Parks):

- lack of woody cover over water surface for green heron
- lack of herbaceous canopy in the littoral zone for green heron
- water generally too deep for green heron foraging
- available trees provide minimal nesting opportunities for wood duck
- minimal winter and brood cover along the banks for the wood duck

The HSI calculations for wood duck in each of the six segments did not require interspersed factoring because neither the bottomland hardwoods nor herbaceous wetlands within those areas score 0.0 for any life requisite.

Grasslands

Grasslands are dominated by grasses, native or introduced, that are not regularly planted or mowed, and have a minimal canopy cover of 25%. Grasslands provide open space, a food source for passerines and the eastern cottontail, and cover for escape and nesting by means of tall grass, scattered brush piles and shrubs for a variety of animals. Red-tailed hawks hunt for prey in open grasslands.

Until recently, many grasslands within the study area have been impacted by long-term cattle grazing. These areas show a lack of diversity and an abundance of poor quality, grazing resistant vegetation. Other areas show less evidence of past agricultural practices and are populated with a greater diversity of native grassland species. In general, grasslands at Lavon Lake are comprised of short native and introduced grasses and forbs, and occasional scattered trees. The grass species found in the data plots were Johnsongrass (*Sorghum halepense*), coastal bermuda

(*Cynodon dactylon*), KR bluestem (*Bothriochloa ischaemum*), Indiangrass (*Sorghastrum nutans*), lovegrass (*Eragrostis* sp.), knotroot bristlegrass (*Setaria parviflora*), little bluestem (*Schizachyrium scoparium*), silver bluestem (*Andropogon saccharoides*), Canada wildrye (*Elymus canadensis*), Japanese brome (*Bromus japonicas*), and Virginia wildrye (*Elymus virginicus*). Forb species also found include western ragweed (*Ambrosia psilostachya*), oxalis sp., daisy fleabane (*Erigeron strigosus*), dollarweed (*Hydrocotyle umbellata*), giant ragweed (*Ambrosia trifida*), snow on the prairie (*Euphorbia bicolor*), goldenrod (*Solidago* sp.), milkweeds (*Asclepias* sp.), coneflower (*Echinacea* sp.), bee balm (*Monarda didyma*), and balloonvine (*Cardiospermum halicacabum*).

The grassland habitats within Segments 1,2,4, and 6 were valued as average. Grassland habitats within Segments 3 and 5 were valued as good habitat (Table 3).

Table 3. HSI Values for Grassland Habitat per Indicator Species within the Dallas Floodway Project Area.

Indicator Species	Grassland Evaluation Areas					
	Segment 1 722.30ac	Segment 2 1191.86ac	Segment 3 1766.26ac	Segment 4 573.68ac	Segment 5 1333.17ac	Managed Parks (6) 1184.12ac
Eastern Meadowlark	0.40	0.41	0.56	0.52	0.69	0.36
Eastern Cottontail	0.77	0.83	0.98	0.71	0.89	0.85
American Kestrel	0.65	0.69	0.68	0.66	0.65	0.66
HSI Average	0.61	0.64	0.74	0.63	0.74	0.62
Habitat Units	438.20	766.76	1307.03	361.42	990.99	738.10

*Multi-habitat Species

The limiting factors for grasslands in Segment 1:

- lack of nest sites (i.e., cliffs, earth banks, abandoned buildings and trees larger than 12 inches dbh) for the kestrel
- minimal availability of herbaceous canopy \leq 12 inches preferred by kestrel
- distance to perch sites typically too great for eastern meadowlark
- minimal proportion of grass in herbaceous canopy for eastern meadowlark

The limiting factors for grasslands in Segment 2:

- lack of nest sites (i.e., cliffs, earth banks, abandoned buildings and trees larger than 12 inches dbh) for the kestrel

- minimal availability of herbaceous canopy ≤ 12 inches preferred by kestrel
- distance to perch sites typically too great for eastern meadowlark
- minimal cover for eastern cottontail (shrub/tree and persistent herbaceous vegetation)

The limiting factors for grasslands in Segment 3:

- lack of nest sites (i.e., cliffs, earth banks, abandoned buildings and trees larger than 12 inches dbh) for the kestrel
- minimal availability of herbaceous canopy ≤ 12 inches preferred by kestrel
- distance to perch sites typically too great for eastern meadowlark

The limiting factors for grasslands in Segment 4:

- lack of nest sites (i.e., cliffs, earth banks, abandoned buildings and trees larger than 12 inches dbh) for the kestrel
- minimal availability of herbaceous canopy ≤ 12 inches preferred by kestrel
- minimal proportion of grass in herbaceous canopy for eastern meadowlark
- minimal cover for eastern cottontail (shrub/tree and persistent herbaceous vegetation)

The limiting factors for grasslands in Segment 5:

- lack of nest sites (i.e., cliffs, earth banks, abandoned buildings and trees larger than 12 inches dbh) for the kestrel
- minimal availability of herbaceous canopy ≤ 12 inches preferred by kestrel
- minimal proportion of grass in herbaceous canopy for eastern meadowlark

The limiting factors for grasslands in Segment 6:

- lack of nest sites (i.e., cliffs, earth banks, abandoned buildings and trees larger than 12 inches dbh) for the kestrel
- minimal availability of herbaceous canopy ≤ 12 inches preferred by kestrel
- distance to perch sites typically too great for eastern meadowlark
- minimal cover for eastern cottontail (shrub/tree and persistent herbaceous vegetation)

Table 4. Summary of Existing Wildlife Habitat Acres, Habitat Suitability Indices and Habitat Units.

Evaluation Areas	Bottomland Hardwood			Wetland			Grassland		
	Acres	HSI Average	HUs	Acres	HSI Average	HUs	Acres	HSI Average	HUs
Segment 1	1886.05	0.59	1119.06	243.33	0.53	128.96	722.30	0.61	438.20
Segment 2	1749.80	0.57	997.39	47.28	0.71	33.57	1191.86	0.64	766.76
Segment 3	1489.91	0.48	710.19	99.74	0.63	62.84	1766.26	0.74	1307.03
Segment 4	1020.11	0.54	554.26	119.85	0.71	84.69	573.68	0.63	361.42
Segment 5	2695.37	0.57	1536.36	6.10	0.69	4.21	1333.17	0.74	990.99
Managed Parks (6)	648.87	0.57	369.86	10.42	0.45	4.69	1184.12	0.62	738.10
TOTALS	9,490.11	0.55	5,287.12	526.72	0.62	318.96	6771.39	0.66	4602.5

Threatened and Endangered Species and Birds of Conservation Concern

The only federally listed threatened or endangered species known to occur in Collin County is the endangered whooping crane (*Grus americana*). Whooping cranes may be encountered in any county in north central Texas during migration. Autumn migration normally begins in mid-September, with most birds arriving on the wintering grounds at Aransas National Wildlife Refuge between late October and mid-November. Spring migration occurs during March and April. Whooping cranes prefer isolated areas away from human activity for feeding and roosting, with vegetated wetlands and wetlands adjacent to cropland being utilized along the migration route. Foods consumed usually include frogs, fish, plant tubers, crayfish, insects, and waste grains in harvested fields. It is possible that whooping cranes may temporarily utilize habitats present within the study area during their annual migration but an encounter would be a rare occurrence.

The bald eagle (*Haliaeetus leucocephalus*) was formerly listed in Collin County but was removed from the federal threatened and endangered species list effective August 8, 2007. However, bald eagles are still afforded safeguards under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. We recommend all activities be conducted in accordance with the Service’s National Bald Eagle Management Guidelines which may be accessed at <http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>.

The Service published the *Birds of Conservation Concern 2002* (BCC) in December 2002. “The overall goal of the BCC is to accurately identify the migratory and non-migratory bird species (beyond those already designated as Federally threatened or endangered) that represent our highest conservation priorities and draw attention to species in need of conservation action” (U.S. Fish and Wildlife Service 2002).

Copies of the *Birds of Conservation Concern 2002* may be obtained by writing to the Chief, Division of Migratory Bird Management, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, Mail Stop 4107, Arlington, VA 22203-1610, ATTN: BCC 2002. It is also available for downloading on the Division of Migratory Bird Management's web page at <http://migratorybirds.fws.gov>.

The following 23 species on the BCC lists may utilize appropriate habitat types within the general vicinity of study area:

little blue heron (*Egretta caerulea*) - inland marshes and ponds
northern harrier (*Circus cyaneus*) - marshes, prairies, and savannas
peregrine falcon (*Falco peregrinus*) - generalist
American golden-plover (*Pluvialis dominica*) - prairies, and savannas
long-billed curlew (*Numenius americanus*) – open water, prairies, and savannas
Hudsonian godwit (*Limosa haemastica*) - inland marshes
buff-breasted sandpiper (*Tryngites subruficollis*) - prairies, margins of lakes
red-headed woodpecker (*Melanerpes erythrocephalus*) - woodlands
scissor-tailed flycatcher (*Tyrannus forficatus*) – prairies, savannas, and open shrubland
loggerhead shrike (*Lanius excubitor*) – open savanna, shrubland
Bell's vireo (*Vireo bellii*) - dense thicket
Sprague's pipit (*Anthus spragueii*) - short grass prairie
prothonotary warbler (*Protonotaria citrea*) – bottomland hardwood
worm-eating warbler (*Helmitheros vermivorus*) - woodlands
Swainson's warbler (*Limnithlypis swainsonii*) - bottomland hardwood
Kentucky warbler (*Oporornis formosus*) - bottomland hardwood
field sparrow (*Spizella pusilla*) – old fields, scrubland, forest edge
Henslow's sparrow (*Ammodramus henslowii*) – grasslands with scattered shrub
Le Conte's sparrow (*Ammodramus caudacutus*) – thick, damp grassy areas, wetlands
Harris' sparrow (*Zonotrichia querula*) - scrub, undergrowth in open woodlands and savanna, thickets, brushy fields, and hedgerows
Smith's longspur (*Calcarius pictus*) – short grassland
chestnut-collared longspur (*Calcarius ornatus*) - shortgrass prairie, plowed field, overgrazed pasture
painted bunting (*Passerina ciris*) - riparian and thorn forest, oak woodlands, savanna, brushy pastures, and hedgerows

Because some of these species could potentially utilize appropriate habitats within the study area, especially as temporary stopover breaks during annual migration, we recommend that future

projects avoid and/or minimize adverse impacts to intact upland and riparian habitats whenever possible.

PRELIMINARY PLANNING RECOMMENDATIONS

Our habitat analysis indicates the following specific measures could be beneficial for the restoration of natural habitats impacted by urban development within the study area.

1. We recommend that the Corps consider the designation of Environmentally Sensitive Area to habitats throughout the study area which were found to be highly functioning or have the potential to be restored to this state. These habitats may include, but are not limited to, the mature, intact bottomland hardwood forests within Segments 4 and 5; highly diverse native grasslands within segment 2; and any other areas deemed fit for this designation by the Corps.
2. Widen the bottomland hardwood corridors along the creeks and their associated tributaries as much as possible (up to 150 feet on each side) by planting native mast producing trees and shrubs to create a more functional riparian buffer zone. Riparian buffer zones provide several benefits for terrestrial and aquatic resources. First, riparian zones stabilize eroding banks by absorbing the erosive force of flowing water while roots hold soil in place. Second, riparian zones filter sediment, nutrients, pesticides, and animal waste runoff. Finally, riparian zones provide shade, shelter, and food for wildlife and aquatic organisms. Native mast producing trees and shrubs, such as pecan, bur oak, red oak, black walnut (*Juglans nigra*), wild plum (*Prunus mexicana*), sumac (*Rhus sp.*), hawthorne (*Crataegus sp.*), and coral-berry, should be planted in the expanded portion of the bottomland hardwood to improve canopy cover and food base. We recommend planting 70 percent woody stems, with no more than 25 percent consisting of soft mast producers. Shrubs should be planted at no more than 30 percent stems. Some scattered open spaces should be maintained for fox squirrel movement.
3. Thin portions, but not all, of the existing riparian corridor and upland deciduous forest under mast producing trees where the understory is too dense in order to improve fox squirrel habitat and to open the stands as preferred by numerous species.
4. We recommend planting mast producing trees and shrubs in the existing woodlands where they are lacking to improve the canopy cover and food base. The thick overstory and/or understory may need to be thinned and cleared around the young trees to provide space and sunlight. Leave snags standing and let downed logs remain. Existing mast producing trees should be allowed to mature and increase in size.
5. Provide brush and log piles in all existing habitats where needed to provide cover for small mammals. This may be accomplished both by leaving fallen timber where it lies, and by piling any timber which might be cut during essential, permitted clearing.

6. If hazardous materials testing has not been conducted in areas to be restored as habitat, we suggest that it be done before any restoration work is initiated if there is any potential for past contamination.
7. Herbaceous wetlands could be created off stream providing essential wildlife habitat and nonpoint source pollution control. In this role, wetlands would provide several benefits that contribute to water quality improvements. First, the wetlands provide water quality function through solids settling, nutrient transformation, and biological uptake. Second, because they provide a fairly large surface area, wetlands provide floodwater storage and serve to collect peak flood flows known to carry most of the polluted runoff from nonpoint sources. Finally, wetlands provide diversity in the landscape and supply a unique habitat for many plant and animal species.
8. Plant locally available native aquatic plants and shrubs around the water edges. We recommend the use of locally available sedges, water willow (*Justicia americana*), softstem bulrush (*Schoenoplectus tabernaemontani*), water pennywort (*Hydrocotyle umbellata*), switch grass, smartweeds (*Polygonum sp.*), and buttonbush (*Cephalanthus occidentalis*). The wetland should not be mowed unless it is absolutely necessary to manage non-desirable plant species (i.e., invasives, exotics).
9. Restore native grasslands where possible throughout the study area to replace bermudagrass, Johnsongrass, and non-grass herbaceous monocultures commonly found where long-term grazing has impacted the study area. We recommend planting native grass and forb species appropriate for the soils. Little bluestem, big bluestem, Indian grass, side-oats grama, switch grass, vine-mesquite, Illinois bundle-flower (*Desmanthus illinoensis*), Maximilian sunflower (*Helianthus maximilian*), and Engelmann's daisy (*Engelmannia peristeri*) are excellent forage and seed producing species to consider. Plant a few shrub mottes and briar thickets in grasslands, and shrub and tree savannas, but maintain them to only about 5 percent canopy cover.
10. Any mowing schedule that may be developed should promote tall grass growth, but not interfere with tall-grass nesting birds. The grassland should not be mowed until after July 15. Maintain a "no mow" zone around herbaceous wetlands and stream shorelines. Understandably, this is generally not possible in public parkland areas.
11. We recommend that the direct, indirect, and cumulative impacts and conservation needs of the *Birds of Conservation Concern 2002* (BCC) be considered during any restoration or flood control project planning.

In addition, the following are some general recommendations for improving and maintaining lands in and adjacent to the study area for wildlife habitat that the city could practice and recommend to landowners:

1. We recommend that the use of controlled burning be investigated to promote healthy prairie ecosystems. Fire is a natural and essential component of grassland/prairie

maintenance useful in controlling the abundance of invasive species while promoting the growth of natural, fire-dependent native prairie vegetation.

2. Reduce mowing on managed areas and along the water's edge. Reseed and manage portions of these areas as native grasslands or wetland herbaceous plants.
3. Develop a program to eradicate exotic plants in areas where their abundance may prevent natural reestablishment of native vegetation. Use only native plants during the restoration project.
4. Control bank erosion through use of biological engineering to the extent possible and necessary.
5. Develop a plan to greatly reduce or eliminate the use of fertilizers, pesticides, and herbicides on public lands.
6. Initiate a program to help landowners/developers to plan their development footprint in order to avoid sensitive areas and provide upland buffers adjacent to streams.

SUMMARY

The Lavon Lake – Trinity River watershed has been heavily impacted by urban development. Of the 154 data sites, all have been somewhat impacted. However, there are numerous valuable wildlife habitats remaining within the watershed. The specific habitat restoration measures including those recommended in this report could help improve some of the natural habitats that have been impacted and advance habitat diversity and quality of remaining habitats, thus benefitting a variety of resident and migratory wildlife species. Designation of Environmentally Sensitive Areas could also further safeguard existing quality habitats from further degradation.

Appendix E – USFWS Trust Resources Report

USACE Lavon Lake Master Plan Revision

IPaC Trust Resources Report

Generated April 20, 2016 06:55 AM MDT, IPaC v3.0.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



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U.S. Fish & Wildlife Service

IPaC Trust Resources Report



NAME

USACE Lavon Lake Master Plan
Revision

LOCATION

Collin County, Texas

DESCRIPTION

The Lavon Lake Master Plan is a land use planning document that guides USACE management of natural resources and recreation programs on Federal land at Lavon Lake.



IPAC LINK

<https://ecos.fws.gov/ipac/project/3DU2R-NXHAR-C5FAZ-VSR3Q-X2UDCY>

U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Arlington Ecological Services Field Office

2005 Ne Green Oaks Blvd

Suite 140

Arlington, TX 76006-6247

(817) 277-1100

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the [Endangered Species Program](#) of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

[Section 7](#) of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Least Tern *Sterna antillarum* Endangered

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

Wind Energy Projects

CRITICALHABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B07N

Piping Plover *Charadrius melodus* Threatened

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

Wind Energy Projects

CRITICALHABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B079

Red Knot *Calidris canutus rufa* Threatened

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

Wind Energy Projects

CRITICALHABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0DM

Whooping Crane *Grus americana* Endangered

CRITICALHABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B003

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.^[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php>

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle *Haliaeetus leucocephalus*

Bird of conservation concern

Season: Wintering

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B008

Bell's Vireo *Vireo bellii*

Bird of conservation concern

Season: Breeding

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0JX

Dickcissel *Spiza americana*

Bird of conservation concern

Season: Breeding

Fox Sparrow *Passerella iliaca*

Bird of conservation concern

Season: Wintering

Golden Eagle *Aquila chrysaetos*

Bird of conservation concern

Season: Wintering

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0D

[V](#)

Harris's Sparrow <i>Zonotrichia querula</i> Season: Wintering	Bird of conservation concern
Hudsonian Godwit <i>Limosa haemastica</i> Season: Migrating	Bird of conservation concern
Lark Bunting <i>Calamospiza melanocorys</i> Season: Wintering	Bird of conservation concern
Le Conte's Sparrow <i>Ammodramus leconteii</i> Season: Wintering	Bird of conservation concern
Least Bittern <i>Ixobrychus exilis</i> Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B092	
Little Blue Heron <i>Egretta caerulea</i> Season: Breeding	Bird of conservation concern
Loggerhead Shrike <i>Lanius ludovicianus</i> Year-round http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0FY	Bird of conservation concern
Mississippi Kite <i>Ictinia mississippiensis</i> Season: Breeding	Bird of conservation concern
Orchard Oriole <i>Icterus spurius</i> Season: Breeding	Bird of conservation concern
Painted Bunting <i>Passerina ciris</i> Season: Breeding	Bird of conservation concern
Prothonotary Warbler <i>Protonotaria citrea</i> Season: Breeding	Bird of conservation concern
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> Year-round	Bird of conservation concern
Rusty Blackbird <i>Euphagus carolinus</i> Season: Wintering	Bird of conservation concern
Scissor-tailed Flycatcher <i>Tyrannus forficatus</i> Season: Breeding	Bird of conservation concern
Short-eared Owl <i>Asio flammeus</i> Season: Wintering http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0HD	Bird of conservation concern
Sprague's Pipit <i>Anthus spragueii</i> Season: Wintering http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0GD	Bird of conservation concern

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete, or the acreages reported may be inaccurate. Please contact the local U.S. Fish & Wildlife Service office or visit the [NWI map](#) for a full list.

Freshwater Emergent Wetland

[PEM1A](#)

[PEM1C](#)

[PEM1Ch](#)

395.0 acres

49.3 acres

42.8 acres

<u>PEM1Fh</u>	36.1 acres
<u>PEM1Ah</u>	26.3 acres
<u>PEM1/SS1Ch</u>	11.6 acres
<u>PEM1Fx</u>	8.8 acres
<u>PEM1Cx</u>	1.77 acres

Freshwater Forested/shrub Wetland

<u>PFO1A</u>	1400.0 acres
<u>PFO1Fh</u>	298.0 acres
<u>PFO1Ch</u>	123.0 acres
<u>PFO5Fh</u>	94.6 acres
<u>PSS1/EM1Ah</u>	66.2 acres
<u>PFO1C</u>	63.7 acres
<u>PFO5/UBHh</u>	49.8 acres
<u>PFO1/SS1C</u>	45.5 acres
<u>PSS1/FO1A</u>	38.4 acres
<u>PFO1Ah</u>	37.9 acres
<u>PSS1/EM1Ch</u>	23.4 acres
<u>PSS1/EM1A</u>	21.4 acres
<u>PFO1/SS1Ch</u>	13.5 acres
<u>PFO5Hh</u>	11.2 acres
<u>PSS1/FO1Ah</u>	9.95 acres
<u>PFO1/UBFh</u>	7.33 acres
<u>PSS1C</u>	4.65 acres
<u>PFO5/UBFh</u>	3.76 acres

Freshwater Pond

<u>PUB/FO5Fh</u>	1270.0 acres
<u>PUBHh</u>	366.0 acres
<u>PUS/EM1Ch</u>	97.4 acres
<u>PUBHx</u>	29.0 acres
<u>PUBFh</u>	8.84 acres
<u>PUB/ABFh</u>	3.24 acres
<u>PUBH</u>	2.13 acres
<u>PAB4Fh</u>	1.73 acres
<u>PAB/EM1Fh</u>	0.511 acre
<u>PAB4/EM1Fh</u>	0.461 acre

PUSCh	0.255 acre
PAB3Fh	0.127 acre
Lake	
L1UBHh	111.0 acres
L2USCh	7.85 acres
Riverine	
R2UBH	18.1 acres

A full description for each wetland code can be found at the National Wetlands Inventory website: <http://107.20.228.18/decoders/wetlands.aspx>

Appendix F

TPWD 2011 List of Species of Greatest Conservation Need

TEXAS BLACKLAND PRAIRIES SPECIES OF GREATEST CONSERVATION NEED								
Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
MAMMALS								
<i>Blarina hylophaga plumblea</i>	Elliot's short-tailed shrew			G5T1Q	S1	Savanna/Open Woodland		N
<i>Geomys attwateri</i>	Attwater's pocket gopher			G4	S4	Shrubland		Y
<i>Lutra canadensis</i>	River otter			G5	S4	Riparian	Appendix II, CITES	N
<i>Mustela frenata</i>	Long-tailed weasel			G5	S5	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland	Statewide	N
<i>Myotis austroriparius</i>	Southeastern myotis			G3G4	S3	Caves/Karst, Forest, Riparian		N
<i>Myotis velifer</i>	Cave myotis			G5	S4	Caves/Karst,		N
<i>Puma concolor</i>	Mountain lion			G5	S2	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland, Riparian	Statewide	N
<i>Spilogale putorius</i>	Eastern spotted skunk			G4T	S4	Savanna/Open Woodland, Grassland		N
<i>Sylvilagus aquaticus</i>	Swamp rabbit			G5	S5	Riparian, Freshwater Wetland		N
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat			G5	S5	Cave/Karst, Artificial Refugia	Statewide	N
<i>Taxidea taxus</i>	American badger			G5	S5	Grassland, Desert scrub, Woodland, Savanna/Open Woodland, Forest		N
<i>Ursus americanus</i>	Black bear	SAT	T	G5	S3	Forest, Woodland, Savanna/Open Woodland, Desert Scrub, Shrubland	see also Louisiana black bear; may overlap with Louisiana black bear in TBPR, ECPL	N
Mammals References:								
W.B. Davis and D.J. Schmidly. 1997 and 1994. Mammals of Texas (online and in print). Texas Tech University (1997) and Texas Parks and Wildlife Department (1994). http://www.nsr.ttu.edu/tmot1/Default.htm (accessed 2011)								
BIRDS								
BIRDS ONLY: instead of endemism these numbers are for taxonomic sorting								
<i>Ammodramus henslowii</i>	Henslow's Sparrow			G4	S2S3N,SX B	Grassland, Savanna/Open Woodland	Winter	100
<i>Ammodramus leconteii</i>	Le Conte's Sparrow					Grassland	Winter	101
<i>Ammodramus savannarum</i>	Grasshopper Sparrow			G5	S3B	Grassland, Agricultural	Year-round	97
<i>Anas acuta</i>	Northern Pintail			G5	S3B,S5N	Lacustrine, freshwater wetland, saltwater wetland, coastal, marine	Winter	2
<i>Anthus spragueii</i>	Sprague's Pipit	C		G4	S3N	Barren/Sparse Vegetation, Grassland, Shrubland, Agricultural	Winter	80
<i>Asio flammeus</i>	Short-eared Owl			G5	S4N	Grassland, Shrubland, Agricultural	Winter	65
<i>Buteo lineatus</i>	Red-shouldered Hawk			G5	S4B	Woodland, Forest, Riparian, Freshwater Wetland	Year-round	26
<i>Butorides virescens</i>	Green Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Cultural Aquatic	Breeding	16
<i>Calcarius mccownii</i>	McCown's Longspur			G4	S4	Grassland, Agricultural	Winter, TBPR (northern), ECPL (northern)	104
<i>Calcarius pictus</i>	Smith's Longspur					Grassland, Agricultural	Winter	105
<i>Caprimulgus carolinensis</i>	Chuck-will's-widow			G5	S3S4B	Woodland, Forest, Riparian	Breeding	66
<i>Charadrius montanus</i>	Mountain Plover	PT		G3	S2	Agricultural, Grassland	Winter	43
<i>Chondestes grammacus</i>	Lark Sparrow			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	98
<i>Circus cyaneus</i>	Northern Harrier			G5	S2B,S3N	Grassland, Shrubland	Year-round	23

Texas Blackland Prairies Ecoregion Species of Greatest Conservation Need

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
<i>Cistothorus platensis</i>	Sedge Wren			G5	S4	Grassland, Freshwater Wetland	Winter	78
<i>Colinus virginianus</i>	Northern Bobwhite			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	deleted for CHIH	4
<i>Dendroica dominica</i>	Yellow-throated Warbler			G5	S4B	Woodland, Forest, Riparian	Breeding	84
<i>Dryocopus pileatus</i>	Pileated Woodpecker			G5	S4B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	69
<i>Egretta caerulea</i>	Little Blue Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	13
<i>Egretta thula</i>	Snowy Egret			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	12
<i>Euphagus carolinus</i>	Rusty Blackbird			G4	S3	Woodland, Forest, Riparian, Lacustrine, Freshwater Wetland	Winter	110
<i>Haliaeetus leucocephalus</i>	Bald Eagle			G5	S3B,S3N	Riparian, Lacustrine, Freshwater Wetland, Saltwater Wetland	Year-round, added CRTB	22
<i>Hylocichla mustelina</i>	Wood Thrush			G5	S4B	Woodland, Forest, Riparian	Breeding	79
<i>Icterus spurius</i>	Orchard Oriole			G5	S4B	Shrubland, Savanna/Open Woodland, Woodland, Riparian	Breeding	111
<i>Ictinia mississippiensis</i>	Mississippi Kite			G5	S4B	Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Breeding	20
<i>Ixobrychus exilis</i>	Least Bittern			G5	S4B	Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary	Breeding	11
<i>Lanius ludovicianus</i>	Loggerhead Shrike			G4	S4B	Desert Scrub, Grassland, Shrubland, Savanna/Open Woodland, Agricultural, Developed	Year-round	73
<i>Limnothlypis swainsonii</i>	Swainson's Warbler			G4	S3B	Woodland, Forest, Riparian	Breeding	88
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker			G5	S3B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	67
<i>Meleagris gallopavo</i>	Wild Turkey			G5	S5B	Shrubland, Savanna/Open Woodland, Forest, Riparian, Agricultural	Year-round, added <i>merriami</i> for CHIH	8
<i>Mycteria americana</i>	Wood Stork		T	G4	SHB,S2N	Riverine, Freshwater wetland	Migrant	18
<i>Oporornis formosus</i>	Kentucky Warbler			G5	S3B	Woodland, Forest	Breeding	90
<i>Passerina ciris</i>	Painted Bunting			G5	S4B	Shrubland, Agricultural	Breeding	107
<i>Piranga rubra</i>	Summer Tanager			G5	S5B	Urban/Suburban/Rural	Breeding	106
<i>Pluvialis dominica</i>	American Golden-Plover			G5	S3	Grassland, Freshwater Wetland, Agricultural	Migrant	39
<i>Poecile carolinensis</i>	Carolina Chickadee			G5	S5B	Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	76
<i>Protonotaria citrea</i>	Prothonotary Warbler			G5	S3B	Woodland, Forest, Riparian, Lacustrine, Freshwater Wetland	Breeding	86
<i>Scolopax minor</i>	American Woodcock			G5	S2B,S3N	Woodland, Forest, Riparian	Winter (some breeding during that time)	51
<i>Seiurus motacilla</i>	Louisiana Waterthrush			G5	S3B	Woodland, Forest, Riparian	Breeding	89
<i>Spiza americana</i>	Dickcissel			G5	S4B	Grassland, Agricultural	Breeding	108
<i>Spizella pusilla</i>	Field Sparrow			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	96
<i>Sternula antillarum</i>	Least Tern	LE*	E*	G4	S3B	Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Marine, Developed: Industrial	Year-round; subspecies <i>athalassos</i>	54
<i>Sturnella magna</i>	Eastern Meadowlark			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round; subspecies <i>lilliana</i> added for CHIH	109
<i>Thryomanes bewickii</i> (<i>bewickii</i>)	Bewick's Wren			G5	S5B	Shrubland, Savanna/Open Woodland, Woodland, Developed: Urban/Suburban/Rural	Year-round, red-backed form only	77
<i>Tympanuchus cupido</i>	Greater Prairie-Chicken (Interior)			G4	S1B	Grassland	Year-round	6
<i>Tyrannus forficatus</i>	Scissor-tailed Flycatcher			G5	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Breeding	71
<i>Vireo bellii</i>	Bell's Vireo			G5	S3B	Desert scrub, Shrubland, Riparian	Breeding	74
<i>Zonotrichia querula</i>	Harris's Sparrow			G5	S4	Shrubland, Agricultural	Winter	103

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
Birds References:								
The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American Ornithologists' Union (http://www.aou.org/).								
REPTILES AND AMPHIBIANS								
<i>Anaxyrus (Bufo) woodhousii</i>	Woodhouse's toad			G5	SU	Woodland, Forest, Freshwater Wetland		N
<i>Apalone mutica</i>	smooth softshell turtle					Riparian, Riverine, Lacustrine, Freshwater Wetland	added	N
<i>Apalone spinifera</i>	spiny softshell turtle					Riparian, Riverine, Lacustrine, Freshwater Wetland	added, not AZNM	N
<i>Cheylydra serpentina</i>	Common snapping turtle					Riparina, Riverine	added	N
<i>Crotalus atrox</i>	Western diamondback rattlesnake				S4	Barren/Sparse Vegetation, Desert Scrub, Grassland, Shrubland, Savanna, Woodland, Caves/Karst		N
<i>Crotalus horridus</i>	Timber (Canebrake) Rattlesnake		T	G4	S4	Woodland, Forest, Riparian		N
<i>Graptemys caglei</i>	Cagle's map turtle		T	G3	S1	Riparina, Riverine		Y
<i>Graptemys versa</i>	Texas map turtle			G4	SU	Riparina, Riverine		Y
<i>Heterodon nasicus</i>	Western hognosed snake					Desert Scrub, Grassland, Shrubland	added	N
<i>Macrochelys temminckii</i>	alligator snapping turtle		T	G3G4	S3	Riparian, Riverine, Cultural Aquatic	added	N
<i>Ophisaurus attenuatus</i>	western slender glass lizard					Grassland, Savanna	added	N
<i>Phrynosoma cornutum</i>	Texas horned lizard		T	G4G5	S4	Desert Srub, Grassland, Savanna		N
<i>Pseudacris streckeri</i>	Strecker's Chorus Frog			G5	S3	Grassland, Savanna, Woodland, Riparian, Cultural Aquatic, Freshwater Wetland		N
<i>Sistrurus catenatus</i>	massasauga					Grassland, Barren/Sparse Vegetation, Shrubland, Coastal,	added	N
<i>Terrapene carolina</i>	Eastern box turtle			G5	S3	Grasslands, Savanna, Woodland		N
<i>Terrapene ornata</i>	Ornate box turtle			G5	S3	Grassland, Barren/Sparse Vegetation, Deset Scrub, Savanna, Woodland		N
<i>Thamnophis sirtalis annectans</i>	Texas Garter Snake (Eastern/Texas/ New Mexico)			G5	S2	Riparian, Around Lacustrine and Cultural Aquatic Sites		Y
<i>Trachemys scripta</i>	Red-eared slider					Riparian, Riverine, Lacustrine, Freshwater Wetland, Cultural Aquatic	added	N
Reptiles and Amphibians References:								
J.E. Werler and J.R. Dixon. 2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 519 pgs.								
J.R. Dixon. 1987. Amphibians and Reptiles of Texas. Texas A&M University Press, College Station. 434 pp.								
FRESHWATER FISHES							Range in Texas, as known	

Texas Blackland Prairies Ecoregion Species of Greatest Conservation Need

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
<i>Anguilla rostrata</i>	American eel			G4	S5	Streams and reservoirs in drainages connected to marine environments	Originally found in large rivers from the Red River to the Rio Grande; Red River (from the mouth upstream to and including the Kiamichi River), Sabine Lake (including minor coastal drainages west to Galveston Bay), Galveston Bay (including minor coastal drainages west to mouth of Brazos River), Brazos River, Colorado River, San Antonio Bay (including minor coastal drainages west of mouth of Colorado River to mouth of Nueces River), Nueces River. Extirpated in several drainages (dams)	N
<i>Atractosteus spatula</i>	alligator gar					Near surface habitats in slack water and backwater habitats of rivers. Preferred pool, pool-bank snag, pool-channel snag, pool-snag complex, pool-edge, and pool-vegetation habitat	Red River (from the mouth upstream to and including the Kiamichi River), Sabine Lake (including minor coastal drainages west to Galveston Bay), Galveston Bay (including minor coastal drainages west to mouth of Brazos River), Brazos River, Colorado River, San Antonio Bay (including minor coastal drainages west of mouth of Colorado River to mouth of Nueces River), Nueces River	N
<i>Cyprinella elongatus</i>	Blue sucker		T	G3G4	S3	Large, deep rivers, and deeper zones of lakes	Red River (from the mouth upstream to and including the Kiamichi River), Sabine Lake (including minor coastal drainages west to Galveston Bay), Galveston Bay (including minor coastal drainages west to mouth of Brazos River), Brazos River, Colorado River, San Antonio Bay (including minor coastal drainages west of mouth of Colorado River to mouth of Nueces River), Nueces River	N
<i>Etheostoma fonticola</i>	Fountain darter	LE	E	G1	S1	Thermally constant (21-24 °C) springs and the upper San Marcos (Hays Co.) and Comal (Comal Co.) rivers, usually in dense beds of <i>Vallisneria</i> , <i>Elodia</i> , <i>Ludwigia</i> and other aquatic plants; substrate normally mucky	Upper San Marcos (Hays Co.) and Comal (Comal Co.) rivers, San Antonio Bay drainage unit Note: original population in the Comal River extirpated in mid-1950's when Comal Springs ceased to flow; a population from San Marcos was reintroduced into Comal Springs in 1975	Y

Texas Blackland Prairies Ecoregion Species of Greatest Conservation Need

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
<i>Macryhbopsis storeriana</i>	Silver chub					Broad rivers with low gradient which flow through old mature valley; bottoms gravel to silt, but more common over silt or mud, turbid water with very soft sand/silt substrate Normally inhabits pools, will move to riffle if siltation is heavy; when large streams very turbid or depositing unusually large amounts of silt, will temporarily migrate into clearer streams of higher gradients; when waters were very clear individuals move to deeper water	Red River and the lower Brazos River; Brazos River population is apparently disjunct from other populations of this species, which range through the Mississippi River Basin to Mobile Bay	N
<i>Micropterus treculii</i>	Guadalupe bass			G3	S3	Small lentic environments; commonly taken in flowing water	Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system	Y
<i>Notropis atrocaudalis</i>	Blackspot shiner					More abundant near headwaters; runs and pools over all types of substrates, generally avoiding areas of backwater and swiftest currents	Red River (from the mouth upstream to and including the Kiamichi River), Sabine Lake (including minor coastal drainages west to Galveston Bay), Galveston Bay (including minor coastal drainages west to mouth of Brazos River), and Brazos River	N
<i>Notropis bairdi</i>	Red River shiner					Turbid waters of broad, shallow channels of main stream, over bottom mostly of silt and shifting sand; streambeds with widely fluctuating flows subject to high summer temperatures, high rates of evaporation, and high concentrations of dissolved solids; tolerant of high salinities	Red River, from the mouth upstream to and including the Kiamichi River	N
<i>Notropis buccula</i>	Small eye shiner	C		G2Q	S2	Turbid waters of broad, sandy channels of main stream, over substrate consisting mostly of shifting sand; broad condition tolerances (turbidity, salinity, oxygen).	Brazos River; historically as far south as Hempstead (Waller County)	Y
<i>Notropis chalybaeus</i>	Ironcolor shiner					Small to medium sized streams that drain pine woodlands; acid, tannin-stained, non-turbid sluggish Coastal Plain streams and rivers of low to moderate gradient; often at the upstream ends of pools, with a moderate to sluggish current, and sand, mud, silt, or detritus substrata; usually associated with aquatic vegetation; in the San Marcos River (Hays Co.), a disjunct population is restricted to clear, spring-fed waters with abundant aquatic vegetation	Red River (from the mouth upstream to and including the Kiamichi River), Sabine Lake (including minor coastal drainages west to Galveston Bay), San Antonio Bay (including minor coastal drainages west of mouth of Colorado River to mouth of Nueces River, isolated population found in the San Marcos River headwaters)	N

Texas Blackland Prairies Ecoregion Species of Greatest Conservation Need

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
<i>Notropis oxyrhynchus</i>	Sharpnose shiner	C		G3	S3	Moderate current velocities and depths, sand bottom	Brazos River drainage; Red River drainage, when a tributary to the Brazos River was captured into the Red River drainage; introduced in Colorado River drainage	Y
<i>Notropis potteri</i>	Chub shiner		T	G4	S3	Turbid, flowing water with silt or sand substrate; tolerant of high salinities	Brazos River, Colorado River, San Jacinto River, Trinity Rivers, and Galveston Bay	N
<i>Notropis shumardi</i>	Silverband shiner					Large rivers, smaller tributaries and oxbow lakes that frequently reconnect to Brazos River mainstem; main channel with moderate to swift current velocities and moderate to deep depths; associated with turbid water over silt, sand, and gravel; tolerant of high turbidity	Red River (from the mouth upstream to and including the Kiamichi River), Sabine Lake (including minor coastal drainages west to Galveston Bay), Galveston Bay (including minor coastal drainages west to mouth of Brazos River), Brazos River, and Colorado River	N
<i>Percina apristis</i>	Guadalupe darter					Riffles; most common under or around boulders in the main current; moderately turbid water; absent in collections from the clearest waters tributary to the Guadalupe, namely spring heads and the main river west of Kerrville	Guadalupe River and its tributaries, the San Marcos and Blanco Rivers; apparently absent from the headwaters of the Blanco and the entirety of the San Antonio River	Y
<i>Polyodon spathula</i>	Paddlefish		T	G4	S3	Large river systems and tributaries; deepwater channel habitats; low-gradient areas of moderate to large-sized rivers, sluggish pools, backwaters, bayous, and oxbows with abundant zooplankton; large reservoirs if connected to/can access free-flowing streams in the spring for spawning	Historically occurred in Texas in every major river drainage from the Trinity Basin eastward; currently only Red River, from the mouth upstream to and including the Kiamichi River	N
<i>Satan eurystomus</i>	Widemouth blindcat		T	G1	S1	Karst: Subterranean waters	Restricted to 5 artesian wells penetrating the San Antonio Pool of the Edwards Aquifer (Edwards Limestone, Lower Cretaceous) in the vicinity of San Antonio (Bexar County)	Y
<i>Trogloglanis pattersoni</i>	Toothless blindcat		T	G1	S1	Karst: Subterranean waters	Restricted to 5 artesian wells penetrating the San Antonio Pool of the Edwards Aquifer (Edwards Limestone, Lower Cretaceous) in the vicinity of San Antonio (Bexar County)	Y
Freshwater Fish References:								
C. Thomas, T.H. Bonner and B.G. Whiteside. 2007. Freshwater Fishes of Texas: A Field Guide. Sponsored by The River Systems Institute at Texas State University, published by Texas A&M University Press.								
Editor's Note: All freshwater fishes life history information in this table was sourced directly from the online version; citations are embedded in the online version at http://www.bio.txstate.edu/~tbonner/txfishes/								
INVERTEBRATES								
<i>Bombus pensylvanicus</i>	American bumblebee			GU	SU*	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Bee/Wasp/Ant	
<i>Chimarra holzenthali</i>	Holzenthali's Philopotamid caddisfly			G1G2	S1	Riparian, Riverine	Aquatic - Insects - Caddisflies; added TBPR, ECPL	
<i>Cotinis boylei</i>	A scarab beetle			G2*	S2*	Grassland, Shrubland, Woodland	Terrestrial - Insect - Beetles	
<i>Nicrophorus americanus</i>	American Burying Beetle	LE		G1	S1	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Beetles	
<i>Potamilus amphichaenus</i>	Texas heelsplitter		T	G1G2	S1	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
<i>Procambarus regalis</i>	Regal burrowing crayfish			G2G3	S2?*	Freshwater Wetland, Grassland	Aquatic - Crustaceans - Crayfish	

Texas Blackland Prairies Ecoregion Species of Greatest Conservation Need

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
<i>Procambarus steigmani</i>	Parkhill prairie crayfish			G1G2	S1S2*	Freshwater Wetland, Grassland	Aquatic - Crustaceans - Crayfish	
<i>Pseudocentropiloides morihari</i>	A mayfly			G2G3	S2?*	Riverine, Riparian	Aquatic - Insects - Mayflies	
<i>Sphinx eremitoides</i>	Sage sphinx			G1G2	S1?*	Grassland	Terrestrial - Insect - Butterflies/Moths	
<i>Susperatus tonkawa</i>	A mayfly			G1	S1*	Riparian, Riverine	Aquatic - Insects - Mayflies	
Invertebrates References:								
www.bugguide.net – good tool for identification and taxonomic information.								
www.texasento.net – compilation of information on insects in Texas								
www.odonatacentral.org – resource for identification and distribution of damselflies and dragonflies								
www.butterfliesandmoths.org – resource for identification and distribution of Lepidoptera								
www.texasmussels.wordpress.com – resource for information on freshwater mussels in Texas								
Howells, R. G., R. W. Neck and H. D. Murray. 1996. Freshwater Mussels of Texas. Texas Parks and Wildlife Press, Austin.								
Burlakova, L. E., A. Y. Karatayev, V. A. Karatayev, M. E. May, D. L. Bennett and M. J. Cook. 2011. Biogeography and conservation of freshwater mussels (Bivalvia:Unionidae) in Texas: patterns of diversity and threats. Diversity and Distributions: 1-15.								
PLANTS								
<i>Agalinis densiflora</i>	Osage Plains false foxglove			G3	S2	Savanna/Open Woodland - Outcrops	Terrestrial	N
<i>Astragalus reflexus</i>	Texas milk vetch			G3	S3	Savanna/Open Woodland	Terrestrial	Y
<i>Calopogon oklahomensis</i>	Oklahoma grass pink			G3	S1S2	Savanna/Open Woodland; Grassland; Freshwater Wetland	Terrestrial	N
<i>Carex edwardsiana</i>	canyon sedge			G3G4S3S4	S3S4	Woodland (slopes above Riparian)	Wetland	Y
<i>Carex shinnensis</i>	Shinner's sedge			G3?	S2	Grassland	Wetland	N
<i>Crataegus dallasiana</i>	Dallas hawthorn			G3Q	S3	Riparian (creeks in the Blackland Prairie)	Terrestrial	Y
<i>Cuscuta exaltata</i>	tree dodder			G3	S3	Woodland	Terrestrial	N
<i>Dalea hallii</i>	Hall's prairie-clover			G3	S3	Savanna/Open Woodland; Grassland	Terrestrial	Y
<i>Echinacea atrorubens</i>	Topeka purple-coneflower			G3	S3	Savanna/Open Woodland	Terrestrial	N
<i>Hexalectris nitida</i>	Glass Mountains coral-root			G3	S3	Woodland	Terrestrial	N
<i>Hexalectris warnockii</i>	Warnock's coral-root			G2G3	S2	Woodland	Terrestrial	N
<i>Hymenoxys pygmaea</i>	Pygmy prairie dawn			G1	S1	Barren/Sparse Vegetation with Grassland matrix (saline prairie)	currently being described	Y
<i>Liatris glandulosa</i>	glandular gay-feather			G3	S3	Savanna/Open Woodland	Terrestrial	Y
<i>Paronychia setacea</i>	bristle nailwort			G3	S3	Savanna/Open Woodland	Terrestrial	Y
<i>Phlox oklahomensis</i>	Oklahoma phlox			G3	SH	Savanna/Open Woodland	Terrestrial	N
<i>Physaria engelmannii</i>	Engelmann's bladderpod			G3	S3	Savanna/Open Woodland	Terrestrial	Y
<i>Polygonella parksii</i>	Parks' jointweed			G2	S2	Savanna/Open Woodland (sandhills); Grassland	Terrestrial	Y
<i>Prunus texana</i>	Texas peachbush			G3G4	S3S4	Savanna/Open Woodland; Grassland	Terrestrial	Y
<i>Thalictrum texanum</i>	Texas meadow-rue			G2	S2	Savanna/Open Woodland; Riparian (bottomland forest)	Terrestrial	Y
<i>Zizania texana</i>	Texas wild rice	LE	E	G1	S1	Riverine (spring-fed, clear, thermally constant, moderate current, sand to gravel substrate)	Aquatic	Y

Appendix G – Notice to Seaplane Pilots March 2000

NOTICE TO SEAPLANE PILOTS
U.S. Army Corps of Engineers, Fort Worth District
Prohibitions and Restrictions Governing the Use of Seaplanes

POLICY

In accordance with Title 36, Chapter III, Part 328 of the Code of Federal Regulations, it is the objective of the Corps of Engineers natural resources management mission to maximize public enjoyment and use of Corps lakes, consistent with their aesthetic and biological values. Within that context, the following restrictions governing the use of seaplanes have been developed.

DISTRICT-WIDE PROHIBITIONS AND RESTRICTIONS

1. Pilots are responsible for knowing the rules and regulations pertaining to aircraft as set forth in Title 36, Chapter III, Part 327.4 of the Code of Federal Regulations. Copies are available from any Corps of Engineers Lake Office.
2. Seaplanes may not be operated between sunset and sunrise. Where not specifically restricted or prohibited, recreational seaplane operations are allowed seven days a week.
3. Aircraft larger than 5,000 pounds gross weight are prohibited from landing without special permission from the District Engineer.
4. Commercial seaplane operations are prohibited unless authorized by the District Engineer. Commercial operations, if authorized, will be limited to the hours of 10 a.m. to 5 p.m., Monday through Friday, from November 1 to April 1.
5. Individual letter permits may be issued for seaplanes to operate in prohibited areas on a one-time-only basis.
6. The operation of a seaplane at Corps of Engineers lakes is at the risk of the plane's owner, operator, and passenger(s). All lakes in the Fort Worth District are operated as flood control reservoirs with widely fluctuating pool elevations. Pilots are encouraged to contact each lake project office for current pool elevation information. Addresses and phone numbers of each lake are listed in the attached Visitor's Guide. Information may also be obtained from the Corps of Engineers web site at www.swf.usace.army.mil
7. Where landings and takeoffs are not totally prohibited at a given lake, a minimum distance of 500 feet from shore or structures must be maintained during landing and takeoffs.
8. The attached information lists specific restrictions and prohibitions for each lake in the Fort Worth District.

SEAPLANE OPERATIONS ARE PROHIBITED ON THE FOLLOWING LAKES

Lake Georgetown
 Grapevine Lake
 Hords Creek Lake
 O.C. Fisher Lake
 B.A. Steinhagen Lake
 Waco Lake

SPECIFIC RESTRICTIONS ON SEAPLANE OPERATION

<p align="center">AQUILLA LAKE</p> <p>Seaplane operations are prohibited in all areas except on 'open water' areas of the lake from the dam northeast to the mouth of Hackberry Creek Branch and from the dam northwest to an East-West line extending from the north bank of the Old School branch.</p>	<p align="center">JIM CHAPMAN LAKE - COOPER DAM</p> <p>Landings and takeoffs are prohibited in the uncleared portion of the lake west of a line running from the west end of South Sulphur State Park to the peninsula at the mouth of Doctors Creek and in the cove formed Doctors Creek.</p>
<p align="center">BARDWELL LAKE</p> <p>Landings and takeoffs are prohibited north of Highway 34 and in all coves off the main body of the lake.</p>	<p align="center">GRANGER LAKE</p> <p>Landings and takeoffs are prohibited in both major arms of the lake formed by Willis Creek and the San Gabriel River and in the large, shallow lake area north of a line from the outlet structure to the east tip of the San Gabriel Wildlife Area.</p>
<p align="center">BELTON LAKE</p> <p>Landings and takeoffs are prohibited north of Highway 36, in the coves formed by Owl Creek and Cedar Creek, and in the arm of the lake formed by Cowhouse Creek upstream from the northwest end of the Fort Hood Recreation Area.</p>	<p align="center">JOE POOL LAKE</p> <p>Landings and takeoffs are prohibited in all lake areas west of the Lakeridge Parkway bridges.</p>
<p align="center">BENBROOK LAKE</p> <p>Landings and takeoffs are prohibited in the lake area south of the abandoned pump station on the east shore and in the coves formed by East and West Dutch Branch Creeks.</p>	<p align="center">LAKE O THE PINES</p> <p>Landings and takeoffs are prohibited in all coves and bays off the main body of the lake and in uncleared and shallow areas of the lake.</p>
<p align="center">CANYON LAKE</p> <p>Landings and takeoffs are prohibited upstream from Cranes Mill Park and in all coves and major bay areas off of the main body of the lake. (Including the large lake area east and west of Canyon Park.)</p>	<p align="center">LAVON LAKE</p> <p>Landings and takeoffs are prohibited in lake areas north of Collin Park, north of Tickey Creek Park, and in all coves and bays off the main body of the lake.</p>

SPECIFIC RESTRICTIONS ON SEAPLANE OPERATION	
<p style="text-align: center;">LEWISVILLE LAKE</p> <p>Landings and takeoffs are prohibited in uncleared areas north of Crescent Oaks Park, the entire area west of IH 35 and north of Highway 720, and in large uncleared portions of the entire eastern half of the lake.</p>	<p style="text-align: center;">SOMERVILLE LAKE</p> <p>Landings and takeoffs are prohibited west of the west end of Birch Creek Unit of Somerville Lake State Park and in all coves and bays off the main body of the lake.</p>
<p style="text-align: center;">NAVARRO MILLS LAKE</p> <p>Landings and takeoffs are prohibited west of Wolf Creek Park 1.</p>	<p style="text-align: center;">STILLHOUSE HOLLOW LAKE</p> <p>Landings and takeoffs are prohibited west and south of Cedar Knob Road and in large shallow areas surrounding unnamed islands in the main body of the lake.</p>
<p style="text-align: center;">PROCTOR LAKE</p> <p>Landings and takeoffs are prohibited in all areas north and west of the eastern tip of Promontory Park and all areas west of the southwest tip of Promontory Park.</p>	<p style="text-align: center;">WHITNEY LAKE</p> <p>Seaplane operations are prohibited in areas downstream from a line drawn from the northern tip of Walling Bend park to the mouth of Frazier Creek and upstream from a line drawn from the mouth of Cedar Creek southwest to the opposite undeveloped shoreline. The coves formed by King Creek and Cedron Creek are also prohibited</p>
<p style="text-align: center;">RAY ROBERTS LAKE</p> <p>Landings and takeoffs are prohibited north of Highway 3002 and in areas north and east of a line from the northeast tip of Johnson Park to the southwest tip of Jordan Park.</p>	<p style="text-align: center;">WRIGHT PATMAN LAKE</p> <p>Landings and takeoffs are prohibited in all coves and bays off main body of lake and in uncleared and shallow areas of the lake.</p>
<p style="text-align: center;">SAM RAYBURN RESERVOIR</p> <p>Landings and takeoffs are prohibited west of Highway 147, north of Highway 83, and in scattered uncleared areas of the reservoir.</p>	

NOTE: The latest revision to this Notice to Seaplane Pilots was completed in March of 2000.

Appendix H – Comments and Government Response

APPENDIX H

SUMMARY OF PUBLIC COMMENTS RECEIVED DURING PLAN FORMULATION

Government and City Stakeholder Comment

City of Lucas

1. Wild hog management.

USACE: Management of wild or feral hogs will be in accordance with USACE policies and Texas Parks and Wildlife regulation. Management and control measures are implemented cooperatively with TPWD and USFWS. Hogs may be hunted in designated areas.

2. Lease agreement for Brockdale Park.

USACE: A Park and Recreation Lease can be considered. All lease agreements must be in accordance with USACE policies. Cities must meet minimum criteria and demonstrate capability to maintain parks and recreation areas.

3. Lease agreement for Highland Park.

USACE: A Park and Recreation Lease can be considered. All lease agreements must be in accordance with USACE policies. Cities must meet minimum criteria and demonstrate capability to maintain parks and recreation areas.

4. Define utility corridors; do not adversely affect natural beauty of Lucas or negatively impact quality of life for citizens.

USACE: Concur.

5. Preserve wildlife habitat.

USACE: Concur.

6. Preserve Raptor Center.

USACE: Concur.

7. Lucas supports TTPA and safe horse trails.

USACE: Concur.

8. Expansion of trails network and future connectivity.

USACE: This type of recreation is acceptable. Future development is funding and partner dependent. USACE does support trail connectivity when such connectivity does not contradict operational policies or Federal regulations that do not allow for this activity in the interest of national security.

9. Coordination of public emergency services; protect assets, deter vandalism, protect against wild fires.

USACE: Concur.

10. Focus on low intensity use of waterways; environmentally sensitive.

USACE: Concur.

11. Prohibit expansion of marinas; control current number and size.

USACE: Marina expansion and current usage shall be in accordance with USACE operation and real estate management regulations and policy. Public need and boating capacity are factors to consider. Marina expansion is not a consideration at this time.

TxDOT

1. Included provisions for expanding existing roads which may be widened during the life of the master plan.

USACE: Per national USACE policy set forth in ER 1130-2-550, widening of existing roads shall be addressed on a case-by-case basis. Regional mobility plans shall be considered.

2. Mitigation ratios and planting specifications for impact from roadway expansion should be included in the plan and areas for storage mitigation and habitat restoration/enhancement should be identified.

USACE: Mitigation, including but not limited to planting specifications, flood storage, and habitat restoration shall be addressed on a case-by-case basis for roadway widening proposals. These issues are typically included in the preparation of NEPA documents.

3. Roadways crossing USACE property should have maintenance easements to allow for bridge repairs without requiring a temporary construction license. Mitigation for the impacts to these easements could be established elsewhere on USACE Lavon Lake property.

USACE: When existing easements are found to be inadequate to allow for routine bridge repairs, consideration will be given for increased easement boundaries.

TPWD

1. Concern is the sports fisheries of the lake; angler access to the lake should be year round.

USACE: Concur.

2. Upper lake access is usually available at the Little Ridge boat ramp. However, there are no lower lake areas open during the winter months which have boat ramps that can be used in low level conditions.

USACE: Under current operational procedures, USACE-operated boat ramps in East Fork Park, Lavonia Park and Mallard Park are open year round and provide convenient angler access to the southwest and southeast sectors of the lake. Concessionaire-operated boat ramps in Collin Park also provide angler access to the southwest sector of the lake when open.

3. Open Avalon Park in the fall and winter for boat launching and low level conditions.

USACE: See above response under item 2. Avalon Park is located adjacent to East Fork Park where ramps are open year round.

4. Develop paddling trails including access for kayaks and canoes; new or existing park adapted launch ramp, restroom facilities, and parking.

USACE: Concur with the concept of paddling trails and associated trailhead facilities.

Establishment of paddling trails, as with land-based trails, are generally funding and partnership dependent.

5. Do not support any transfer of public lands to private land development.

USACE: Concur. No such transfers are under consideration. Minor land disposals may be pursued to correct boundary errors or resolve encroachments, but major transfers/disposals are normally the subject of Congressional legislation.

6. Continue controlling zebra mussels in Lake Lavon.
USACE: Concur.

Public Comment

Bicycle

1. The addition of bicycle (bike and hike) trails to Lavon Lake, concrete trails, 10 mile long, connected to existing streets or existing trails.

USACE: Long trails that extend beyond the boundaries of High Density Recreation areas (developed parks) are almost exclusively natural surface trails. Shorter trails that are confined to the boundaries of park areas may be constructed of concrete, depending on the degree of soil disturbance required. Connection to trails outside federal properties is encouraged in the interest of community connectivity and requires close coordination with the surrounding municipalities. Such connections may not be appropriate for controlled access park areas.

2. Bicycle trails associated within park areas.

USACE: This type of recreation is acceptable within Federal boundaries. Future development would be funding and partner dependent.

3. The addition of mountain bicycle (off-road bike and hike) trails to Lavon Lake, 20 mile long, partner with DORBA.

USACE: This type of recreation is acceptable within Federal boundaries when in accordance with operational policies and land classifications. Multi-mile trails are funding and partner dependent. Trails outside Federal properties should be coordinated with the surrounding municipalities.

4. The Skyview (road) should be open to cyclists.

USACE: We assume this comment is directed at the road across Lavon Dam. Non-Concur. Federal regulations do not allow for this access due to increased national security.

5. Remove barriers that hinder connectivity.

USACE: USACE is in support of connectivity when such connectivity does not contradict operational policies or Federal regulations that do not allow for this access type access due to increased national security.

6. Open dam to cyclists and pedestrians.

USACE: Non-Concur. Federal regulations do not allow for this access due to increased national security.

7. Hike, bike, and equestrian path connecting Dallas/Fort Worth Trail System to the North East Texas Trail (NETT). The NETT goes 130 miles from Farmersville to New Boston. Paved or unpaved bicycling or hiking trail along Lake Lavon's east side, connecting these two public-use trails.

USACE: The Government is aware of the NETT and can participate in discussion about connectivity through USACE land at Lavon Lake.

Boat Ramps

1. The addition of low water ramps that work for all size boats.

USACE: This type of recreation feature is acceptable within Federal boundaries. Future development would be funding and/or partner dependent.

2. Increase the length of existing boat ramps.

USACE: This type of recreation feature is acceptable within Federal boundaries. Future development would be funding and partner dependent.

3. Open additional ramps to year round.

USACE: This can be reviewed. Boat ramp usage is based upon current operational policies, seasonal lake traffic and funding available for operation.

Campgrounds

1. RV campground facilities at Clear Lake are limited.

2. Add secure, peaceful, shaded RV campground parks with water, sewer and 50 amp electrical hookups; spacious layout of pad sites so not crowded.

3. Extended camping season at Clear Lake.

USACE: Concur in the general improvement and expansion of camping facilities within Clear Lake Park. Progress will be funding dependent.

Disk Golf

1. 18 hole disk golf course

USACE: This type of recreation is acceptable within USACE-operated parks. In parks that are leased to others, recent USACE regulations at ER 1130-2-550 specify that recreational facilities such as a disk golf course are not water-dependent and do not rely on the project's natural resources and therefore may not be approved as a stand-alone facility. Such a facility may be acceptable as an amenity associated with a comprehensive resort. Future development in a USACE-operated park would be funding and/or partner dependent.

Equestrian

1. Request that land containing the Trinity Trail trail bed are classified as Low Intensity Recreational, from the water line to the Corps boundary. This will preserve the natural feel and look of the woods and fields that the trail traverses, increasing the enjoyment of the trail by hikers and equestrians.

USACE: During master plan development the indicated area will be reviewed and evaluated for potential designation to this land classification.

2. Request that the Trinity Trail trailheads be classified as Low Intensity Recreational. This will prevent further development of the trailheads beyond their current uses (i.e. Ample parking for horse trailers, bathrooms, picnic tables, pavilions, water for horses, electric outlets for gatherings at the pavilions).

USACE: During master plan development the indicated area will be reviewed and evaluated for potential designation to this land classification.

3. Request that the Sycamore grove along the north and south sides of Wilson Creek, containing the Giant Sycamore, and the area within the 'Sycamore Loop' of the trail, containing the Bent Sycamore (see Trinity Trail Emergency Markers 92 through 87) be classified as an Environmentally Sensitive Area. This will ensure that no development or hardened trails are allowed in this area.

USACE: During master plan development the indicated area will be reviewed and evaluated for potential designation to this land classification.

4. Request that the watershed along White Rock Creek (between Trinity Trail Emergency Markers 67 through 64) be classified as an Environmentally Sensitive Area.

Since the creek does overflow and flood the adjacent land in high rainfall events, it doesn't appear to have ever been farmed and the area contains a large number of old growth trees. This will ensure that no development or hardened trails are allowed in this area.

USACE: During master plan development the indicated area will be reviewed and evaluated for potential designation to this land classification.

5. Request that the meadows approximately 2-1/2 and 3 miles south of the Brockdale trailhead (between Trinity Trail Emergency Markers 27 and 26), be classified as an Environmentally Sensitive Area. This stretch of meadows sitting high above the lake, and offers the most scenic view of the lake along the entire length of the trail. Allowing any development in this area would greatly impact the vistas available from the trail.

USACE: During master plan development the indicated area will be reviewed and evaluated for potential designation to this land classification.

6. Request that each of the major meadows traversed by the trail be examined for native grasses and if the meadow is a native grass meadow, the meadow and its environs should be classified as an Environmentally Sensitive Area.

USACE: During master plan development the indicated area will be reviewed and evaluated for potential designation to this land classification.

7. Request that the Corps continue its policy of excluding bicycles and other wheeled vehicles (except emergency and TTPA maintenance vehicles) from the Trinity Trail. Mixing wheeled vehicles and equestrians on the same trail will create dangerous situations and conflict on a trail that was designed and maintained solely for hiking and equestrian use.

USACE: Lavon Lake is a federal property designated for public use, open to all user groups. Organizations and groups with organized activities within USACE boundaries do not own the real property and shall not be afforded exclusive rights within these boundaries. Research indicates that there are many multi-use trails with successful coexistence of human, cycle, and equine traffic. The Trinity Trail is operated under a Memorandum of Understanding (MOU) between USACE and Collin County with the majority of maintenance performed by volunteers. In accordance with the MOU trail use is currently restricted to equine and pedestrian traffic and USACE has no plans to actively seek the integration of bicycle traffic. Future management of the trail will be partly dependent on the direction that Collin County wishes to pursue.

8. For safety reasons, no bikes should be allowed on the Trinity Trail. The trail is used by beginner horses and horse riders that are not parade ready or advanced enough to ride with bicycles. As a rule, new horses and new horse riders (usually children) do not mix with bicycles on a trail. We need to preserve the Trinity Trail as it is, as an equestrian and hiker trail. Safety should come first.

USACE: See response for item 7 above.

9. I am for a bike trail on the east side of Lake Lavon so the Northeast Texas Trail can hook up through Wylie. There needs to be a trail made for the bikes to get across the Trinity River along Highway 78.

USACE: The Government is aware of the NETT and can participate in discussion about connectivity through USACE land at Lavon Lake.

10. TTPA maintains the equestrian trails therefore only they should use them.

USACE: See response for item 7 above.

11. Include educational signage for interaction between activities.

USACE: Signage on USACE lands is governed by the USACE national sign manual.

Educational signs are appropriate in many situations to increase visitor enjoyment and safety.

12. Limit Trinity Trails to horse only due to the number of less experienced riders and horses that use the trail.

USACE: See response to number 7 above.

General

1. Limit technical mountain bikers on trails due to erosion.

USACE: Concur. Mountain bike or off-road bike traffic shall be confined to designated trails and trails shall be monitored for erosion damage.

2. No motorized vehicles on trails.

USACE: Concur with the exception of maintenance vehicles.

3. Recreation sites, expanded as population grow requires.

USACE: During development of the master plan expansion of recreation facilities will be considered.

4. Water shortage concerns.

USACE: Comment noted. Use of water below the conservation pool elevation of 492.0 NGVD, is monitored and controlled by NTMWD.

5. Concern over resorts on perimeter; Development around the lake perimeter, on Corps land, should not deny public use on lake lands.

USACE: The Government cannot control development on private lands that adjoin USACE land. USACE is willing to discuss public access points with Collin County and surrounding municipalities.

6. Tree removal from the dry lake beds would increase the recreational use of the water surface.

USACE: The extent of tree clearing during construction of Lavon Lake sought to balance the need for recreational use of the water surface as well as the need for fisheries habitat offered by the standing dead timber in the lake. The trees that were not removed are generally located in the upper portions of the reservoir where water depth is generally less than 12 feet when the lake is at the conservation pool elevation of 492.0 NGVD. With only small reductions in pool elevation from evaporation and water withdrawals, these shallow areas quickly become

shallower, rendering these areas unsuitable for typical recreational boat traffic. USACE has no plans to pursue removal of standing dead trees in the reservoir.

7. Develop a stump removal plan to increase recreational area.

USACE: See response to No. 6 above.

8. Maintaining ecologically friendly uses of the land.

USACE: Concur. The USACE natural resources management mission statement in USACE regulation ER 1130-2-540, states that natural resources shall be conserved and managed using ecosystem management principles.

9. Concern over protecting adjacent landowners, their families and property from burglars and child predators masquerading as "walkers?!" if new trails were built around lake.

USACE: Recent outdoor recreation surveys conducted by TPWD and USFS, indicate high public demand for additional public trails and connectivity of trail systems. Existing trails at Lavon Lake and several other USACE lakes in the Dallas-Fort Worth region are heavily used with few, if any, incidents such as those described in this comment. However, future placement of trails near residential areas would require public involvement giving both trail users and adjacent homeowners an opportunity to comment.

Hunting

1. Maintain and/or expand available acreage for archery hunting.

USACE: Archery hunting is available at Lavon Lake in accordance with TPWD regulations and USACE hunting policy with the exception that USACE currently does not allow whitetail deer to be hunted on USACE land. TPWD only recently authorized archery-only whitetail deer hunting in Collin County and USACE plans to coordinate with TPWD to conduct a whitetail deer population survey to determine if the population on USACE land is sufficient to allow hunting.

2. Support a limited archery whitetail deer season.

USACE: See USACE comment above.

Lake Water Level

1. Increase lake level up to 10 feet for long term water supply and recreation use.

USACE: The Master Plan does not address the management of water for water supply or flood risk management operations. Increasing the conservation pool elevation of any USACE reservoir is a major action that would likely require Congressional authorization, study sponsors, and years of study.

2. Make the lake deeper to reduce evaporation; use bulldozers to add depth to the lake while it is low. Use excess dirt to create peninsulas and islands for wildlife habitat.

USACE: The Master Plan does not address the management of water for water supply or flood risk management operations. Excavation to deepen the lake would be a major, costly, and multi-year task, requiring careful analysis of the cost versus benefits and environmental impacts. There is currently no initiative being undertaken to deepen the lake by excavation.

3. Maintain constant level; no release to Ray Hubbard when low.

USACE: The Master Plan does not address the management of water for water supply or flood risk management operations. In accordance with contracts between the Government and NTMWD, the management and control of water when the lake is at or below the conservation pool elevation of 492.0 NGVD is the responsibility of NTMWD.

Blackland Prairie Raptor Center

1. Maintain current lease agreement and BPRC mission.

USACE: Concur

2. Change Brockdale Park classification, identified in 1972 as Recreation Lands/High Density Recreation, be changed to reflect the work of Blackland Prairie Raptor Center; Environmentally sensitive and low density.

USACE: By definition, High Density Recreation areas are those areas having developed facilities such as paved roads, buildings, camping and picnic facilities. During master plan development the classification of Brockdale Park will be reviewed.

3. With the understanding of the requirements of permits from the U.S. Fish and Wildlife Services and Texas Parks and Wildlife Department for maintaining Education Raptors and Rehabilitating Raptors, designate half of the area currently called Brockdale Park as inactive, to remain wild.

USACE: See above response under item 2.

Roads and Utilities

1. Included provisions for expanding existing roads which may be widened during the life of the master plan.

USACE: In accordance with national USACE policy in ER-1130-2-550, Chapter 17, expansion of existing roads will be considered on a case-by-case basis. Regional mobility plans will be considered.

2. Mitigation ratios and planting specifications for impact from roadway expansion should be included in the plan and areas for storage mitigation and habitat restoration/enhancement should be identified.

USACE: Mitigation, including but not limited to planting specifications, flood storage, and habitat restoration shall be addressed on a case-by-case basis for roadway widening proposals. These issues are typically included in the preparation of NEPA documents.

3. Roadways crossing USACE property should have maintenance easements to allow for bridge repairs without requiring a temporary construction license. Mitigation for the impacts to these easements could be established elsewhere on USACE Lavon Lake property.

USACE: When existing easements are found to be inadequate to allow for routine bridge repairs, consideration will be given for increased easement boundaries.

4. Define utility corridors; do not adversely affect natural beauty of Lucas or negatively impact quality of life for citizens.

USACE: During master plan development, designation of utility corridors will be considered.

**Appendix I – Comments from TPWD
Waterfowl Management**



10/20/2015

Jared Laing
Texas Parks and Wildlife Department
1942 FM 848 Tyler, TX 75707

U.S. Army Corps of Engineers
Michael Kinard, Lake Manager
Lavon Lake Office
3375 Skyview Drive
Wylie, Texas 75098

Dear Mr. Kinard:

I am writing this letter, as requested, in response to the meeting between our agencies at the Lake Lavon field office on October 2, 2015 regarding waterfowl hunting regulations at Lake Lavon. At this meeting we were presented with information from the USACE about current waterfowl hunting regulations on the lake. We were asked one question in particular; whether there is a justification for designated waterfowl sanctuary areas on the lake. For clarification purposes, we will define sanctuary areas as any area that attracts and holds waterfowl where they are not disturbed. Disturbance is any activity that causes waterfowl to alter their natural behavior. Examples of disturbance include boat traffic, vehicle traffic, low-flying aircraft, pedestrian traffic, hunting, predator avoidance, etc... Since waterfowl are very adept flyers and travel thousands of miles each year, a main issue affecting the value of sanctuary areas is the attributes of the landscape adjacent to the property in question. That being said, the landscape around Lake Lavon has numerous water features, primarily small ponds and lakes, as well as Lake Ray Roberts, on which no hunting is allowed. With the amount of waterfowl habitat surrounding Lake Lavon, the majority of which has little, if any, disturbance during the season when larger concentrations of waterfowl are present (September-March), we believe that designated sanctuary areas are of little value from a biological standpoint. However, we understand there may be social or political issues on the topic.

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Chairman-Emeritus
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Carter P. Smith
Executive Director

I hope this letter is what you were looking for and that it helps with your decisions as you move forward. Please let me know if I can be of any further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Jared Laing", written over a large, stylized scribble.

Jared Laing
Regional Waterfowl Biologist
Texas Parks and Wildlife Department

Appendix J – Pertinent Public Laws

Appendix J - Pertinent Public Laws

- a. Public Law 59-209, Antiquities Act of 1906. - The first Federal law established to protect what are now known as "cultural resources" on public lands. It provides a permit procedure for investigating "antiquities" and consists of two parts: An act for the Preservation of American Antiquities, and Uniform Rules and Regulations.
- b. Public Law 74-292, Historic Sites Act of 1935. - Declares it to be a national policy to preserve for (in contrast to protecting from) the public, historic (including prehistoric) sites, buildings, and objects of national significance. This act provides both authorization and a directive for the Secretary of the Interior, through the National Park Service, to assume a position of national leadership in the area of protecting, recovering, and interpreting national archeological historic resources. It also establishes an "Advisory Board on National Parks; Historic Sites, Buildings, and Monuments, a committee of eleven experts appointed by the Secretary to recommend policies to the Department of the Interior".
- c. Public Law 75-761, Flood Control Act of 1938. - This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- d. Public Law 78-534, Flood Control Act of 1944. - Section 4 of the act as last amended in 1962 by Section 207 of Public Law 87-874 authorizes USACE to construct, maintain, and operate public parks and recreational facilities in reservoir areas and to grant leases and licenses for lands, including facilities, preferably to Federal, State or local governmental agencies.
- e. Public Law 79-525, River and Harbor Act of 1946. - This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- f. Public Law 83-780, Flood Control Act of 1954. - This act authorizes the construction, maintenance, and operation of public park and recreational facilities in reservoir areas under the control of the Department of the Army and authorizes the Secretary of the Army to grant leases of lands in reservoir areas deemed to be in the public interest.
- g. Public Law 85-624, Fish and Wildlife Coordination Act 1958. - This act as amended in 1965 sets down the general policy that fish and wildlife conservation shall receive equal consideration with other project purposes and be coordinated with other features of water resource development programs. Opportunities for improving fish and wildlife resources and adverse effects on these resources shall be examined along with other purposes which might be served by water resources development.
- h. Public Law 86-717, Forest Conservation. - This act provides for the protection of forest and other vegetative cover for reservoir areas under the jurisdiction of the Secretary of the Army and the Chief of Engineers.

- i. Public Law 87-874, Rivers and Harbors Act of 1962. - This act authorizes the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.
- j. Public Law 88-578, Land and Water Conservation Fund Act of 1965. - This act established a fund from which Congress can make –appropriations for outdoor recreation. Section 2(2) makes entrance and user fees at reservoirs possible by deleting the words "without charge" from Section 4 of the 1944 Flood Control Act as amended.
- k. Public Law 89-72, Federal Water Project Recreation Act of 1965. - This act requires that not less than one-half the separable costs of developing recreational facilities and all operation and maintenance costs at Federal reservoir projects shall be borne by a non-Federal public body. An OCE/OMB implementation policy made these provisions applicable to projects completed prior to 1965.
- l. Public Law 89-90, Water Resources Planning Act (1965). - This act established the Water Resources Council and gives it the responsibility to encourage the development, conservation, and use of the Nation's water and related land resources on a coordinated and comprehensive basis.
- m. Public Law 89-272, Solid Waste Disposal Act, as amended by PL 94-580, dated October 21, 1976. - This act authorized a research and development program with respect to solid-waste disposal. It proposes (1) to initiate and accelerate a national research and development program for new and improved methods of proper and economic solid-waste disposal, including studies directed toward the conservation of national resources by reducing the amount of waste and unsalvageable materials and by recovery and utilization of potential resources in solid waste; and (2) to provide technical and financial assistance to State and local governments and interstate agencies in the planning, development, and conduct of solid-waste disposal programs.
- n. Public Law 89-665, Historic Preservation Act of 1966. - This act provides for: (1) an expanded National Register of significant sites and objects; (2) matching grants to states undertaking historic and archeological resource inventories; and (3) a program of grants-in aid to the National Trust for Historic Preservation; and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 requires that the President's Advisory Council on Historic Preservation have an opportunity to comment on any undertaking which adversely affects properties listed, nominated, or considered important enough to be included on the National Register of Historic Places.
- o. Public Law 90-483, River and Harbor and Flood Control Act of 1968, Mitigation of Shore Damages. - Section 210 restricted collection of entrance fee at USACE lakes and reservoirs to users of highly developed facilities requiring continuous presence of personnel.
- p. Public Law 91-190, National Environmental Policy Act of 1969 (NEPA). - NEPA declared it a national policy to encourage productive and enjoyable harmony between man and his environment, and for other purposes. Specifically, it declared a "continuing policy of the Federal Government... to use all practicable means and measures...to foster and promote

the general welfare, to create conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Section 102 authorized and directed that, to the fullest extent possible, the policies, regulations and public law of the United States shall be interpreted and administered in accordance with the policies of the Act.

- q. Public Law 91-611, River and Harbor and Flood Control Act of 1970. - Section 234 provides that persons designated by the Chief of Engineers shall have authority to issue a citation for violations of regulations and rules of the Secretary of the Army, published in the Code of Federal Regulations.
- r. Public Law 92-347, Golden Eagle Passbook and Special Recreation User Fees. - This act revises Public Law 88-578, the Public Land and Water Conservation Act of 1965, to require Federal agencies to collect special recreation user fees for the use of specialized sites developed at Federal expense and to prohibit the Corps of Engineers from collecting entrance fees to projects.
- s. Public Law 92-500, Federal Water Pollution Control Act Amendments of 1972. - The Federal Water Pollution Control Act of 1948 (PL 845, 80th Congress), as amended in 1956, 1961, 1965 and 1970 (PL 91- 224), established the basic tenet of uniform State standards for water quality. Public Law 92-500 strongly affirms the Federal interest in this area. "The objective of this act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters."
- t. Public Law 92-516, Federal Environmental Pesticide Control Act of 1972. - This act completely revises the Federal Insecticide, Fungicide and Rodenticide Act. It provides for complete regulation of pesticides to include regulation, restrictions on use, actions within a single State, and strengthened enforcement.
- u. Public Law 93-81, Collection of Fees for Use of Certain Outdoor Recreation Facilities. - This act amends Section 4 of the Land and Water Conservation Act of 1965, as amended to require each Federal agency to collect special recreation use fees for the use of sites, facilities, equipment, or services furnished at Federal expense.
- v. Public Law 93-251, Water Resources Development Act of 1974. - Section 107 of this law establishes a broad Federal policy which makes it possible to participate with local governmental entities in the costs of sewage treatment plan installations.
- w. Public Law 93-291, Archeological Conservation Act of 1974. - The Secretary of the Interior shall coordinate all Federal survey and recovery activities authorized under this expansion of the 1960 act. The Federal Construction agency may transfer up to one percent of project funds to the Secretary with such transferred funds considered nonreimbursable project costs.
- x. Public Law 93-303, Recreation Use Fees. - This act amends Section 4 of the Land and Water Conservation Act of 1965, as amended, to establish less restricted criteria under which

Federal agencies may charge fees for the use of campgrounds developed and operated at Federal areas under their control.

- y. Public Law 93-523, Safe Drinking Water Act. - The act assures that water supply systems serving the public meet minimum national standards for protection of public health. The act (1) authorizes the Environmental Protection Agency to establish Federal standards for protection from all harmful contaminants, which standards would be applicable to all public water systems, and (2) establishes a joint Federal-State system for assuring compliance with these standards and for protecting underground sources of drinking water.
- z. Public Law 94-422, Amendment of the Land and Water Conservation Fund Act of 1965. - Expands the role of the Advisory Council. Title 2 - Section 102a amends Section 106 of the Historical Preservation Act of 1966 to say that the Council can comment on activities which will have an adverse effect on sites either included in or eligible for inclusion in the National Register of Historic Places.
- aa. Public Law 99-662, The Water resources Development Act 1986. - Provides for the conservation and development of water and related resources and the improvement and rehabilitation of the Nation's water resources infrastructure.
- bb. Public Law 110-114, Water Resources Development Act of 2007, Section 3134. - This act requires lakes within the State of Oklahoma under Corps of Engineers jurisdiction research methods for demonstration projects to benefit and enhance recreation.

Appendix K – List of Acronyms

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ADA	Americans with Disabilities Act
CAP	Climate Action Plan
CCRTMP	Collin County Regional Trails Master Plan
CRMP	Cultural Resources Management Plan
DC	District Commander
EA	Environmental Assessment, NEPA Document
EC	Engineer Circular
EM	Engineering Manual
EP	Engineering Pamphlet
EPA	United States Environmental Protection Agency
ER	Engineering Regulation
ESA	Environmentally Sensitive Area
FONSI	Finding of No Significant Impact
GIS	Geographical Information Systems
HDR	High Density Recreation
HQ	USACE Headquarters
LEED	Leadership in Engineering and Environmental Design
MP	Master Plan or Master Planning
MRML	Multiple Resource Management Lands
NHPA	National Historic Preservation Act
NRRS	National Recreation and Reservation Service
NRHP	National Register of Historic Places
NSRE	National Survey on Recreation and the Environment
NGVD	National Geodetic Vertical Datum
NWI	National Wetland Inventory
NCTCOG	North Central Texas Council of Governments

NRCS	Natural Resources Conservation Service
NTMWD	North Texas Municipal Water District
NEPA	National Environmental Policy Act, 1970
NOA	Notice of Availability
O&M	Operations and Maintenance
OMB	Office of Management and Budget
OMBIL	Operations and Maintenance Business Information Link
OMP	Operational Management Plan for a specific lake Project
OPM	Operations Project Manager
PDT	Project Development Team
PM	Project Management or Project Manager
PMP	Project Management Plan
SGCN	Species of Greatest Conservation Need
SHPO	State Historical Preservation Office
SWF	U. S. Army Corps of Engineer's Fort Worth District Office
SWF-OD	Operations Division, U. S. Army Corps of Engineers, Fort Worth
SWF-RPEC	Regional Planning & Environmental Center located in Fort Worth
TCAP	Texas Conservation Action Plan
TCEQ	Texas Council on Environmental Quality
TXDOT	Texas Department of Transportation
TORP	Texas Outdoor Recreation Plan
TPWD	Texas Parks and Wildlife Department
USACE	United States Army Corps of Engineers
USACE-SWF	U. S. Army Corps of Engineer's Fort Worth District Office
USFW	U. S. Fish and Wildlife Service
USFS	U.S. Forest Service