

Chapter 2: Proposed Action and Alternatives

Initial acquisition of Federal lands at Grapevine and Lewisville Lakes took place in the late 1940's and early 1950's. Land acquisition policy at that time resulted in fee simple acquisition of most lands up to elevation 572 feet at Grapevine Lake and 537 feet at Lewisville Lake. These elevations represent the probable maximum flood elevation of each lake. In a relatively few locations, mostly in the upper reaches of each lake, a flowage easement estate was acquired in lieu of fee simple acquisition. Additionally, in areas planned for intensive park development, some lands were acquired above the probable maximum flood elevation.

In the late 1950's and early 1960's land acquisition policy became much more conservative, and on lakes in existence at the time, such as Grapevine and Lewisville Lakes, Public Law 85-500 directed that considerable acreage be reconveyed, or sold back, to the original owners. These reconveyed lands were generally located between elevations 560 and 572 at Grapevine Lake, and 529 and 537 at Lewisville Lake. In total, 1849 acres at Grapevine Lake, and 3,679 acres at Lewisville Lake were reconveyed to former owners. However, in most areas designated for intensive park development, very little land was reconveyed. Furthermore, at Lewisville Lake, no lands were reconveyed in the entire portion of the lake extending upstream from the old Lake Dallas dam. The Federal land in this area was acquired almost entirely from the City of Dallas, who owned the land as part of Lake Dallas. Federal ownership in this area generally extends up to elevation 537 feet. Where lands were reconveyed, particularly in areas with steep or moderately steep shorelines, the width of Federal land from the boundary line to the conservation pool elevation was reduced considerably.

In the late 1980's, the conservation pool elevation of Lewisville Lake was permanently raised from 515 feet to 522 feet. This permanent increase in the conservation pool elevation was made possible by the reallocation of a portion of Lewisville Lake's flood storage capacity to the newly constructed Ray Roberts Lake. The seven-foot increase in the conservation pool (sometimes referred to as the normal pool) resulted in further reduction of the width of Federal land surrounding Lewisville Lake, most noticeably in those relatively steep shoreline areas where lands had been reconveyed. Shoreline areas that were reduced in width by the reconveyance of lands and the increase in the conservation pool to the extent that the width of the majority of Federal ownership is less than 100 horizontal feet shall be referred to as "narrow shorelines". These areas are identified in Appendix B.

Figure 2-1 helps define the terms used to establish a range of reasonable alternatives that were analyzed in this programmatic environmental assessment. The figure is bounded at the top by the *Federal property line*, which is well defined and fixed, is typically obvious when encountered at both Grapevine and Lewisville Lakes, and legally separates adjacent landowners from Federal lands. At the bottom of the figure is a representation of the *shoreline*, which follows a specific elevation as measured above mean sea level (msl). The shoreline is variable, based on drought or flood or lake pool maintenance operations. Under extreme drought conditions, Grapevine Lake's shoreline has dropped to 521 feet msl (2/26/79), while Lewisville Lake's shoreline dropped to 507 feet msl (10/15/00). Under extreme conditions, the shoreline can cross the Federal property line, going up to or slightly higher than the elevation of the dam's emergency spillway elevation (Grapevine Lake's emergency spillway is 560 feet msl; Lewisville Lake's emergency spillway is 532 feet msl).

Figure 2-1 also indicates the *conservation pool elevation*, the elevation at which USACE attempts to maintain the lakes under normal conditions. Grapevine Lake's conservation pool elevation is 535 feet msl; Lewisville Lake's conservation pool elevation is 522 feet msl. While this line is not intentionally demarked on the ground, it is fairly obvious at the lake since there is often a distinct erosion face at this elevation around the lake.

Figure 2-1 shows a line representing where *mowing and underbrushing limits* occur, and is established as a distance from the Federal property line. This line is not demarked on the ground, and there is not an easy way to visualize where the line is on the ground when visiting the lake without a tape measure. Under existing conditions (25 foot mowing/underbrushing zone at Grapevine Lake and 50 mowing/underbrushing zone at Lewisville Lake), approximately 1,782 acres fall within this zone.

The area between the current mowing/underbrushing zone and conservation pool, designated in this programmatic environmental assessment and Figure 2-1 as the *habitat zone*, contains approximately 24,413

acres. USACE has developed a set of ecosystem based vegetation management prescriptions that would be allowed in the habitat zone (see Appendix H). Community groups, lead by a certified master naturalist, would be able to apply for a permit to implement some or all of these prescriptions in an attempt to improve the habitat quality on Federal lands surrounding Grapevine and Lewisville Lakes. These prescriptions include removal of invasive and undesirable vegetative species, planting of native species, and other activities to enhance wildlife habitat.

Finally, Figure 2-1 has a representation of a pedestrian *access path*, which some adjacent landowners have been issued a permit to maintain for accessibility to the lake. For this programmatic environmental assessment, 3 pedestrian access path scenarios were considered: no access paths, individual access paths, and community access paths. As implied, the no access paths alternative would not permit access paths between adjacent landowner property and the shoreline. The individual access paths alternative would allow each individual adjacent landowner to request a permit to develop and maintain a 3 foot wide access path from their own private property across Federal land and to the shore. The community access paths alternative would allow groups of individuals, perhaps a neighborhood association, to request permits to develop and maintain a single path that a "community" of adjacent landowners would use to access the shore. In all cases, however, permits for pedestrian access paths would be issued on a case-by-case basis and preference would be given to community paths over individual paths.

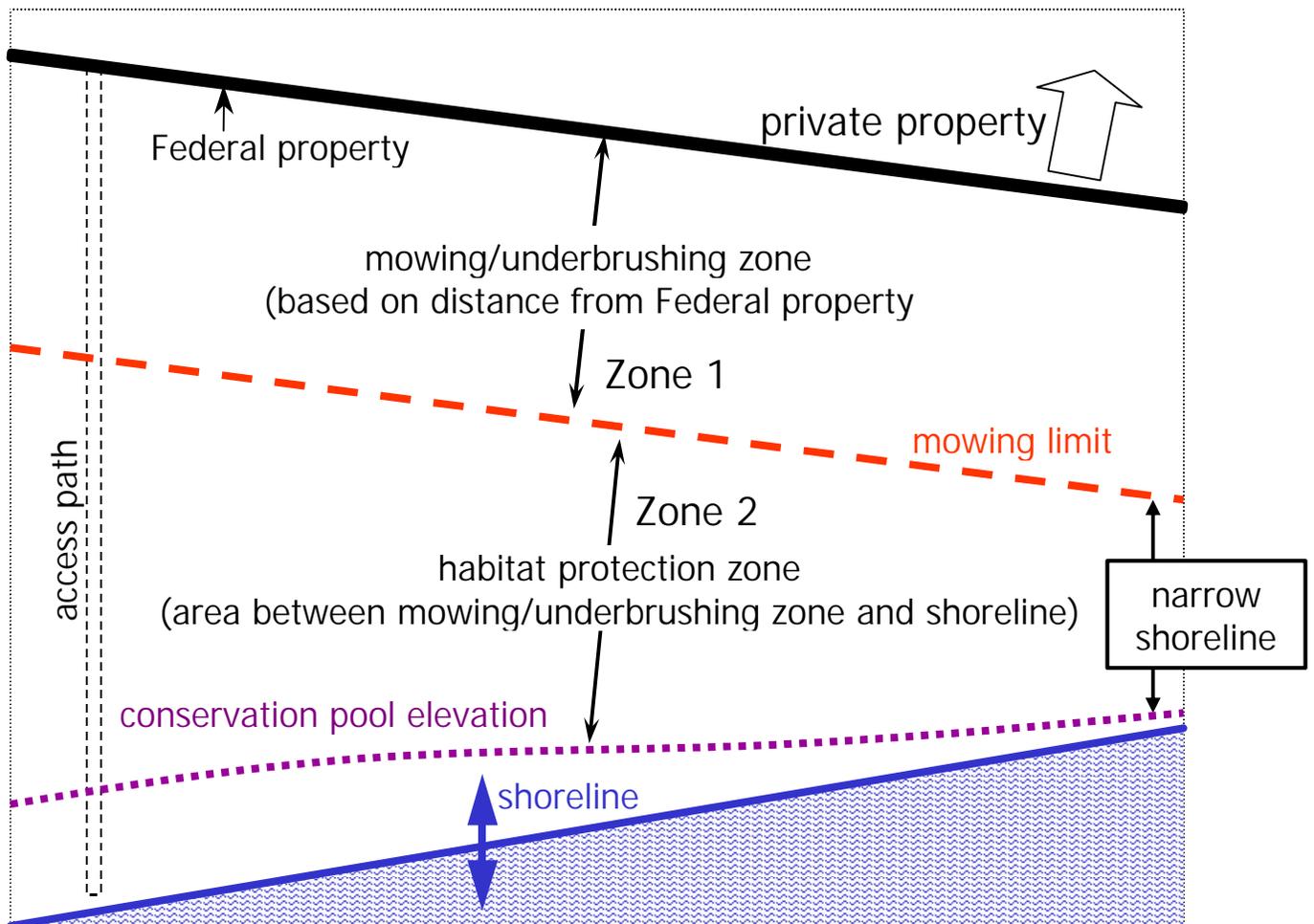


Figure 2-1. Stylized map allowing definitions of proposed lines and zones utilized in this programmatic environmental assessment.

An estimate of the number of potential paths can be approached in two ways: based upon the number of private parcels of land about the Federal property line around each lake; and based upon the total length of the Federal property line and a reasonable estimate of the average lot width. Grapevine Lake's Federal property line currently has approximately 317 individual parcels and Lewisville Lake's Federal property line currently has approximately 872 individual parcels, totaling 1,189 parcels in the study area. However, some of these parcels are quite large and are subject to future sub-dividing. If an ultimate 100-foot wide lot is assumed, a total of 351 miles of property line at the two lakes, could potentially generate approximately 18,500 adjacent lots and an equal number of pedestrian access paths could be foreseeable in the future if the individual access path scenario is selected. Mowing and underbrushing to create access paths may decrease root systems and result in soil erosion, as stated in the Mowing/Underbrushing part of this section. The relative degree of impact of each access path sub-alternative on erosion can be estimated by the number of access paths: between approximately 1,200 and 18,500 potential access paths inducing erosion if the individual access path sub-alternative is chosen, 5 to 15 times fewer access paths inducing erosion if the community access path option is chosen, and no access paths inducing erosion if the no access paths option is chosen.

The lines illustrated in Figure 2-1 allow a definition of two zones: Zone 1, an area where mowing and underbrushing activities are allowed as a measure to provide adjacent landowners access, firebreaks, and undesirable species control, and; Zone 2, an area where mowing and underbrushing activities are prohibited to provide wildlife habitat on Federal lands and water quality protection at the shoreline by reducing erosion and other nonpoint source pollutants (e.g. fertilizers or pesticides that might be applied by adjacent landowners.)

While many combinations of widths of Zones 1 and 2 and pedestrian access paths can be considered (more than 20 combinations were initially considered), six alternatives were chosen to be analyzed in detail:

Alternative 1 (No Action, or status quo): This action would continue with written permits for a 25-foot mowing/underbrushing zone at Grapevine Lake and a 50-foot mowing/underbrushing zone at Lewisville Lake, with the remainder of the area managed as a wildlife habitat zone using ecosystem management practices. Permits for community access paths would be allowed under this alternative. Currently, not all areas that fall within the current allowable mowing/underbrushing zones are mowed; however, many areas around each lake are mowed and/or underbrushed past the allowable limits. Which adjacent landowners mow and/or underbrush (either within or beyond the allowable limits) does not appear to be predictable, but it appears that once one landowner begins the activity, others are more likely to follow. Further, the wider the distance between the Federal property line and the lake, especially when the distance exceeds several hundred feet, the less likely it appears that adjacent landowners are willing to undertake mowing/underbrushing beyond the allowable limit. Likewise, as the distance becomes narrower, the more likely adjacent landowners are to mow and/or underbrush past the allowable limit.

Alternative 2 (No mowing/underbrushing alternative): This action would not allow any mowing by adjacent landowners on public lands at either lake, with all areas managed as wildlife habitat using ecosystem management practices. Permits for community access paths would be allowed under this alternative.

Alternative 3 (Fire safety alternative): This action would establish a 25-foot wide mowing/underbrushing zone at both lakes to provide a fire safety buffer, with all remaining areas managed as wildlife habitat using ecosystem management practices. Permits for community access paths would be allowed under this alternative.

Alternative 4 (Minimum habitat buffer alternative): This action would continue with written permits for a 25-foot mowing/underbrushing zone at Grapevine Lake and a 50-foot mowing/underbrushing zone at Lewisville Lake, but would also establish a 25-foot wide minimum habitat buffer zone along the conservation pool elevation, such that no mowing/underbrushing activities would be allowed within the habitat buffer zone, even if the habitat buffer zone occurred within the mowing/underbrushing zone. In other words, the habitat zone would dominate over the mowing/underbrushing zone where the distance between the Federal property line and the conservation pool elevation is narrow.

Alternative 5 (Expanded mowing/underbrushing alternative): This action would expand with the mowing/underbrushing zone to 50 feet at Grapevine Lake and to 100 feet at Lewisville Lake, with the

remainder of the area managed as a wildlife habitat zone using ecosystem management practices. Permits for community access paths would be allowed under this alternative.

Alternative 6 (Mowing/underbrushing all areas alternative): This action would allow adjacent landowners to apply for a permit to mow and underbrush all the way to the shoreline on the property adjacent to their property. Permits for access paths would not be needed because adjacent landowners would have access to the lake due to mowing/underbrushing permits.

Alternative 7 (Narrow shoreline variance): This action would continue with written permits for a 25-foot mowing/underbrushing zone at Grapevine Lake and a 50-foot mowing/underbrushing zone at Lewisville Lake, but would allow variances for additional mowing/underbrushing if the width between the Federal property line and the conservation pool is too narrow to support a viable habitat zone or a create a minimal water quality buffer zone along the shoreline. If there is less than 50 linear feet between the mowing/underbrushing zone and the conservation pool elevation, adjacent landowners could apply for a permit to mow and/or underbrush lands between the USACE property line and the conservation pool (up to 75 feet at Grapevine Lake and up to 100 feet at Lewisville Lake). For those adjacent landowners receiving a mowing/underbrushing permit to mow and/or underbrush past the normal allowable distance and into the narrow shoreline (i.e. a variance), there would be ecosystem management prescriptions requirements imposed. The requirements would include, but are not limited to such things as fewer mowings each season and leaving clumps of unmowed patches where native grass and shrub species have been planted. Permits for community access paths would be allowed under this alternative.

The width of the mowing/underbrushing zone selected for each alternative is based in large part on minimum recommended widths of buffer zones for water quality, habitat, and habitat corridor purposes. Buffer widths ranging from less than 20 feet for water quality protection, to habitat zones exceeding 1,600 feet for birds can be found in the literature (see Tables 2-1 and 2-2). For water quality in Table 2-2, studies conducted using wooded filter strips have resulted in a higher percentage of sequestered nutrients compared to grass strips. A more detailed summary of the results obtained from these studies is presented in Chapter 4, Impacts of Proposed Action and Alternatives, C: Water Quality. Buffer widths for ecological concerns are typically wider than those recommended for water quality concerns, as seen in Table 2-3, but relatively narrow natural vegetation buffer strips can provide a corridor for many species of wildlife to move about and survive in a fragmented ecosystem. Studies conducted to determine buffer width necessary to maintain species diversity and richness have proven to be specific to the not only the target species, but also to the type of habitat within the buffer area. In general, the widths are based upon the range of the species. For example, birds require larger buffers due to their relatively broader ability to travel compared to other animals, while plants need smaller areas to maintain diversity. These studies are also summarized in Chapter 4, E: Biological Resources.

At Grapevine and Lewisville Lakes, with fixed amounts of land between the Federal property line and the shoreline, increasing the width of the mowing/underbrushing zone has a direct and inversely proportional effect on the amount of land available for the habitat zone.

Table 2-1. Buffer Zones for Water Quality

% TSS Removed	% Phosphorus Removed	% Nitrogen Removed	Width (feet)	Authors
92			s 81	Young et al. (1980)
75			s 98	Lynch et al. (1985)
80			s 200	Horner and Mar (1982)
90			s 62	Peterjohn and Correll (1984)
94			s 197	Peterjohn and Correll (1984)
85			s 30	Ghaffarzadeh et al. (1996)
84	79	73	s 30	Dillaha et al. (1989)
	80	89	s 33	Shisler et al. (1987)
	95	100	s 63	Vought et al. (1995)
	90	90	s 16	Madison et al. (1992)

Table 2-2. Recommended Buffer Widths for Habitats

Function	Recommended Width (feet)	Authors
Reptile/Amphibian Habitat	s 100	Burbrink et al. (1998)
	> 98	Rudolph and Dickson (1990)
	s 541	Semlitsch (1998)
	s 240	Burke and Gibbons (1995)
	s 131	Vesely and McComb (2002)
Bird Habitat	s 328	Darveau et al. (1995)
	s 328	Hodges and Krementz (1996)
	s 328	Mitchell (1996)
	s 328	Trinquet et al. (1990)
	s 1640	Spackman and Hughes (1995)
	s 1640	Kilgo et al. (1998)
	s 328	Keller et al. (1993)
	s 492	Vander Haegen and deGraaf (1996)
s 131	Hagar (1999)	
Mammal Habitat	s 246	Johnson and Brown (1990)
	s 164	Dickson (1989)
Vegetation	s 49	Chapman and Ribic (2002)
	s 98	Spackman and Hughes (1995)