

Chapter 3: Affected Environment of the Region and Project Area

The study area for this programmatic environmental assessment is the area between the Federal property line and the conservation pool level at the two lakes (approximately 26,662 acres) (see Figures 3-1 and 3-1). All spatial analyses undertaken for this programmatic environmental assessment were completed using geographic information system (GIS) technology. The GIS data utilized in this programmatic environmental assessment represent the best available data for the Grapevine and Lewisville Lake areas. GIS technology, while providing many advanced capabilities in the way questions about environmental impacts can be asked, is limited in the absolute accuracy of maps and data that are generated. For example, Global Positioning Satellite (GPS) receivers were utilized to record the spatial coordinates of the Federal property line. GPS data are often accurate to within a meter or two, but can be 30 meters or more from true. None-the-less, USACE has confidence that the GIS data utilized in this programmatic environmental assessment has ample accuracy to make decisions at the programmatic level. Areas were ground truthed to ensure that the level of accuracy was sufficient for this level of analysis. As such, no claims are made to the accuracy or completeness of the data or to its suitability for a particular use other than a programmatic assessment of mowing/underbrushing activities in the study area.

A. Current Land Use and Land Cover

USACE manages approximately 18,000 acres of land surrounding Lewisville Lake and 8,700 acres surrounding Grapevine Lake. Areas above the conservation pool elevation are allocated into one of the following categories, according to EP 1130-2-550 (Table 3-1):

1. Operations. Lands for operation of the project, i.e., flood control, hydropower, navigation, water supply, etc.
2. Recreation. Lands for public recreation.
3. Fish and Wildlife. Lands for the management of fish and wildlife located on project lands.

Allocated project lands are further classified to ensure development and resource management consistent with authorized project purposes and the provisions of NEPA and other Federal laws:

1. Project Operations. Lands required for the structure, operations center, office, maintenance compound and other areas that are used solely for project operations.
2. Recreation. Land developed for intensive recreational activities by the visiting public.
3. Mitigation. Land acquired or designated specifically for mitigation.
4. Environmental Sensitive Areas (ESAs). Areas where scientific, ecological, cultural or aesthetic features have been identified. Included in this land classification are areas dominated by climax or near-climax vegetation; areas where vegetation has been planted as mitigation for loss of natural resources; riparian areas, wetlands and other high-value aquatic sites; areas valued for roosting, nesting, or feeding for important wildlife species; areas where natural vegetation or topography serves as important visual and noise buffers; and areas having exceptional aesthetic qualities such as large expanses of wildflowers (environmental stewardship). Limited or no development of public use is contemplated on land in this classification. No agricultural or grazing uses are permitted on this land.
5. Multiple Resource Management. Lands managed for one or more of, but not limited to, these activities to the extent that they are compatible with the primary allocation(s).
 - a. Recreation – Low Density. Recreation activities such as hiking, primitive camping, wildlife observation, or hunting.
 - b. Wildlife Management General – Fish and wildlife management activities (environmental stewardship).
 - c. Vegetative Management – Managed for the protection and development of forest and vegetative cover (environmental stewardship).
6. Easement lands. All lands for which the Corps holds an easement interest but not fee title.

Table 3-1. Approximate Allocation of Land under the Jurisdiction of USACE between the Federal Property Line and the Conservation Pool Level

	Management Areas (in acres)			
	Wildlife	Recreation	Operations	Total
Grapevine Lake	4,052	4,063	600	8,715
Lewisville Lake	11,292	4,998	1,190	17,480

Lands designated as wildlife management areas (those designated as environmentally sensitive areas, wildlife management areas, and vegetative management areas) account for approximately 59% of the total lands at Grapevine and Lewisville Lakes while designated recreational lands account for approximately 35%.

Using recent IKONOS satellite imagery, lands between the Federal property line and the conservation pool were classified into five potential land cover classes: woody, herbaceous, maintained grasses, barren and other (See Appendix C for methodology). The satellite imagery analysis resulted in good separation into woody (leaves, branches and boles – trees and shrubs [15,514 acres at both lakes]) and non-woody (herbaceous [7,886 acres at both lakes]) classes. The Barren class comprised areas of bare ground such as asphalt roads, rooftops and other impervious surfaces [1,013 acres at both lakes]. The Maintained grasses class consisted of areas of “bright” vegetation easily identified in the imagery. For example, golf courses, baseball fields and manicured lawns typically presented a different visual signature in the imagery [1,556 acres at both lakes]. All other land covers were unknown, perhaps due to mixed signatures, and were placed in the “other” class [226 acres at both lakes]. Table 3-2 lists the current land cover at each lake based on the IKONOS imagery.

Table 3-2. Current Land Cover Between the Federal Property Line and the Conservation Pool Level

Land cover	Grapevine Lake		Lewisville Lake	
	acres	percent	acres	percent
Wooded	5,573	63.9	9,942	55.4
Herbaceous	2,452	28.1	5,434	30.3
Maintained grasses	243	2.8	1,312	7.3
Barren	381	4.4	633	3.5
Other	67	0.8	158	0.9
Totals	8,715	100	17,654	100

Corps of Engineers - Study Boundaries Lake Grapevine

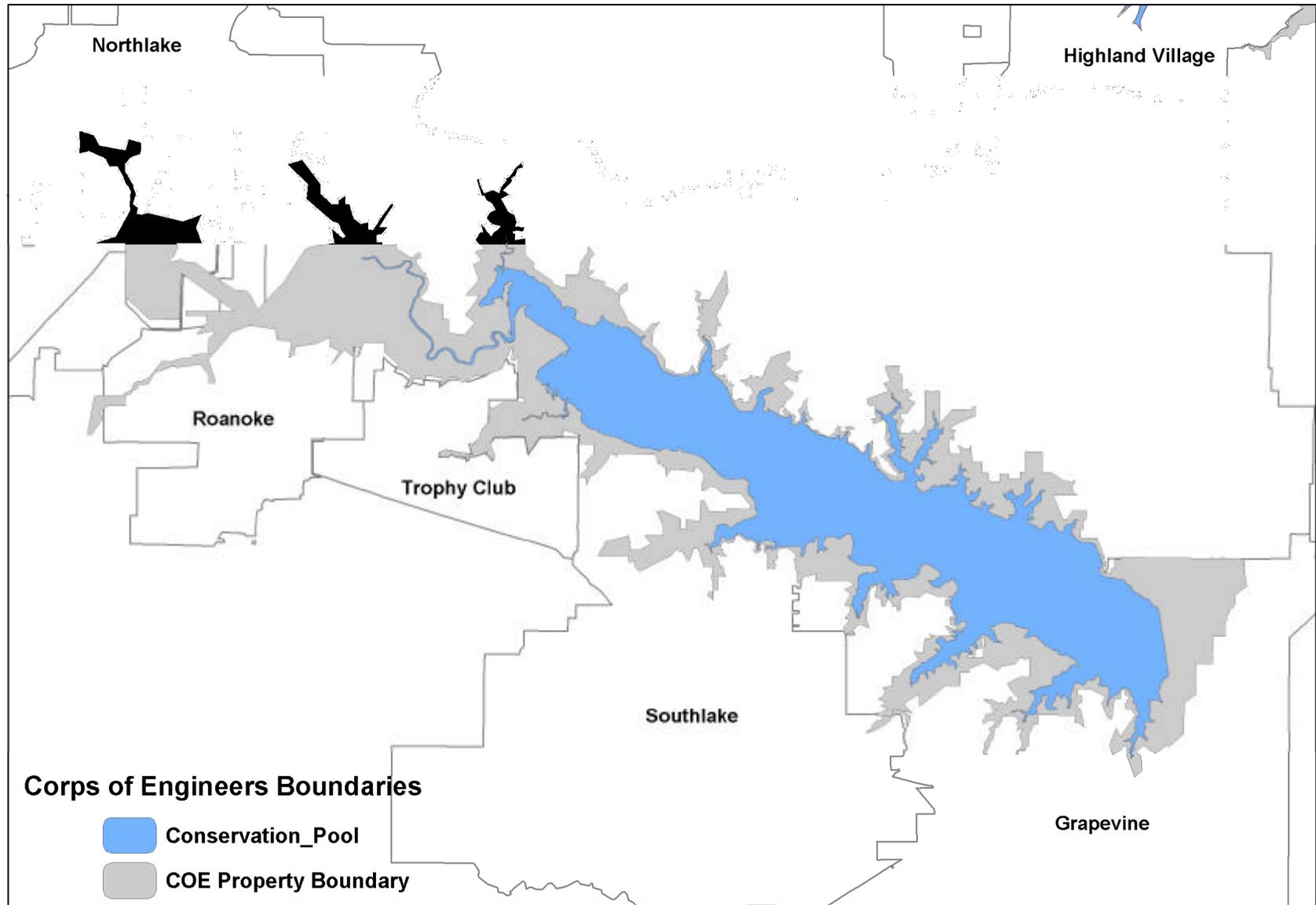


Figure 3-1. Study Area at Grapevine Lake.

Corps of Engineers - Study Boundaries Lake Lewisville

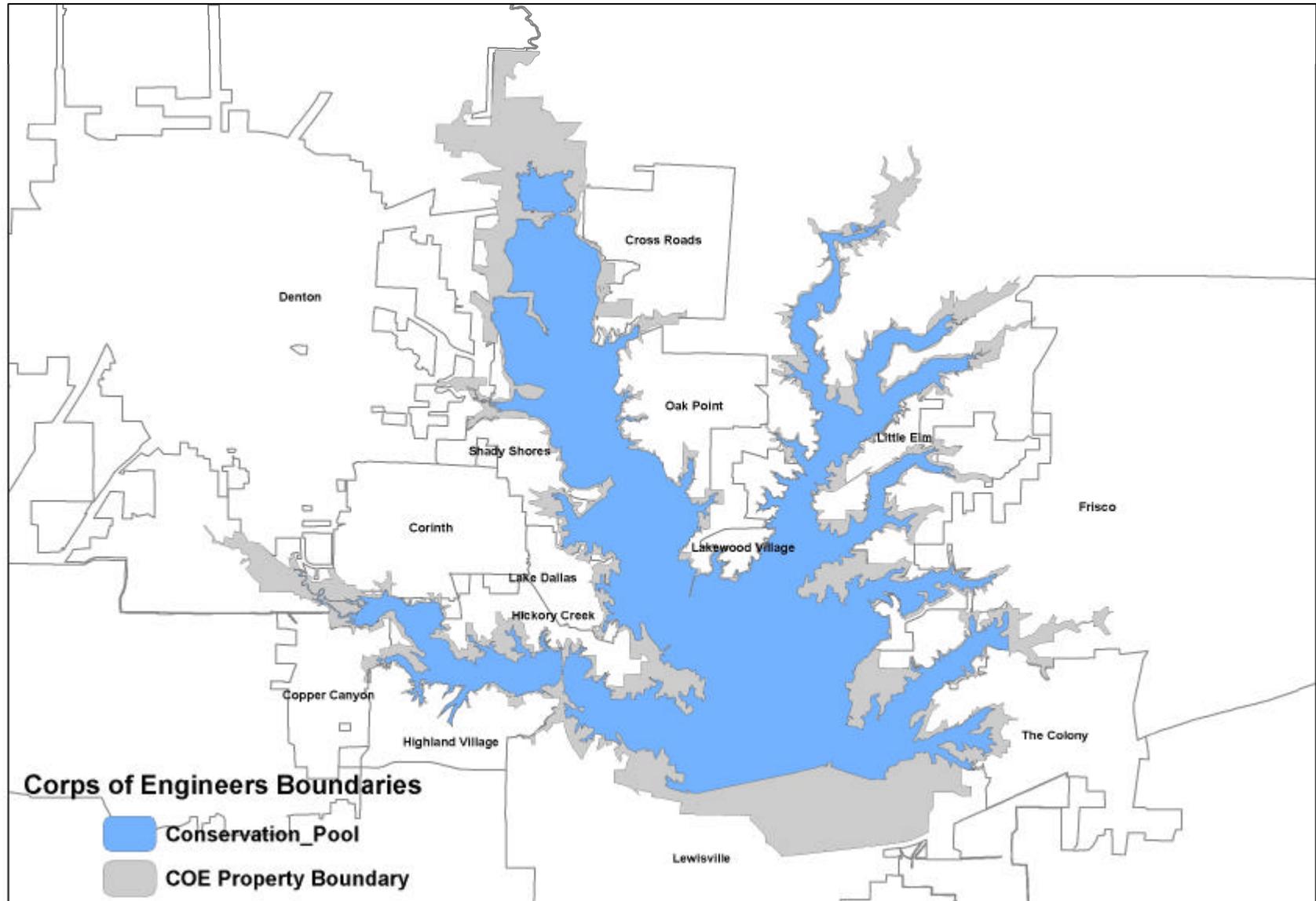


Figure 3-2. Study Area at Lewisville Lake

B. Physiography (Soils)

The geology of Lewisville Lake includes of two different formations: the Eagle Ford and the Woodbine. The Eagle Ford Formation, which consists of shale with minor sandstone interbeds, forms the bedrock for the eastern portion of the lake while the Woodbine Formation, composed of sandstone, shale and clay, is found in the western region. Grapevine Lake occurs on only one formation, the Woodbine.

Soil surveys conducted for Denton County (Ford and Pauls, 1980) classify the soils surrounding Lewisville Lake as five different categories. One soil type occurs on upland savannahs around the lake, the Birome-Gasil-Callisburg unit. The three units that occur on the upland prairies are Navo-Wilson, Branyon-Burleson-Heiden, and Altoga-Vertel-Ferris. The Frio-Ovan unit includes the soils found in the bottomlands. Characteristics of each soil type are shown in Table 3-3.

Table 3-3. Soil Types of Lewisville Lake

Soil Type	Depth	Slope	Composition	Permeability
Birome-Gasil-Callisburg ¹	Moderately Deep to Deep	1 to 15%	Loamy	Moderate to Slow
Navo-Wilson ¹	Moderately Deep to Deep	0 to 5%	Loamy	Very Slow
Branyon-Burleson-Heiden ¹	Moderately Deep to Deep	0 to 15%	Clayey	Very Slow
Altoga-Vertel-Ferris ¹	Moderately Deep to Deep	1 to 15%	Clayey	Moderate to Very Slow
Frio-Ovan ¹	Deep	< 1%	Clayey	Moderately Slow to Very Slow

1 = Information obtained from Denton County Soil Survey

2 = Information obtained from Tarrant County Soil Survey

Due to Grapevine Lake's dual residence in two different counties, soils on the northern side on the lake are classified by the Denton County Soil Survey (Ford and Pauls, 1980), while soils on the southern portion are classified by the Tarrant County Soil Survey (Ressel, 1981). Birome-Gasil-Callisburg and Crosstell-Gasil-Rader occur in the uplands around the lake while the bottomlands consist of soils belonging to the Frio-Ovan and Frio-Trinity units. Characteristics of Grapevine Lake soils are shown in Table 3-4.

Table 3-4. Soil Types of Grapevine Lake

Soil Type	Depth	Slope	Composition	Permeability
Birome-Gasil-Callisburg ¹	Moderately Deep to Deep	1 to 15%	Loamy	Moderate to Slow
Crosstell-Gasil-Rader ²	Deep	0 to 8%	Loamy	Moderate to Slow
Frio-Ovan ¹	Deep	< 1%	Clayey	Moderately Slow to Very Slow
Frio-Trinity ²	Deep	0 to 1%	Clayey	Moderately Slow to Very Slow

1 = Information obtained from Denton County Soil Survey

2 = Information obtained from Tarrant County Soil Survey

C. Water Quality

The Texas Commission on Environmental Quality (TCEQ), authorized to establish water quality standards, annually submits an assessment of the state's surface waters every two years to the U.S. Environmental Protection Agency (EPA). The *Texas Water Quality Inventory and 303(d) List* identifies waters that do not meet the water quality standards set for their use (Table 3-5) under the Federal Clean Water Act. The surface waters in Texas have been separated into segments by the TCEQ in order to organize water quality data.

Lewisville Lake has been designated Segment 0823 of the Trinity River Basin, with classifications for Aquatic Life Use, Contact Recreation Use, General Use, Fish Consumption Use, and Public Water Use. Of the nine monitoring sites lie within the 23,280 acres of the Lewisville Lake water body area, the TCEQ cited two areas for nutrient enrichment concern in their 2002 List (Table 3-6).

Grapevine Lake has been designated Segment 0826 of the Trinity River Basin, with classifications for Aquatic Life Use, Contact Recreation Use, General Use, Fish Consumption Use, and Public Water Use. Out of ten monitoring sites for Grapevine Lake's 7,380 acre water body area, the TCEQ cited one area for concern in their 2002 List (Table 3-7).

Table 3-5. Water Quality Criteria for Lewisville and Grapevine Lakes

Segment Name	Chloride ¹ (mg/L)	Sulfates ¹ (mg/L)	Total Dissolved Solids ¹ (mg/L)	Dissolved Oxygen ² (mg/L)	pH Range ³ (SU)	Fecal Coliform (no./100ml)	Maximum Temperature (°F)
Lewisville Lake	80	60	500	5	6.5-9.0	200	90
Grapevine Lake	80	60	500	5	6.5-9.0	200	93

¹ Maximum annual averages for segment

² Minimum 24-hour means at any site within segment

³ Minimum and maximum values expressed in standard units

Table 3-6. Lewisville Lake Water Quality Exceedances

Monitoring Site	Location Size (acres)	Concern	Description of Concern	# of samples	# of exceedances
Hickory Creek	2,616	Nutrient Enrichment	Ammonia	25	11
Little Elm Creek	3,589	Nutrient Enrichment	Nitrate+Nitrate Nitrogen	10	4

Table 3-7. Grapevine Lake Water Quality Exceedances

Monitoring Site	Location Size (acres)	Use	Description of Concern	# of samples	# of exceedances
Middle portion of reservoir southeast of Walnut Grove Park	1,351	General Use	High pH	7	1

D. Wetlands

The definition most commonly used by Federal, state, and local agencies was developed by the United States Army Corps of Engineers (USACE), the United States Environmental Protection Agency (EPA), and the United States Fish and Wildlife Service (FWS):

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (Federal Register, Section 328.3(b), 1991; Federal Register, Section 230.4(t), 1991).

In addition, the definition requires that wetlands possess the following characteristics:

- Vegetation consisting of macrophytes adapted to areas with saturated soil conditions.
- Soil classified as hydric or possesses reducing characteristics.
- Hydrology that results in inundation either permanently or periodically with mean water depths less than 2 meters so that the soil is saturated to the surface at some time during the growing season.

Two types of wetlands can be found near lakes and reservoirs. Riverine wetlands refer to those wetlands within rivers or streams while fringe wetlands are located near large bodies of water that receive periodic and adequate two-way flow. For Lewisville and Grapevine Lakes, there is a small potential for fringe wetlands on the shoreline of the main body of the lake. There is an increased likelihood of encountering riverine wetlands as you move up the tributaries draining into the main lake bodies.

A wide variety of wildlife utilizes wetlands for reproductive, feeding, or nesting habitats. In addition, wetlands can protect water quality in lakes by removing nutrients and nonpoint source pollutants (e.g. herbicides), and can attenuate floodwaters. A common shrub found in the fringe wetlands is the common buttonbush (*Cephalanthus occidentalis*). It is an obligate wetland shrub, which not only helps stabilize shorelines, but also provides seeds consumed by several species of waterfowl (USDA, 2002).

E. Biological Resources

1. Vegetation

Lewisville and Grapevine Lakes fall within two vegetational areas of North Central Texas: the Eastern Cross Timbers and the Blackland Prairie (Diggs et al., 1999). The sandy, acidic soils resulting from the Woodbine bedrock allow for the of the dominant trees found in the Cross Timbers, post oak (*Quercus stellata*) and blackjack oak (*Quercus marilandica*) (Dyksterhuis, 1948). These trees possess deep root systems that extend through the sandstone strata to access water, resulting in the dwarfed stature of most oaks in the Cross Timbers (Engle, 1997). Within and between the forests in undisturbed areas, the dominant native grass of the open savannahs is little bluestem (*Schizachyrium scoparium*). Other common grasses include Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), and Sideoats grama (*Bouteloua curtipendula*), (Dyksterhuis, 1948).

The Blackland Prairie borders the eastern side the Cross Timbers and is characterized by deep, clayey soils mixed with sandy loams. In undisturbed areas, little bluestem (*Schizachyrium scoparium*) is the dominant climax grass and other common grasses include big bluestem (*Andropogon gerardii*), indiangrass (*Sorghastrum nutans*), side-oats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsute*), switchgrass (*Panicum anceps*), and dropseed (*Sporobolus asper*) (Dyksterhuis, 1951). Native woody vegetation consists of post oak (*Quercus stellata*), cedar elm (*Ulmus crassifolia*), and bois d'Arc (*Maclura pomifera*) (Diggs et al., 1999).

Sampling performed in undisturbed areas of Denton County for the 1980 Soil Survey indicate the potential composition of plant species for major soil types found around Lewisville and Grapevine Lakes. Each table below shows the individual soil units in bold with the soil composition in italics as well as the percent

composition of dominant plant species for the following major soil types in Denton County (Appendix D): Birome-Gasil-Callisburg, Navo-Wilson, Branyon-Burleson-Heiden, Altoga-Vertel-Ferris, and Frio-Ovan.

As most of the lands around the lakes have been modified, a survey was conducted in 2004 to ascertain the current composition of vegetation around Lewisville and Grapevine Lakes (Tables 3-8 to 3-12). As noted in during field surveys associated with this programmatic environmental assessment, the beneficial climax grasses are mostly absent around Grapevine and Lewisville Lakes. The dominant trees found in the overstory include cedar elm (*Ulmus crassifolia*), post oak (*Quercus stellata*), hackberry (*Celtis laevigata*), Texas ash (*Fraxinus texensis*), honey mesquite (*Prosopis glandulosa*), and black willow (*Salix nigra*). Dominant vegetation of the understory consists of saplings of cedar elm, eastern red cedar (*Juniperus virginiana*), post oak, winged elm (*Ulmus alata*), hackberry, and Texas ash as well as green briar (*Smilax bona-nox*), Carolina snailweed (*Cocculus carolinus*), and poison ivy (*Toxicodendron radicans*). Japanese brome (*Bromus japonicus*), Scribner's panicum (*Dichantherium oligosanthes*) and bermudagrass (*Cynodon dactylon*) are the dominant grasses.

Table 3-8. Typical Overstory Species in Lewisville and Grapevine Lake Region.

Common Name	Scientific Name	Common Name	Scientific Name
Box elder	<i>Acer negundo</i>	Bur oak	<i>Quercus macrocarpa</i>
Pecan	<i>Carya illinoensis</i>	Blackjack oak	<i>Quercus marilandica</i>
Black hickory	<i>Carya texana</i>	Shumard oak	<i>Quercus shumardii</i>
Southern hackberry	<i>Celtis laevigata</i>	Post oak	<i>Quercus stellata</i>
Buttonbush	<i>Cephalanthus occidentalis</i>	Black Oak	<i>Quercus velutina</i>
Flowering dogwood	<i>Cornus drummondii</i>	Black willow	<i>Salix nigra</i>
Hawthorn	<i>Crataegus engelmannii</i>	Western soapberry	<i>Sapindus saponaria</i>
Common persimmon	<i>Diospyros virginiana</i>	Gum bumelia	<i>Sideroxylon lanuginosum</i>
Texas ash	<i>Fraxinus texensis</i>	Coralberry	<i>Symphoricarpos orbiculatus</i>
Honey locust	<i>Gleditsia triacanthos</i>	Winged elm	<i>Ulmus alata</i>
Eastern redcedar	<i>Juniperus virginiana</i>	American elm	<i>Ulmus americana</i>
Chinese privet	<i>Ligustrum sinense</i>	Cedar elm	<i>Ulmus crassifolia</i>
Osage orange	<i>Maclura pomifera</i>	Red elm	<i>Ulmus rubra</i>
Red Mulberry	<i>Morus rubra</i>	Viburnum	<i>Viburnum</i>
Eastern cottonwood	<i>Populus deltoides</i>	Hercules' club	<i>Zanthoxylum clava-herculis</i>
Honey mesquite	<i>Prosopis glandulosa</i>		

2. Wildlife

Mammals common to the Lewisville and Grapevine Lake areas include the Opossum (*Didelphis virginiana*), Evening Bat (*Nycticeius humeralis*), Nine-banded Armadillo (*Dasypus novemcinctus*), American Beaver (*Castor americana*), White-footed Mouse (*Peromyscus leucopus*), Hispid Cotton Rat (*Sigmodon hispidus*), Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), Eastern Fox Squirrel (*Sciurus niger*), Eastern Cottontail (*Sylvilagus floridanus*), Plains Harvest Mouse (*Reithrodontomys montanus*), White Tail Deer (*Odocoileus virginianus*) bobcat (*Felis rufus*), and Striped Skunk (*Mephitis mephitis*). Other species may have ranges that could bring them in or around the lakes areas. All potential species in Denton and Tarrant counties (Davis and Schmidly, 1994) are listed in Appendix E.

Birds common to the Lewisville and Grapevine Lake areas include the Double-crested Cormorant (*Phalacrocorax auritus*), Canada Goose (*Branta americana*), American Wigeon (*Anas americana*), Gadwall (*Anas strepera*), Green-winged Teal (*Anas crecca*), Mallard (*Anas platyrhynchos*), Blue-winged Teal (*Anas discors*), Northern Shoveler (*Anas clypeata*), Ring-necked Duck (*Aythya collaris*), Lesser Scaup (*Aythya affinis*), Bufflehead (*Bucephala albeola*), Little Blue Heron (*Egretta caerulea*), Great Blue Heron (*Ardea herodias*), Great Egret (*Ardea alba*), Cattle Egret (*Bubulcus ibis*), Turkey Vulture (*Cathartes aura*), Red-tailed

Hawk (*Buteo jamaicensis*) American Kestrel (*Falco sparverius*), American Coot (*Fulica americana*), Killdeer (*Charadrius vociferous*), Ring-billed Gull (*Larus delawarensis*), Forster's Tern (*Sterna forsteri*), Rock Dove

Table 3-9. Typical Understory¹ of Lewisville and Grapevine Lake Region

Common Name	Scientific Name	Common Name	Scientific Name
Peppervine	<i>Ampelopsis arborea</i>	Japanese Honeysuckle	<i>Lonicera japonica</i>
Trumpet vine	<i>Campsis radicans</i>	Virginia creeper	<i>Parthenocissus quinquefolia</i>
Ballonvine	<i>Cardispermum halicacabum</i>	Blackberry	<i>Rubus</i> sp.
Clematis	<i>Clematis</i> sp.	Greenbriar	<i>Smilax bona-nox</i>
Carolina snailseed	<i>Cocculus carolinus</i>	Poison ivy	<i>Toxicodendron radicans</i>
Dodder	<i>Cuscuta</i> sp.	Grapevine	<i>Vitis</i> sp.
Pitted Morning Glory	<i>Ipomoea lacunosa</i>	Mexican Plum	<i>Prunus mexicana</i>
Sumac	<i>Rhus coriaria</i>	Chickasaw Plum	<i>Rosaceae Prunus</i>
Coral Honeysuckle	<i>Lonicera sempervirens</i>	Eastern Redbud	<i>Cercis canadensis</i>

All saplings (< 5 cm diameter at breast height (dbh) and greater than 1 meter in height) from Table 3-9 also classified as Understory. (For example, buttonbush, Chinese privet, coralberry and Viburnum)

Table 3-10. Typical Grasses of Lewisville and Grapevine Lake Region

Common Name	Scientific Name	Common Name	Scientific Name
Couch grass	<i>Agropyron repens</i>	Redroot flatsedge	<i>Cyperus erythrorhizos</i>
Purple three-awn	<i>Aristida purpurea</i>	Scribner's panicum	<i>Dichanthelium oligosanthes</i>
Wild oats	<i>Avena fatua</i>	Canada wildrye	<i>Elymus canadensis</i>
King ranch bluestem	<i>Bothriochola ischaemum</i>	Red lovegrass	<i>Eragrostis secundiflora</i>
Little quakinggrass	<i>Briza minor</i>	Little barley	<i>Hordeum pusillum</i>
Rescuegrass	<i>Bromus catharticus</i>	Rush	<i>Juncus</i> sp.
Japanese chess	<i>Bromus japonicus</i>	Witchgrass	<i>Panicum capillare</i>
Buffalo grass	<i>Buchloe dactyloides</i>	Western wheatgrass	<i>Pascopyrum smithii</i>
Ravenfoot sedge	<i>Carex crus-corvi</i>	Dallisgrass	<i>Paspalum dilatatum</i>
Frank's sedge	<i>Carex frankii</i>	Indiangrass	<i>Sorghastrum nutans</i>
Woolyfruit sedge	<i>Carex lasiocarpus</i>	Johnsongrass	<i>Sorghum halepense</i>
Leavenworth's sedge	<i>Carex leavenworthii</i>	Tall dropseed	<i>Sporobolus asper</i>
Hop sedge	<i>Carex lupalina</i>	Smutgrass	<i>Sporobolus indicus</i>
Coastal sandbur	<i>Cenchrus spinifex</i>	Texas dropseed	<i>Sporobolus texanus</i>
Inland sea oats	<i>Chasmanthium latifolia</i>	White tridens	<i>Tridens albescens</i>
Bermudagrass	<i>Cynodon dactylon</i>	Sixweeks fescue	<i>Vulpia octoflora</i>

(*Columba livia*), Mourning Dove (*Zenaida macroura*), Chimney Swift (*Chaetura pelagica*), Red-bellied Woodpecker (*Melanerpes carolinus*), Scissor-tailed Flycatcher (*Tyrannus forficatus*), Blue Jay (*Cyanocitta cristata*), American Crow (*Corvus brachyrhynchos*), American Robin (*Turdus migratorius*), Northern Mockingbird (*Mimus polyglottos*), European Starling (*Sturnus vulgaris*), Purple Martin (*Progne subis*), Barn Swallow (*Hirundo rustica*), Carolina Chickadee (*Poecile carolinensis*), House Sparrow (*Passer domesticus*), American Goldfinch (*Carduelis tristis*), Yellow-rumped Warbler (*Dendroica coronata*), Song Sparrow (*Melospiza melodia*), Dark-eyed Junco (*Junco hyemalis*), Savannah Sparrow (*Passerculus sandwichensis*), Dickcissel (*Spiza americana*), Northern Cardinal (*Cardinalis cardinalis*), Red-winged Blackbird (*Agelaius*

phoeniceus) Great-tailed Grackle (*Quiscalus mexicanus*), Common Grackle (*Quiscalus quiscula*), Northern Bob-white (*Colinus virginianus*), Carolina Wren (*Thryothorus ludovicianus*) and Brown-headed Cowbird (*Molothrus ater*). Other species may have ranges that could bring them in or around the lakes areas, but do not common residents. All potential species of Denton and Tarrant counties (Pulich, 1988; Tveten, 1996) are listed in Appendix E.

Herpetofuna common to the Lewisville and Grapevine Lake areas include the Red-eared Turtle (*Trachemys scripta elegans*), Common Snapping Turtle (*Chelydra americana*), Mississippi Mud Turtle (*Kinosternon subrubrum hippocrepsis*), Ground Skink (*Scincella lateralis*), Texas Spiny Lizard (*Sceloporus olivaceus*), Five-lined Skink (*Eumeces fasciatus*), Texas Brown Snake (*Storeria dekayi texana*), Western Ribbon Snake (*Thamnophis proximus proximus*), Rough Earth Snake (*Virginia striatula*), Rough Green Snake (*Opheodrys aestivus*), Western Cottonmouth (*Agkistrodon piscivorus leucostoma*), Diamondback Water Snake (*Nerodia rhombifer rhombifer*), Small-mouthed Salamander (*Ambystoma texana*), Western Lesser Siren (*Siren intermedia nettingi*), Southern Leopard Frog (*Rana utricularia*), Bullfrog (*Rana catesbeiana*), and Green Treefrog (*Hyla cinerea*). Other species may have ranges that could bring them in or around the lakes areas. All potential species of Denton and Tarrant counties (Garrett and Barker, 1987; Tennant, 1985) are listed in Appendix E.

3. Wildlife Habitat

In general, the fauna of Lewisville and Grapevine Lakes can be assigned to three different habitat types: wooded (forested and shrub dominated habitats), herbaceous (non-wooded, non-mowed areas such as native and invasive grasslands), maintained grasses (mowed landscaping varieties) (Appendix E). Some species may utilize different habitats for different purposes. For example, the mink (*Mustela vison*) dens underneath trees in bottomland forests, but hunts largely in aquatic habitats (Davis and Schmidly, 1994). The fauna may be further separated into guilds based on the vegetation cover utilized by the animal within the main habitat types. For wooded areas, the vegetation classes consist of the arboreal habitat of the overstory and the brushy habitat of the understory. For grasslands, the classes are short-grass and tall-grass.

The Wildlife Habitat Appraisal Procedure (WHAP), developed by the Texas Parks and Wildlife Department (Frey, 1995), was applied at both Grapevine and Lewisville Lakes to determine existing habitat quality. This procedure is based upon measurements of existing key vegetation components that contribute to the ecological condition of the area, and results in an index of overall suitability for wildlife. Key habitat variables measured or estimated in the field include: site potential for woody and herbaceous plant production; age of existing vegetation; relative abundance of the habitat type and its value to wildlife; diversity of occurring woody vegetation; vertical stratification of vegetation canopy cover; relative abundance or scarcity of dens and refuge sites; and availability of browse and herbaceous materials. These measurements are made at multiple sample plots, and converted to a Habitat Quality Scores, which are typically averaged for each habitat type. The scores theoretically range from 0 (no habitat quality) to 1.0 (optimum habitat quality). Finally, the Habitat Quality score is multiplied by the number of acres of each habitat type, yielding a number of Habitat Units for the study area. For example, if there are 300 acres of forested lands, and the average Habitat Quality score is 0.65, then there are 195 Habitat Units of forested land in the study area. Habitat Units can be thought of as representing the amount of equivalent optimum habitat that occurs in the study area. In the above example, the 300 acres of forested lands in the study area provide the equivalent amount of wildlife habitat as 195 acres of optimum forest habitat.

Between 10 May 2004 and 21 May 2004, a total of 32 sample plots in wooded areas, and 33 sample plots in herbaceous/grasslands areas were measured at Grapevine and Lewisville Lakes (See Appendix G for data). Sites were selected with a stratified pseudo-random strategy: sites considered to have lower levels of human disturbance (i.e., higher quality sites), moderate levels of human disturbance, and higher levels of human disturbance (i.e., lower quality sites). Table 3-11 indicates that wooded sites sampled in low disturbance had average Habitat Quality scores of 0.75 at Grapevine Lake and 0.65 at Lewisville Lake. Herbaceous/grasslands sites sampled in low disturbance areas had average scores of 0.44 and 0.42 at Grapevine and Lewisville Lakes, respectively. Scores dropped substantially in high disturbance areas. Wooded sites sampled in high disturbance areas had average scores of 0.50 at Grapevine Lake and 0.43 at Lewisville Lake, an approximate average drop of 34% in habitat quality from low disturbance areas. Herbaceous/ grasslands sites sampled in high disturbance areas had average scores of 0.29 and 0.30 at Grapevine and Lewisville Lakes, respectively, an approximate average drop in 31% from low disturbance areas.

In total, the approximate 26,195 acres in the Grapevine and Lewisville Lake study area currently provide approximately 14,622 Habitat Units (averaging approximately 0.56 Habitat Units per acre). These results indicate that the wildlife quality of the Federal lands surrounding Grapevine and Lewisville Lakes are only, on average, moderate. While there are several stands of high quality habitat, human impact appears to be the primary limiting or controlling factor on habitat quality across most of the study area. Most of these sites were in an early transitional stage; there were few or no climax communities present. The forested sites were dominated for the most part by just a few species, mostly cedar elm, hackberry, and mesquite. The age structure of most of the forested sites indicated that they are nearing the end of the life cycle for the dominant trees, and indeed, many dead or dying trees were observed. The sapling layer at numerous sites contained oaks and elms, which indicates the possibility for a more higher quality forest habitat within the next couple of decades, if the level of impact is reduced or reversed. Most of the grasslands were dominated by pioneer weedy species, predominantly invasive grasses and annual forbs, such as Japanese brome and ragweed.

Table 3-11. WHAP results for existing conditions at Grapevine and Lewisville Lakes.

Lake	Level of Human Disturbance	Wooded Habitat ¹			Herbaceous & Grasslands Habitats ²		
		acres	HQ	HUs	acres	HQ	HUs
Grapevine	Lower (habitat zone)	5,362	0.75	4,022	2,370	0.44	1,043
	Higher (mow zone)	210	0.50	105	81	0.29	23
Lewisville	Lower (habitat zone)	9,158	0.65	5,953	5,004	0.42	2,102
	Higher (mow zone)	783	0.43	337	430	0.30	129

¹ Wooded Habitat includes areas dominated by trees and areas dominated by shrubby vegetation (a single class in the classified satellite imagery) [unobserved mowed areas may exist underneath the canopy of the trees].

² Herbaceous/Grassland Habitat includes areas dominated by native and invasive grasses that are not mowed, as well as areas dominated by grasses that are frequently mowed (two classes in the classified satellite imagery).

4. Threatened and Endangered Species

The Endangered Species Act of 1973 (PL 93-205) and the amendments of 1988 (PL 100-578) requires all Federal agencies to implement protection programs for the preservation of threatened and endangered species. Although the potential ranges of some threatened or endangered species coincide with the Lewisville and Grapevine Lake areas, no known Federally or State listed species occupy permanent habitats in either area. Currently, four federally listed species may be transient inhabitants of the lake areas while migrating through Denton and/or Tarrant Counties. These species are the Whooping Crane (*Crus americana*), the Piping Plover (*Charadrius melodus*), bald eagle (*Haliaeetus leucocephalus*), and the Interior Least Tern (*Sterna antillarum athalassos*). The only species indigenous to either county is the bald eagle. Currently, bald eagles have been spotted at Lewisville Lake but not at Grapevine.

F. Air Quality

The U.S. Environmental Protection Agency (EPA) is responsible for national air quality regulation and authorizes the Texas Commission on Environmental Quality (TCEQ) to monitor and enforce these standards. To comply with the Federal Clean Air Act of 1970 and the Clean Air Act Amendments of 1977 and 1990, the EPA implemented the National Ambient Air Quality Standards (NAAQS) to ensure protection of public health and the environment from known or anticipated effects of ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, particulates, and lead (Table 3-12). The EPA classifies air quality regions as “nonattainment” areas when the NAAQS are exceeded for a particular pollutant.

As of May 5, 2004, both Denton and Tarrant Counties were designated attainment areas for carbon monoxide, sulfur dioxide, nitrogen dioxide, particulates, and lead. However, they have been designated serious nonattainment areas for ozone's 1-hour and 8-hour averaging times.

Table 3-12. National Ambient Air Quality Standards (NAAQS)

Pollutant	National Standards ^a		Averaging Times
	Primary	Secondary	
Carbon Monoxide	9 ppm (10 mg/m ³)	None	8-hour ¹
	35 ppm (40 mg/m ³)	None	1-hour ¹
Lead	1.5 µg/m ³	Same as Primary	Quarterly Average
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Same as Primary	Annual (Arith. Mean)
Particulate Matter (PM ₁₀)	50 µg/m ³	Same as Primary	Annual ² (Arith. Mean)
	150 µg/m ³		24-hour ¹
Particulate Matter (PM _{2.5})	15 µg/m ³	Same as Primary	Annual ³ (Arith. Mean)
	65 µg/m ³		24-hour ⁴
Ozone	0.08 ppm	Same as Primary	8-hour ⁵
	0.12 ppm	Same as Primary	1-hour ⁶
Sulfur Oxides	0.03 ppm	-----	Annual (Arith. Mean)
	0.14 ppm	-----	24-hour ¹
	-----	0.5 ppm (1300 µg/m ³)	3-hour ¹

^a Primary Standards are the levels of air quality necessary to protect public health.

Secondary Standards are the levels of air quality necessary to protect public welfare.

¹ Not to be exceeded more than once per year.

² Expected annual arithmetic mean must not exceed 50 µg/m³.

³ 3-year average of the annual arithmetic mean must not exceed 15 µg/m³.

⁴ 3-year average of the 98th percentile of 24-hour concentrations must not exceed 65 µg/m³.

⁵ 3-year average of the fourth-highest daily maximum 8-hour average must not exceed 0.08 ppm.

⁶ (a) expected number of days/year with max hourly average concentrations above 0.12 ppm is c 1,

(b) The 1-hour standard is applicable to all areas notwithstanding the promulgation of 8-hour ozone standards

G. Noise

Noise sources around the lake include activities generally associated with parks and recreational areas, residential areas and schools, activities around commercial areas, and noise from vehicles, watercraft, wind, and wildlife. In the Lewisville Bridge Crossing Environmental Overview Study of January 23, 1995, exterior ambient noise measurements were recorded and evaluated. The measurements ranged from 50 dBA L_{eq} to 66 dBA L_{eq} (L_{eq} represents the average sound level over a period of time). This range is typical for the noise levels found in quiet suburban to noisy urban areas (Table 3-13).

Table 3-13. Typical Day-Night Noise Levels in Residential Areas

Residential Type	Typical Range of L_{dn} ¹ , dB	Average L_{dn} , dB	Average census tract population density, no. of people/mi ²
Quiet suburban	48-52	50	630
Normal suburban	53-57	55	2,000
Urban	58-62	60	6,300
Noisy urban	63-67	65	20,000
Very noisy urban	68-72	70	63,000

¹ Day-night average noise sound level

H. Recreation and Open Spaces

Approximately 1.4% of Texas lands are owned by the Federal government, as compared to the national average of just over 24%. The amount of Federal lands ranges from 0.2% (Iowa) to just over 77% (Nevada). There are only 12 states with less of a percentage of Federal lands than Texas, making public lands in Texas a highly valued resource (BLM 1997). Federal lands at Lewisville and Grapevine Lakes offer a variety of opportunities for recreational activities, such as parks, hike and bike trails, lake access areas, marinas, and hunting areas. Recreational lands classified as high intensity recreation include park lands and marinas, while those classified as low intensity recreation include the habitat zone, where hiking and nature viewing are encouraged. For a more detailed description, please refer to the Lewisville Lake Programmatic Environmental Assessment (Carter and Burgess, 1999) and the Grapevine Lake Master Plan Supplement (USACE, 2002). Currently at Grapevine and Lewisville Lakes, USACE maintains lands for recreational purposes (approximately 9,061 acres), and for wildlife management (approximately 15,344 acres for environmental stewardship) purposes.

I. Socioeconomic Conditions

North Central Texas Council of Governments (NCTGOC) composed of 16 counties, was established to assist in planning for local governments. The NCTGOC the region experienced a 29.12% growth rate for the area from 1990 to 2000 and these rapid rates of expansion require coordination between the different counties so that public services keep up with demand. Both Lewisville and Grapevine Lakes serve as water supplies for several counties in the area, and Denton County alone experienced a population increase of 58.29% from 1990 and 2000 (Table 3-12). Population projections estimate a further increase of 154% for Denton County and 60% for Tarrant County (Table 3-14).

Table 3-14. Population Growth in Denton and Tarrant County

County	Population in 1990	Population in 2000	Percent Growth '90 to '00	Estimated Population in 2030	Percent Growth '00 to '30
Denton	273,525	432,976	58.29%	1,085,300	154.00%
Tarrant	1,170,103	1,446,219	23.60%	2,291,700	60.00%

Pressure for development around Grapevine and Lewisville Lakes has continued from the time of their construction. For example, Denton County, is the eighth most populous county in the state. Cities around Lewisville Lake include Denton, the county seat, Lewisville and Carrollton, Frisco and numerous other smaller towns. Cities around Grapevine Lake include Flower Mound, Trophy Club, Southlake and Grapevine and other smaller towns. While population growth has slowed somewhat from the extreme levels of the late 1980's, the area continues to experience strong growth in population and in its economic base. For example, Denton County's tax base increased from \$10.3 billion in 1990 to over \$22 billion in 2001. Job additions in Denton County have continued in both manufacturing and service industries. Denton County's September 2001, unemployment rate was 3.20% (compared to the 5.0% statewide rate and the 5.0% national rate). During the 2001 year, Denton County had over \$1.7 billion in new property added to the tax rolls. This was the highest amount of new construction in Denton County ever recorded in one year. In 2001, for the fifth straight year, over 4,000 new housing starts were recorded in the County. Tarrant County has experienced similar rates of increase, and the NCTCOG projects that total households will increase in Denton and Tarrant Counties from 701,800 in 2000 to 1,268,700 in 2030, an 81% increase. In other words, development pressure around Grapevine and Lewisville Lakes is high.

Adjacent landowners have specific concerns related to socioeconomics. These involve: (1) risks, costs and efforts that some adjacent landowners might incur to reduce or remove species they find undesirable (e.g. rodents and snakes) from their private property; (2) the costs associated with property loss if wildland fires damage or destroy private property; (3) access for adjacent landowners to the shorelines of the lakes; (4) the effect activities conducted on Federal lands might have on their own property values; and, (5) a desire by some adjacent landowners who have been mowing/underbrushing beyond the current allowable limits to be granted "grandfathered rights", and continue the mowing and underbrushing activities to which they have grown accustomed.

- (1) While there are no data available for estimating the costs and efforts currently expended by adjacent landowners for controlling undesirable species on their private property, it is known that the property line around the two lakes is approximately 351 miles long, which offers at least a relative view of these risks, costs and efforts. Preventing undesirable species from crossing a 351-mile boundary involves substantial efforts, perhaps more than can actually be accomplished. A letter received by USACE included photos of a killed snake near their home, approximately 250 feet away from the Federal property line. The snake apparently crossed 250 feet of mowed grass. USACE is charged with providing wildlife habitat and outdoor recreation and it would not meet the underlying purpose and need being addressed in this programmatic environmental assessment (to manage and conserve natural resources while providing quality public outdoor recreation experiences for present and future generations) if more than 250 feet of a mowing/ underbrushing zone is required to adequately buffer adjacent landowners from undesirable species.
- (2) There is a risk from wildland fires at Grapevine and Lewisville Lakes, especially when drought conditions prevail. USACE reported that in April of 1980 an approximate 1090-acre fire occurred along the Elm Fork channel from Highway 380 south to include most of the "delta" formed at the upper end of Lewisville Lake. The fire began on the west side of the river channel and burned from

Highway 380 for a distance of about 8,000 feet. Then the fire expanded to both sides of the river and burned the fairly wide delta that was woodland, dominated by cottonwood and willow (now it is a buttonbush delta). The shoreline fronting what was then known as the "Alvin Reed Camp" subdivision was burned with very intense fire. The lake level at the time was 507 feet msl (conservation pool elevation at the time was 515 feet msl) and the river bottom was dominated by dead, dry, 8-10 foot high giant ragweed. There was likely heavy tree mortality along the riverbanks with a recommendation to harvest the badly burned cottonwood and willow, but there was no report of damage to private property. Another 10- to 20-acre fire occurred on the Lewisville Lake Environmental Learning Area grounds (an area below the Lewisville Lake dam) in the late summer or fall of 1998. Apparently a spark from a railroad track may have started it and then a wooden electric utility pole burned and fell over causing electrical arcing and further spreading of the fire. Several wild fires have occurred over time at Grapevine Lake, but none have occurred over the last several years.

- (3) Current guidelines allow adjacent landowners to apply for a permit from USACE to develop and maintain a pedestrian access path to the shoreline. Currently, approximately 182 access path permits are active, but many more unpermitted paths exist. For this programmatic environmental assessment, 3 pedestrian access path scenarios were considered: no access paths, individual access paths, and community access paths. These scenarios were studied in light of one of the underlying needs stated in Chapter 1 of this programmatic environmental assessment: to provide for long-term public access to, and use of, natural resources.
- (4) Several comments have been received from adjacent landowners alleging that implementing the preferred alternative could create an economic effect of reduced property value of lands adjacent to project lands. As stated in Department of Army Environmental Regulation ER 1130-2-406 (Shoreline Management at Civil Works Projects) Section 4.e, "The issuance of a private shoreline use permit does not convey any real estate or personal property rights or exclusive use rights to the permit holder." Thus, property owners adjacent to project lands do not have the right to use or alter the real property of the United States for private purposes. The claim of reduced property values because of reduced or increased mowing/underbrushing that is allowed on government property is highly speculative and subjective. Analysis is unavailable to substantiate the claim or to establish a reasonable expectation that property values would diminish. Existing variability in land value due to locations and improvements make it impossible to quantify any potential difference that might be associated with mowing/ underbrushing government property. Given the nature of the area and the relatively sporadic and varied nature of adjacent landowners mowing, changes in the mowing guidelines would not be expected to produce a reasonably foreseeable adverse or measurable impact on the economic value of properties adjacent to project lands.
- (5) Comments received at the scoping workshops indicated that some adjacent landowners had been mowing and underbrushing beyond the specified guidelines for many years with no apparent effort by USACE to curtail the mowing. Some of these landowners expressed a desire to allow this mowing to continue by virtue of grandfather rights or privileges. USACE recognizes that such mowing has been ongoing in several areas, primarily at Lewisville Lake. Nonetheless, USACE considers this mowing to be unauthorized and, in several areas, exceeding the intent of the Shoreline Management Plans (SMP's) for Grapevine and Lewisville Lakes. The Grandfather Rights provision in the SMP's pertains only to docks and other private floating facilities but does not pertain to vegetation alteration permits. Neither the SMP's, nor any subsequent guidelines brochures provided to adjacent landowners, authorized unlimited mowing or underbrushing of Federal land. The intent of the SMP's, since publication in 1976, and as stated in Section VII of each SMP is to allow "limited" landscaping and vegetation modification, including mowing and underbrushing. The SMP's further state that "permits issued for landscaping does not contain any special right or privilege". Consequently, USACE maintains that grandfatherable rights to mow beyond 25 feet at Grapevine and 50 feet at Lewisville have never been granted. Mowing and/or underbrushing beyond the 25- and 50-foot zones within narrow shoreline variance areas, as contemplated in Alternative 7, is considered by USACE to be responsive to public interest with only negligible environmental impact, but does not consider mowing and/or underbrushing in narrow shoreline variance areas to be a grandfatherable privilege.