

Appendix B
An Assessment of Potential Impacts to
Archaeological and Cultural Sites
Relating to Reservoir Site
Acquisition Development

**AN ASSESSMENT OF POTENTIAL IMPACTS TO
ARCHEOLOGICAL AND CULTURAL SITES
RELATING TO RESERVOIR SITE
ACQUISITION AND DEVELOPMENT**

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INTRODUCTION

The Texas Water Development Board plans for systematic water resource development in the State of Texas and financially assists construction of resulting development. As part of current state-wide planning efforts, the development feasibility is being examined for sixteen localities across Texas. The State Water Plan designates these localities as unique sites with the highest priority for acquisition and development of future surface water reservoirs. The feasibility of developing these sites is being examined to enable acquisition that will prevent conflicts to their eventual development as water supply reservoirs.

One aspect of reservoir feasibility assessment is determining the potential for adverse impacts to cultural resources, including archeological sites and other historic properties. State and Federal historic preservation statutes require appropriate impacts assessment prior to facility development on public property or using public funds. Impacts assessment includes identification of historic properties and assessment of their historic or cultural significance. If impacts to significant historic properties are unavoidable, then data recovery must be undertaken to offset damage resulting from development.

CURRENT ASSESSMENT METHODOLOGY

Environmental review staff with the Board's Office of Project Construction and Financial Assistance (OPFCA) assisted the Office of Planning in the current assessment of reservoir sites.

Planning staff provided maps showing plotted locations for the sixteen designated unique reservoir sites. Three other sites were included that have not been designated as unique reservoir sites. The sites are shown in Figure 1. The OPFCA archeological staff developed quantitative measures of potential for impacts to historic properties that was specific to the regions of Texas where the reservoir sites are located.

To develop the quantitative measures of potential impacts to historic properties, OPFCA staff archeologists began with an examination of county-level summary data for the study area. This area included twenty seven counties that contain all or part of the proposed reservoir sites. Data in the Texas Historical Commission's (THC) on-line Archeological Sites Atlas were accessed to obtain summary statistics for historic property categories that might be potentially affected by reservoir development. These included both historic and prehistoric recorded archeological sites, historic cemeteries, and historic industrial or military sites. Communications with staff in the THC Archeology Division clarified details about the contents of existing data sets. The THC archeological staff also supplied their assumptions about the numeric relationship between total numbers of recorded archeological sites in counties and the percentage that is significant enough to be considered eligible for inclusion in the National Register of Historic Places.

Based on the THC assumptions and data about sensitive sites, the categories used to derive quantitative measures of potential for impacts to historic properties included sites potentially eligible for inclusion in the National Register of Historic Places, historic cemeteries, sawmills and military sites. The measures themselves were calculated averages of sensitive sites for regions and the study area. Variance of county-level data for the total number of sensitive sites was compared to both regional and study area averages.

A literature search focused on several syntheses published by the THC and the U. S. Army Corps of Engineers Southwest Region. Specific sources included Guy (1990); Kenmotsu and Perttula (1993); and Mercado-Allinger, *et al.* (1996). While a significant amount of archeological work has occurred in the decade since publication of the most-recent volume, the basic interpretations of these sources remain valid for the characteristics and context of historic properties in appropriate regions of Texas.

The literature search included geo-archeological publications that investigated the physiographic context of historic properties. The physical context includes the location of cultural resources in a landscape that has both physical and biological constituents. The biological constituents of the landscape provided a strong attraction for prehistoric or early historic residents who were intent on securing food and other resources. Physical constituents, such as water and clay sources, are also important attractions for those who must live close to the resources offered by a region.

For the current assessment, the physical constituents were viewed as most important. The association between soils and geomorphology is especially valuable as an indicator when determining the potential presence, characteristics, and long-term survival of historic properties. Physical conditions affect how archeological sites are formed and the probability of whether the contents of those sites will survive. Arguments supporting these points were developed by Collins and Bousman (1993) especially for an assessment of factors affecting archeological site formation and survival in Northeast Texas. Their conclusions remain valid and are incorporated into the methodology as devices that allow better interpretation of site distribution data aggregated at the county level.

RESULTS OF THE CURRENT ASSESSMENT

The nineteen reservoir sites identified by the Board's Planning staff were found to include parts of twenty seven counties. To efficiently make the best use of allotted time and resources, OPFCA archeologists used existing publications and available data sources to the maximum extent possible. A summary of previous archeological work and results reported by Guy (1990) is found in Table 1.

The literature search revealed the evolving scale and sophistication of previous archeological investigations in the central and eastern portions of Texas. These investigations were associated with planning for construction of fifty-four reservoirs in an area that partially overlaps with the current study area. The implications for the current study that the Guy (1990) summary bring to light concerning the evolving scale and sophistication of previous research will be discussed in

the Discussion section. Just over 5,000 archeological sites were recorded during reconnaissance or intensive surveys for these reservoirs between World War II and 1986. Of the sites recorded, only about 130 have been determined to be eligible for inclusion in the National Register of Historic Places. Table 2 aggregates Table 1's reservoir survey results by region.

The survey intensity and extent at each reservoir site cannot be determined from the secondary literature sources examined. The results of later surveys do indicate greater numbers of recorded sites. An example of change through time in archeological surveys necessary prior to reservoir construction and their results is the comparison between archeological work done during the quarter century between 1948 and 1984. No archeological sites were located at Lake Benbrook (Tarrant County) in 1948. The 1959 – 1961 archeological survey at Navarro Mills Reservoir in Hill and Navarro counties recorded 19 sites. One of these was subsequently excavated. The 1979 – 1984 investigations at Richland Creek Reservoir (Freestone and Navarro counties) recorded 1,001 sites, tested the significance of 270, and excavated the 53 found to be eligible for inclusion in the National Register of Historic Places.

Historic property categories identified during examination of county-level data in the THC's on-line Archeological Sites Atlas included archeological sites, State Archeological Landmarks, and sites listed on the National Register of Historic Places. Data from the twenty site counties included in the current examination are found in Table 3 for each of these categories. The existing data for these counties includes 7,250 recorded archeological sites, 298 State Archeological Landmarks, and 255 sites listed on the National Register of Historic Places.

For the purposes of the current study, significant other data are reported in the Archeological Sites Atlas for numerous historic sites that are typically not recorded as archeological sites. Most common are historic cemeteries. Sawmills also are numerous, especially in eastern parts of the state. Military sites are reported, but are less common. The Atlas data for the twenty seven counties included entries for 3,042 historic cemeteries, 907 sawmills, and 25 military sites.

Proposed reservoir sites and associated county-level data are aggregated into four regional groups on the basis of shared physiography and characteristics of historic properties. Frequency

data for the regional groups better illustrate the regional variation in individual data categories. The four groups are shown in Figure 2 and Table 4.

The northeast regional group contains 3,296 previously recorded archeological sites in its ten counties. These sites are 45 percent of the total reported in the Atlas for the twenty seven counties used in the current study. A similar percentage of historic properties found in northeastern Texas are listed on the National Register of Historic Places (118 properties). Over half of the historic cemeteries (1,634) reported in the current study are located in these ten counties. Reflecting the forested landscape found by early historic immigrants to the region, almost 81 percent of the historic sawmills are found in this regional group. They include 734 individual listings from the Texas Forestry Museum records that were compiled in the Atlas. Three of the 25 military sites (12 percent) reported in the study area are found in the counties making up this regional group.

The ten-county south central regional group contains 2,520 previously recorded archeological sites, or about 35 percent of the Atlas-reported total. A similar percentage of historic properties found in the region are listed on the National Register of Historic Places (94 properties). The 1,128 historic cemeteries in the ten-county south central regional group represent 37 percent of the total number listed in the Atlas for the current study. The 173 historic sawmills in this region are the remainder of those reported in the Atlas for counties in the current study area. Four of the 25 military sites (16 percent) reported in the study area are found in the counties making up this regional group.

Ten counties in the northwest regional group span the Rolling Plains and High Plains. They contain 1,231 previously recorded archeological sites, or about 17 percent of the Atlas-reported total. Most of these sites are clustered in Garza and Palo Pinto counties. Listed National Register-eligible sites in the region include 21 historic properties. Historic cemeteries are much fewer in number in this region, numbering 104. These represent 3.5 percent of the total number of historic cemeteries listed in the THC Atlas database for counties in the current study area. Nine of the 25 military sites (36 percent) reported in the study area are found in this regional group of counties.

Cameron County in far South Texas is the last county under consideration. The county's archeological sites include 203 previously recorded sites listed in the Archeological Sites Atlas. Twenty-two (22) historic properties from Cameron County are listed on the National Register of Historic Places. European settlement in the county since the mid-18th century is reflected in the 176 historic cemeteries within its borders, almost 6 percent of the total historic cemeteries in the 27 county study area. Nine of the 25 military sites (36 percent) reported in the study area are found in the county.

The THC's long experience in administering state and federal historic preservation programs gives its staff significant insight into the relationship among classes of historic properties. Its Archeology Division staff estimate a ratio of one site potentially significant enough to be eligible for listing in the National Register of Historic Places for every 5 recorded sites currently found in the Archeological Sites Atlas. While professional and avocational archeologists continue to record new archeological sites throughout Texas, the current value of 7,250 previously recorded sites in the 27 county study area would yield a value of 1,451 sites that would be potentially significant enough to be eligible for listing in the National Register. The northeast region contains 660 of the 1,451 archeological sites that are potentially eligible for listing. Just over 500 sites in the south central region would be potentially eligible for the National Register designation. About 250 sites in the northwest region would be eligible, as would 41 in the far south.

The 255 sites currently listed in the National Register of Historic Places in the study area represent less than 20 percent of the sites potentially eligible for listing in these counties. The difference between sites potentially eligible for listing and those actually listed is found Table 4. The value of the differential between actual listing and potential eligible for listing ranges between 8.5 and 53.6 percent for the four regions. This discrepancy between listed and potentially eligible sites has implications for reservoir development that will be discussed in the Discussion section.

DISCUSSION

The examination of frequency and distribution data for historic properties from the 27 county study area indicated that significant numbers of sensitive historic properties are present. Sensitive historic properties include archeological sites and historic structures that are eligible under national criteria of significance for listing in the National Register of Historic Places. While both archeological sites and historic structures may be listed on the National Register of Historic Places, most listed properties represent standing structures rather than archeological components. For both archeological site and National Register property categories in the THC's database, the reported frequencies represent a minimum number. A much higher frequency of sites significant enough to warrant listing is evident when the difference between currently listed National Register properties and all eligible sites is considered. Nearly 1,200 potential National Register sites remain unlisted in the study area. An important consideration for potential development projects is that state and federal historic preservation statutes grant National Register-eligible sites the same protections against unauthorized adverse impacts as listed sites. Historic preservation statutes apply to any public funding that enables development projects to be built and to any permitting necessary before construction. The protections insured by statute will require that the National Register-eligible sites be avoided by reservoir construction or that data recovery measures for them be included in development plans. Applicable statutes include the Texas Antiquities Code, (Title 9, Natural Resource Code, Chapter 191); the Archeological and Historic Preservation Act of 1974, Public Law 93-191; the Historic Sites Act; and the National Historic Preservation Act of 1966, Public Law 89-665, as amended.

Sensitive historic properties also include cemeteries. Over 3,000 cemeteries are reported in the Archeological Sites Atlas separately from archeological sites in the study area. These cemeteries are historic in age and contain the interred remains of Euro-Americans, Native Americans, or African-Americans. Within each regional area, some counties contain higher frequencies of recorded historic cemeteries. In the northeast region, Anderson, Fannin, and Smith each contain over 300 cemeteries. Red River, Lamar, and Cherokee counties each contain between 100 and 135 cemeteries. In south central Texas, Austin County is the oldest county in its region. This former seat of the Austin Colony contains 315 cemeteries, the highest number of any county in

the region. Freestone and Grimes counties also contain between about 150 and 225 cemeteries. Except for sparsely populated Live Oak County, other counties in this region contain between 50 and 100 recorded cemeteries. The northwest region has one county that contains almost 40 percent of its historic cemeteries, Palo Pinto. Clay and Haskell counties also contain between 15 and 25 recorded historic cemeteries. The centuries-old Hispanic settlement in Cameron County of far southern Texas contains well over 150 historic cemeteries.

Any reservoir construction affecting historic cemeteries will be required by statute to consider adverse impacts to them. At least two state statutes apply to construction that may impact historic cemeteries: Title 8 of the Health and Safety Code, Chapters 694 – 715 (relating to regulation of cemeteries); and Title 9 of the Natural Resource Code, Chapter 191 (the Antiquities Code of Texas). In addition, several federal statutes and executive orders apply. These include the Archeological and Historic Preservation Act of 1974, Public Law 93-191; the Historic Sites Act; the National Historic Preservation Act of 1966, Public Law 89-665, as amended; and Executive Order 11953, Protection and Enhancement of the Cultural Environment. The Native American Graves Protection and Repatriation Act of 1990, Public Law 101-601, will also apply if any historic Native American cemeteries or identified individual graves are to be affected. This act requires consultation with current Native American tribes before impacts to Native American cemeteries or graves may occur during planned construction. Similar requirements apply to previously unknown graves discovered during construction.

The total frequency and distribution of prehistoric Native American graves is unknown in the study area and is not represented in the Archeological Sites Atlas data for cemeteries. In many prehistoric Native American graves, most human skeletal material has deteriorated, especially in eastern Texas. Only associated grave offerings, such as pottery or stone tools, remain as sensitive, identifiable contents. Prehistoric Native American graves represent a culturally-sensitive issue that is subject to the protections of federal statute under the Native American Graves Protection and Repatriation Act of 1990, Public Law 101-601. The consultation requirements imposed by this statute were discussed under historic cemeteries and will apply to any reservoir construction contemplated for the sites under consideration.

The effect of advancements in archeological field methods during the past 60 years on survey results was briefly mentioned in the Results section. The total number of sites found during surveys has increased as methods came into use that allowed detection of sites that were previously overlooked. The advancements in methodology have been accompanied by significant increases in the standards necessary to insure statutory compliance.

Archeological surveys still do not completely examine large project areas, but rely on systematic or statistical sampling to insure that a large enough area is thoroughly examined to record most sites and to assess the impacts to significant historic properties that are protected by statutes. The sampling surveys replace reconnaissance survey typically used up until about the mid-1980s. Archeologists now use geomorphic characterization to develop probability models that guide sampling for survey efforts, to date landforms within survey efforts, and to assess the extent and scope of prior disturbance.

Geomorphic characterization allows survey to be concentrated within portions of a project's landscape. Appropriate use of this method allows specific survey techniques to be used where they are most productive. Resources can be allocated using geomorphic characterization into areas best suited for trenching to locate deeply buried sites or systematic pedestrian survey and shovel-testing to locate shallowly buried sites. Use of geomorphic characterization also allows areas that may be much less productive or extensively disturbed by natural causes to be deemphasized.

A recent example is the Phase Ia sample survey of about 10% at the proposed Lake Columbia site in 2006 (Owens, *et al.*, in preparation). Geomorphic characterization helped project archeologists to stratify the project area and focus initial survey efforts onto landforms containing historic properties that could be located quickly using the basic pedestrian walkover and shovel testing survey techniques typically used to find and record sites. Previous to the Phase Ia archeological survey, no archeological sites or historic structures had been recorded in the area and no professional archeological survey had ever been done within the lake basin. The results from archeological survey of almost 1,300 acres recorded 37 new archeological sites, 25 occurrences of isolated artifacts, and 7 historic properties recorded on the basis of standing

structures only. The historic properties with standing structures included a significant late-19th century African-American freedmen's community. The rate of about 3 sites recorded in each 100 acres surveyed within the reservoir area compares closely with data from archeological survey of Lake Gilmer in Upshur County in the early 1990s reported by Parsons, *et al.* (1992).

Large development projects implemented in the 1980s and 1990s included reservoirs and surface mines that provide fuel to power plants in eastern Texas. The results of archeological surveys conducted within portions of the current study area during this era show the effects of more stringent methodologies and regulatory compliance standards. Increasing numbers of archeological sites were recorded, tested, and excavated to mitigate impacts to significant sites.

Data are readily available for the ten counties in northeast Texas that fall within the Texas Historical Commission's northeast planning region. Perttula and Kenmotsu (1993:Table 2.1.1) report that these counties had a total of 1,527 archeological sites recorded in 1991. That total did not include all sites reported from the Cooper Lake survey. The sites in northeast Texas included 128 that were listed as significant and that would warrant state and federal statutory protections. Research for the current 2006 reservoir site feasibility study found an increase of 215 percent in the total number of recorded archeological sites in the northeast region. A five-fold increase in the number of significant sites is also evident in a comparison of data for sites that would potentially be eligible for listing in the National Register of Historic Places.

Partial data from 1991 are available for the south central region from Perttula and Kenmotsu (1993:Table 2.1.1). Their data are specifically for Madison and Walker counties at the region's eastern edge. Recorded archeological sites have increased since 1991 in Madison County by over 500 percent and by 200 percent in Walker County. No significant sites were reported in 1991 for these counties.

Quantitative measures of potential impacts were derived for the study area and the regional subsets of counties within it. The measures are averages calculated for the total number of sensitive sites in each county, allowing comparison between the study area and regions (see Table 5). Degree of variation from both the regional and study area averages is also presented in

Table 5. Counties and regions that have a higher potential for impacts to sensitive cultural resources are identifiable in Table 5 using the degree of variation and the difference between regional and study group averages.

On a regional basis, the northeastern region has the highest potential for reservoir site acquisition and eventual construction to cause impacts to sensitive sites. The northeast regional average is 50 percent higher than that for all twenty-seven counties in the study area. Within this region, the values for three counties greatly exceed both regional and study area averages. The values for Anderson, Cherokee, and Smith counties indicate a very strong potential for impacts to sensitive cultural resources that would be caused by development projects. While considerably lower, values for Red River and Titus counties also exceed the study area average. These values indicate a potential for impacts to sensitive cultural resources that correlates well with the results from previous archeological work. Caddoan sites and historic cemeteries are very frequent in the region, as are sawmills.

The far southern region has the next highest potential for potential impacts to sensitive cultural resources. Cameron County, the single county within the region, has a potential similar to Titus County in the northeastern region. Cameron County's values are based primarily on the historic cemeteries that can be used to indicate a potential frequency for other sensitive historic period sites occupied over the past 250 years.

The south central region has a lower potential for impacts to sensitive cultural resources. The value for its regional average is about 10 percent below the average for the study area average. Within the region, four counties have a much stronger potential. Austin and Freestone counties greatly exceed both the regional and study area average for sensitive sites, primarily due to a large number of historic cemeteries. Grimes County also has similar characteristics. Walker County's large number of recorded historic saw mills yields a strong tendency for impacts to sensitive cultural resources.

The northwest region has the lowest potential impacts to cultural resources that may be sensitive. Four of its counties have had few archeological sites or cemeteries recorded. Two counties have

a stronger potential, mainly due a larger number of sites that may be eligible for listing on the National Register of Historic Preservation. Garza and Palo Pinto counties have many more recorded archeological sites, most likely due to factors related to their physiographic settings.

The scope and cost of future water resource development projects historic preservation compliance is problematic. Large archeological projects are usually driven by the need for development projects to comply with historic preservation statutes. Their project budgets focus on work within the area of affect defined by the development project. While systematic academic archeological research projects have been undertaken throughout Texas for over a century, they are usually focused on much smaller areas. Some research projects are carried out over a span of decades. A good example of these focused, long-term research projects is the excavation of the George C. Davis site. This is an important complex of Caddoan ceremonial mounds within Caddo Mounds State Park in Cherokee County. Excavations at this location have been undertaken periodically by research archeologists from the University of Texas at Austin since the 1930s.

The frequency, characteristics, and significance of archeological sites are currently unknown in much of the state because these areas have never received any professional archeological attention. An example of this type of data gap is the Lake Columbia site where initial archeological surveys occurred recently and only sampled a small percentage of the reservoir basin. Many areas of the state also suffer from incomplete data where professional archeological work occurred decades ago under less stringent statutory or regulatory standards. Additional work will be necessary to comply with current statutory requirements where development projects have not yet been built.

Archeological work is labor-intensive and destroys its primary data during excavations, whether the work is undertaken as pure research or to comply with statutory requirements. Sophisticated techniques, such as geomorphic characterization and ground-penetrating radar, help guide archeological field survey, testing, and excavation efforts. Use of such sophisticated techniques can be expensive in their own right because of equipment or consultant costs. They can limit the unnecessary destruction of the historic properties that make up the archeological record. Judi-

cious use of these techniques focuses work on productive problems where such effort is not wasted. Cost estimates for archeological field projects are based on a specification of survey rates per day or excavation rates of 10-cm levels per day. Appropriate use of sophisticated techniques controls project costs when it allows archeological project managers to focus labor on productive problem areas. It also allows them to be more sophisticated in their interpretation of results from archeological fieldwork.

CONCLUSIONS

Feasibility assessment for systematic water resource development at nineteen sites across the state must include a complete assessment of the potential impacts to historic properties protected under state and federal law. Statutory requirements for permitting and public funding of reservoir construction mandate identification, assessment of significance against national criteria, and data recovery at historic properties meeting those significance criteria if impacts to the properties cannot be avoided. The twenty-seven county project area now contains a total of 7,250 recorded archeological sites. If THC estimates are correct, then their existing data significantly underreports historic properties potentially eligible for listing on the National Register of Historic Places. Less than 20 percent of 1,451 sites meeting eligibility criteria are now listed within the study area for the current assessment. Within this area, a potential of almost 1,200 sites that could meet these criteria may remain, based strictly on the total number of sites now reported. Most of the nineteen reservoir basins under consideration have never had an archeological survey or at best have been incompletely examined. Without adequate archeological fieldwork, an unknown number of very significant sites are left within the reservoir basins. The importance for the current assessment is that these are the sites that will be subject to the bulk of historic preservation statutory compliance requirements. Compliance will require avoidance of impacts or expensive and time-consuming data recovery.

The characteristics of historic period sites vary widely. Many are not recorded separately as archeological sites because they have standing structures. Texas Historical Commission data indicate that historic period cemeteries and sawmills are present in large numbers in several regions. The northeast, south central, and far southern regions contain counties with a long

period of substantial Euro-American occupation. Existing data indicate that these counties have a higher probability of containing significant historic properties not recorded as archeological sites that will receive protection under state and federal historic preservation statutes.

The final consideration in this assessment is that extensive consultation with Native American tribes will be necessary to comply with the requirements of federal statutes. Before they may authorize construction permits or financial assistance for reservoir construction, federal agencies are obligated to consult with tribes to insure that Native American graves are protected. State agencies building or financially assisting construction of major construction projects, such as highways, are already operating within these requirements.

The object of an agency's tribal consultation is to develop agreed-upon protocols for determining cultural affinity within a project area for human skeletal remains or grave goods from interments that are not obviously Euro-American. The consultation process also develops treatment protocols for Native American graves that might be encountered during archeological work or subsequent construction. Potential scopes and costs of Native American consultation for the nineteen reservoir sites under consideration will remain an unknown for the immediate future.

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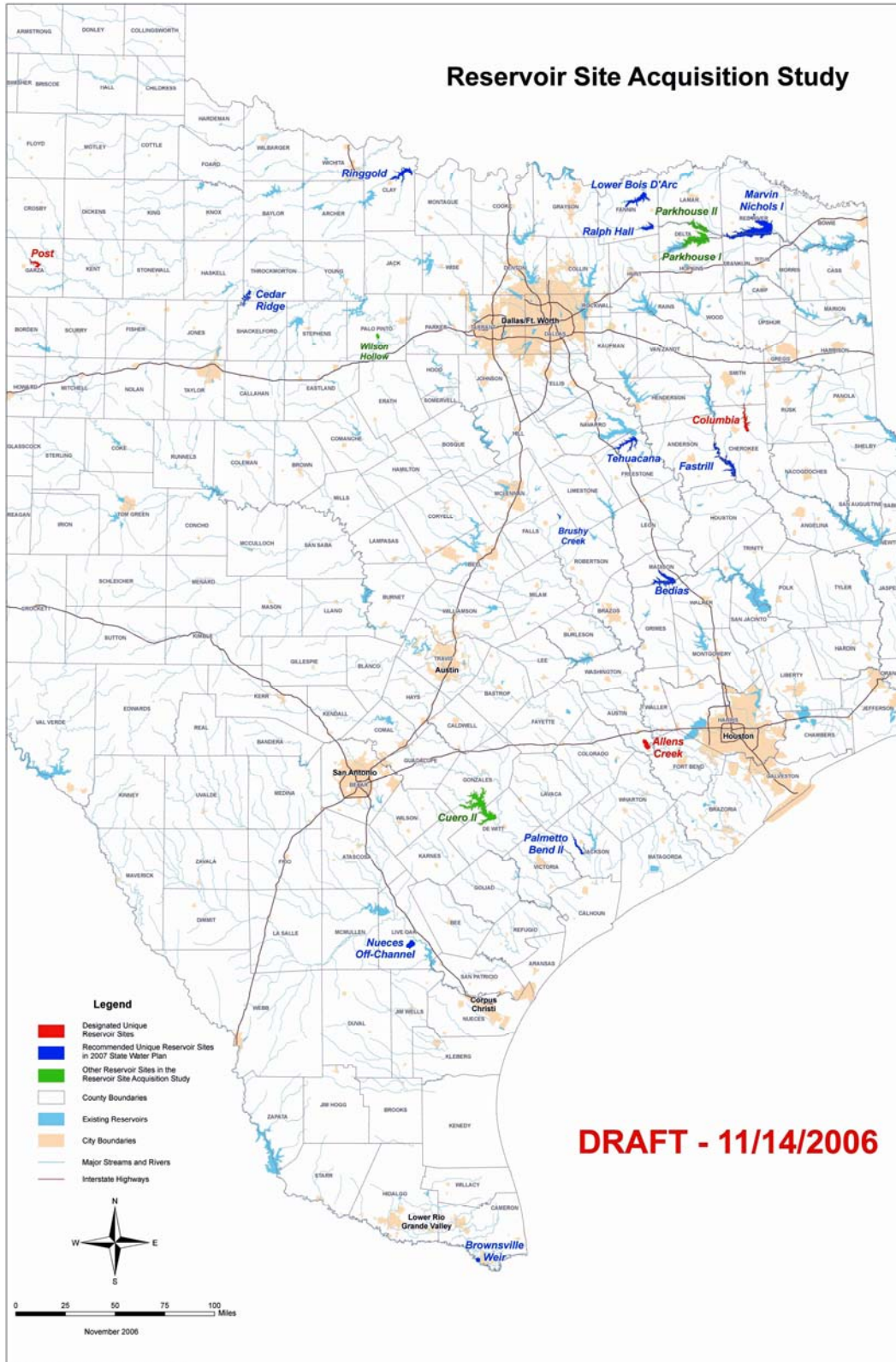


Figure 1: Location of Proposed Reservoir Sites Considered in the Current Study.

Table 1: Synopsis of Previous Reservoir Archeological Investigations in Eastern and Central Texas.

Reservoir	County	Years Investigated	Recorded Sites	Sites Tested	Sites Excavated	Sites NHRP - Eligible or Potentially Eligible
Addicks	Harris	1947, 1964, 1982 - 86	76 (1982 - 86 only)			36
Aquilla	Hill	1972 - 1975, 1977 - 80, 1982 - 83	131	43	19	
Aubrey (Lake Ray Roberts)	Cooke, Denton, Grayson	1972 - 73, 1980 - 83, 1985 - 86	381	60	13	31
Bardwell	Ellis	1963, 1965	15	6	1	1
Barker	Fort Bend, Harris	1983 - 1985	75	6	3	33
B. A. Steinhagen	Jasper, Tyler	1947 - 48	7			
Bayou Loco (Nacogdoches)	Nacogdoches	1972, 1975 - 76	16	4	2	1
Bedias	Grimes, Madison, Walker	1985 - 86	11			
Benbrook	Tarrant	1948	0			
Big Cow Creek	Jasper, Newton	1975 - 76	7			
Big Pine	Lamar, Red River	1971 - 72, 1974 - 75	116	8	2	2
Big Sandy	Upshur, Wood	1980, 1985	129	12		
Blackburn Crossing (Lake Palestine)	Anderson, Cherokee, Henderson, Smith	1957, 1969 - 70, 1975	133		12	
Bois D'Arc	Fannin	1968	13			
Bosque	Bosque	1986	146			
Brushy Creek	Fannin, Grayson	1960	10			
Caddo	Harrison, Marion	1920, 1931, 1950s, 1957, 1968, 1974, 1977, 1983	60	1	2	
Cedar Creek	Henderson, Kaufman	1961, 1963 - 64	33	1	1	
Cleveland	San Jacinto	1985	4			
Cooper	Delta, Hopkins	1951, 1953, 1955, 1959, 1964, 1970, 1972 - 76, 1986	160	32	17	
Cypress Springs	Franklin	1968 - 69	17			

Reservoir	County	Years Investigated	Recorded Sites	Sites Tested	Sites Excavated	Sites NHRP - Eligible or Potentially Eligible
Denison Dam (Lake Texoma)	Cooke, Grayson	1972	158	11		
Ferrels Bridge (Lake O' the Pines)	Camp, Harrison, Marion, Morris, Upshur	1951, 1957 - 60, 1974	75	25	11	
Flat Creek	Henderson	1959	1			
Forney (Lake Ray Hubbard)	Collin, Dallas, Kaufman, Rockwall	1940s, 1950s, 1963 - 65	33	6	3	
Garza-Little Elm (Lake Lewisville)	Denton	1940s, 1950s, 1948 , 1951, 1956, 1973, 1979 - 80, 1986				
Grapevine	Denton, Tarrant	1948, 1975	12	2		
Honea (Lake Conroe)	Montgomery, Walker	1965, 1967	34		4	
Iron Bridge (Lake Tawakoni)	Hunt, Rains, Van Zandt	1957, 1958, 1960	22		3	
Lake Creek	Montgomery	1985 - 86	46			
Lake Fork	Hopkins, Rains, Wood	1975 - 76, 1978 - 79	130	67	11	
Lakeview (Joe Pool Lake)	Dallas, Ellis, Tarrant	1977 - 81, 1984 - 86	42	23	19	14
Lake Lavon	Collin	1940s, 1948, 1950 - 51, 1959 - 60, 1964, 1969, 1973 - 74	34	9	5	
Lake Livingston	Polk, San Jacinto, Trinity, Walker	1961 - 66, 1968 - 69	160	3	6	
Marshall (Little Cypress)	Harrison, Upshur	1981, 1986	18			
McGee Bend (Lake Sam Rayburn)	Angelina, Jasper, Nacogdoches, Sabine, San Augustine	1948, 1956 - 58, 1960 - 62	81	11	10	
Millican	Brazos, Grimes, Leon, Madison	1971, 1973, 1981 - 82	188			
Mineola	Rains, Van Zandt, Wood	1971	91			

Reservoir	County	Years Investigated	Recorded Sites	Sites Tested	Sites Excavated	Sites NHRP - Eligible or Potentially Eligible
Navarro Mills	Hill, Navarro	1959, 1961	19		1	
Pat Mayse	Lamar	1965, 1967	23	5	4	
Ponta	Cherokee, Nacogdoches, Rusk	1968	10			
Richland Creek	Freestone, Navarro	1979 - 84	1001	270	53	
Rockland	Angelina, Polk, Trinity, Tyler	1954	10			
Somerville	Burleson, Lee, Washington	1961, 1963 - 64	29		1	
Tennessee Colony	Anderson, Freestone, Henderson, Navarro	1971 - 72, 1974 - 77	326	14		
Texarkana (Lake Wright Patman)	Bowie, Cass	1949, 1952, 1963, 1970	190		4	
Timber Creek	Fannin	1968	2			
Titus County (Lake Bob Sandlin)	Camp, Franklin, Titus	1968 - 69, 1974 - 75, 1977 - 78	150	13	5	
Toledo Bend	Newton, Panola, Sabine, Shelby	1961 - 68	139	20	7	
Upper Navasota (Lake Limestone)	Leon, Limestone, Robertson	1974 - 77	52	22	4	
Waco Lake	McLennan	1959, 1963 - 65, 1984 - 85	115	13	2	
Wallisville Lake	Chambers, Liberty	1965 - 73, 1979, 1981, 1985 - 86	171	32	9	11
Water's Bluff	Smith, Upshur	1985 - 86	32			1
Lake Whitney	Bosque, Hill, Johnson	1947 - 52, 1956 - 60, 1971 - 72, 1976, 1984	101	29	14	3
Total:			5035	748	252	133

Note: The data within this table is primarily abstracted from Guy (1990). The data in this reference only encompasses work up to and including the year 1986.

Table 2: A Synopsis of Previous Reservoir Archeological Investigations in Eastern and Central Texas, Aggregated by Region.

Northeast Region

Reservoir	County	Years Investigated	Recorded Sites	Sites Tested	Sites Excavated	Sites NHRP - Eligible or Potentially Eligible
Bayou Loco (Nacogdoches)	Nacogdoches	1972, 1975 - 76	16	4	2	1
Big Pine	Lamar, Red River	1971 - 72, 1974 - 75	116	8	2	2
Big Sandy	Upshur, Wood	1980, 1985	129	12		
Blackburn Crossing (Lake Palestine)	Anderson, Cherokee, Henderson, Smith	1957, 1969 - 70, 1975	133		12	
Bois D'Arc	Fannin	1968	13			
Caddo	Harrison, Marion	1920, 1931, 1950s, 1957, 1968, 1974, 1977, 1983	60	1	2	
Cedar Creek	Henderson, Kaufman	1961, 1963 - 64	33	1	1	
Cooper	Delta, Hopkins	1951, 1953, 1955, 1959, 1964, 1970, 1972 - 76, 1986	160	32	17	
Cypress Springs	Franklin	1968 - 69	17			
Ferrels Bridge (Lake O' the Pines)	Camp, Harrison, Marion, Morris, Upshur	1951, 1957 - 60, 1974	75	25	11	
Flat Creek	Henderson	1959	1			
Iron Bridge (Lake Tawakoni)	Hunt, Rains, Van Zandt	1957, 1958, 1960	22		3	
Lake Fork	Hopkins, Rains, Wood	1975 - 76, 1978 - 79	130	67	11	
Marshall (Little Cypress)	Harrison, Upshur	1981, 1986	18			
McGee Bend (Lake Sam Rayburn)	Angelina, Jasper, Nacogdoches, Sabine, San Augustine	1948, 1956 - 58, 1960 - 62	81	11	10	
Mineola	Rains, Van Zandt, Wood	1971	91			
Pat Mayse	Lamar	1965, 1967	23	5	4	

Reservoir	County	Years Investigated	Recorded Sites	Sites Tested	Sites Excavated	Sites NHRP - Eligible or Potentially Eligible
Ponta	Cherokee, Nacogdoches, Rusk	1968	10			
Tennessee Colony	Anderson, Freestone, Henderson, Navarro	1971 - 72, 1974 - 77	326	14		
Texarkana (Lake Wright Patman)	Bowie, Cass	1949, 1952, 1963, 1970	190		4	
Timber Creek	Fannin	1968	2			
Titus County (Lake Bob Sandlin)	Camp, Franklin, Titus	1968 - 69, 1974 - 75, 1977 - 78	150	13	5	
Water's Bluff	Smith, Upshur	1985 - 86	32			1
Subtotal:			1828	193	84	4

Southeast Region

Reservoir	County	Years Investigated	Recorded Sites	Sites Tested	Sites Excavated	Sites NHRP - Eligible or Potentially Eligible
Addicks	Harris	1947, 1964, 1982 - 86	76 (1982 - 86 only)			36
Barker	Fort Bend, Harris	1983 - 1985	75	6	3	33
B. A. Steinhagen	Jasper, Tyler	1947 - 48	7			
Big Cow Creek	Jasper, Newton	1975 - 76	7			
Cleveland	San Jacinto	1985	4			
Honea (Lake Conroe)	Montgomery, Walker	1965, 1967	34		4	
Lake Creek	Montgomery	1985 - 86	46			
Lake Livingston	Polk, San Jacinto, Trinity, Walker	1961 - 66, 1968 - 69	160	3	6	
Rockland	Angelina, Polk, Trinity, Tyler	1954	10			
Toledo Bend	Newton, Panola, Sabine, Shelby	1961 - 68	139	20	7	
Wallisville Lake	Chambers, Liberty	1965 - 73, 1979, 1981, 1985 - 86	171	32	9	11
Subtotal:			729	61	33	80

North Central Region

Reservoir	County	Years Investigated	Recorded Sites	Sites Tested	Sites Excavated	Sites NHRP - Eligible or Potentially Eligible
Aquilla	Hill	1972 - 1975, 1977 - 80, 1982 - 83	131	43	19	
Aubrey (Lake Ray Roberts)	Cooke, Denton, Grayson	1972 - 73, 1980 - 83, 1985 - 86	381	60	13	31
Bardwell	Ellis	1963, 1965	15	6	1	1
Benbrook	Tarrant	1948	0			
Bosque	Bosque	1986	146			
Brushy Creek	Fannin, Grayson	1960	10			
Denison Dam (Lake Texoma)	Cooke, Grayson	1972	158	11		
Forney (Lake Ray Hubbard)	Collin, Dallas, Kaufman, Rockwall	1940s, 1950s, 1963 - 65	33	6	3	
Garza-Little Elm (Lake Lewisville)	Denton	1940s, 1950s, 1948, 1951, 1956, 1973, 1979 - 80, 1986				
Grapevine	Denton, Tarrant	1948, 1975	12	2		
Lakeview (Joe Pool Lake)	Dallas, Ellis, Tarrant	1977 - 81, 1984 - 86	42	23	19	14
Lake Lavon	Collin	1940s, 1948, 1950 - 51, 1959 - 60, 1964, 1969, 1973 - 74	34	9	5	
Navarro Mills	Hill, Navarro	1959, 1961	19		1	
Waco Lake	McLennan	1959, 1963 - 65, 1984 - 85	115	13	2	
Lake Whitney	Bosque, Hill, Johnson	1947 - 52, 1956 - 60, 1971 - 72, 1976, 1984	101	29	14	3
Subtotal:			1197	202	77	49

South Central Region

Reservoir	County	Years Investigated	Recorded Sites	Sites Tested	Sites Excavated	Sites NHRP - Eligible or Potentially Eligible
Bedias	Grimes, Madison, Walker	1985 - 86	11			
Millican	Brazos, Grimes, Leon, Madison	1971, 1973, 1981 - 82	188			
Richland Creek	Freestone, Navarro	1979 - 84	1001	270	53	
Somerville	Burleson, Lee, Washington	1961, 1963 - 64	29		1	
Upper Navasota (Lake Limestone)	Leon, Limestone, Robertson	1974 - 77	52	22	4	
Subtotal:			1281	292	58	

Table 3: Comparison of Recorded Archeological and Cultural Sites for Counties Containing Proposed Reservoir Sites.

County	Historic Cemeteries	Sawmills	Military Sites	Archeological Sites	State Archeological Landmarks	National Register of Historic Places-Listed Sites	Potential Total of National Register of Historic Places-Eligible Sites
Anderson	367	83	2	240	11	25	48
Austin	315	0	2	94	5	7	19
Cameron	176	0	9	203	195	22	41
Cherokee	134	409	0	444	2	6	89
Clay	25	0	0	11	1	2	2
De Witt	62	0	0	283	1	59	57
Delta	31	5	0	283	0	0	57
Falls	77	0	0	80	1	2	16
Fannin	331	10	0	74	1	8	15
Franklin	75	9	0	144	0	2	28
Freestone	226	1	0	617	4	1	123
Garza	4	0	0	694	2	7	139
Gonzales	74	0	3	221	5	9	44
Grimes	151	43	0	431	2	6	86
Haskell	15	0	0	37	0	0	7
Hopkins	70	12	0	251	1	1	50
Jackson	51	0	1	230	1	2	46
Lamar	100	12	1	317	3	40	64
Live Oak	15	0	1	333	2	3	67
Madison	96	3	1	31	0	1	6
Palo Pinto	40	0	0	384	4	6	77
Red River	102	109	0	309	2	6	62
Shackelford	9	0	2	78	5	5	16
Smith	367	85	1	333	22	29	67
Throckmorton	11	0	1	27	1	1	5
Titus	57	0	0	901	12	1	180
Walker	61	126	1	200	15	4	40
TOTAL	3042	907	25	7250	298	255	1451

(Source: Texas Historical Commission On-Line Archeological Sites Atlas, November, 2006)

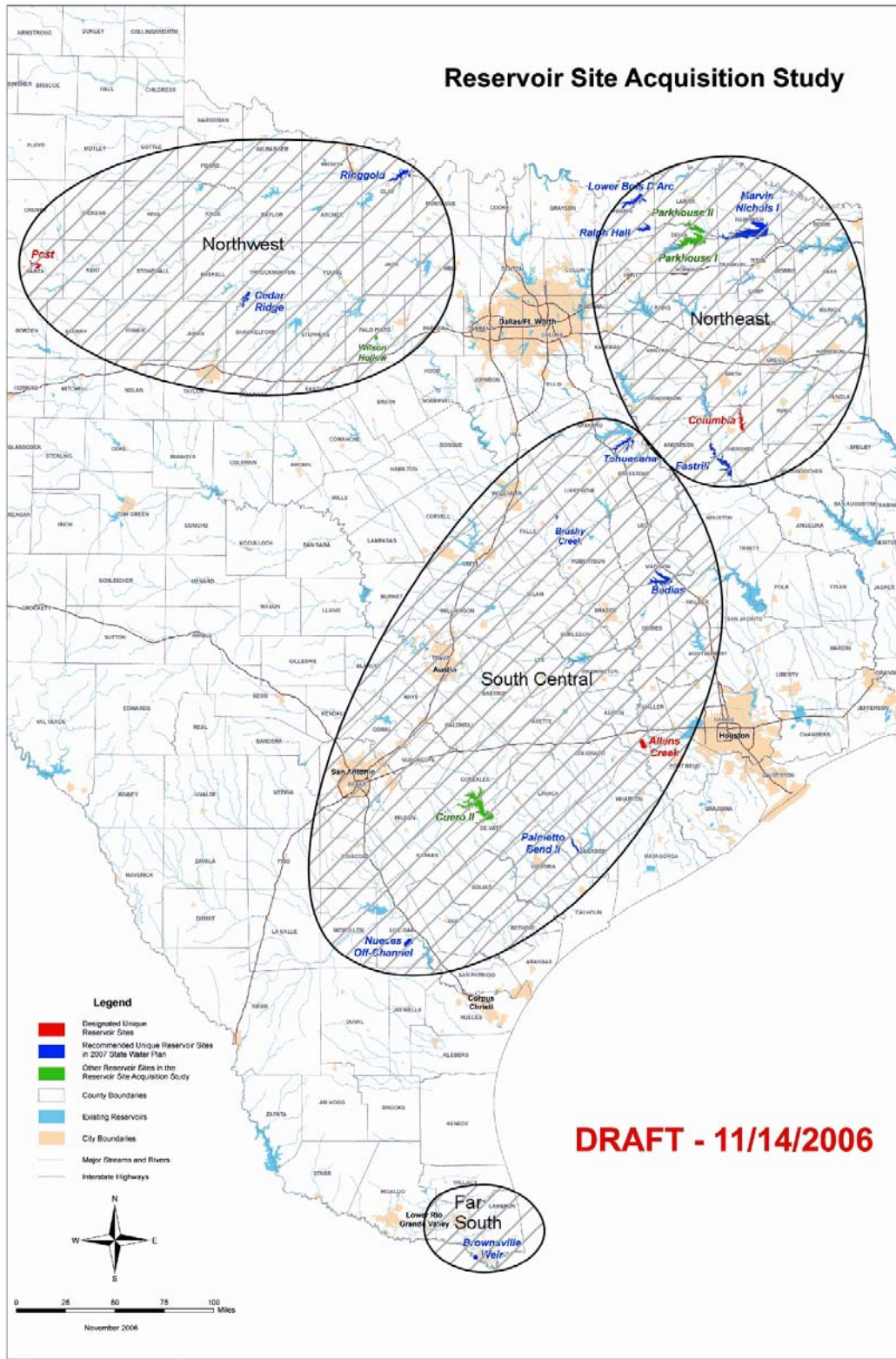


Figure 2: Location of Regional Groups Used in Study, Aggregated on the Basis of Physiography and Characteristics of Historic Properties.

Table 4: Comparison of Recorded Archeological and Cultural Sites for Counties Containing Proposed Reservoir Sites, Aggregated by Regional Group.

County	Historic Cemeteries	Sawmills	Military Sites	Archeological Sites	State Archeological Landmarks	National Register of Historic Places- Listed Sites	Potential Total of National Register of Historic Places- Eligible Sites
Northwest							
Clay	25	0	0	11	1	2	2
Garza	4	0	0	694	2	7	139
Haskell	15	0	0	37	0	0	7
Palo Pinto	40	0	0	384	4	6	77
Shackelford	9	0	2	78	5	5	16
Throckmorton	11	0	1	27	1	1	5
Group Subtotal	104	0	3	1231	13	21	246
Northeast							
Anderson	367	83	2	240	11	25	48
Cherokee	134	409	0	444	2	6	89
Delta	31	5	0	283	0	0	57
Fannin	331	10	0	74	1	8	15
Franklin	75	9	0	144	0	2	28
Hopkins	70	12	0	251	1	1	50
Lamar	100	12	1	317	3	40	64
Red River	102	109	0	309	2	6	62
Smith	367	85	1	333	22	29	67
Titus	57	0	0	901	12	1	180
Group Subtotal	1634	734	4	3296	54	118	660
South Central							
Austin	315	0	2	94	5	7	19
De Witt	62	0	0	283	1	59	57
Falls	77	0	0	80	1	2	16
Freestone	226	1	0	617	4	1	123
Gonzales	74	0	3	221	5	9	44
Grimes	151	43	0	431	2	6	86
Jackson	51	0	1	230	1	2	46
Live Oak	15	0	1	333	2	3	67
Madison	96	3	1	31	0	1	6

County	Historic Cemeteries	Sawmills	Military Sites	Archeological Sites	State Archeological Landmarks	National Register of Historic Places- Listed Sites	Potential Total of National Register of Historic Places- Eligible Sites
Walker	61	126	1	200	15	4	40
Group Subtotal	1128	173	9	2520	36	94	504
Far South							
Cameron	176	0	9	203	195	22	41
Group Subtotal	176	0	9	203	195	22	41
TOTAL	3042	907	25	7250	298	255	1451

(Source: Texas Historical Commission On-Line Archeological Sites Atlas, November, 2006)

Regional Groups include the Following Proposed Reservoir Sites:

Northwest: Cedar Ridge, Post, Ringgold, and Wilson Hollow.
 Northeast: Columbia, Fastrill, Lower Bois D' Arc, Marvin Nichols I, Parkhouse I, Parkhouse II, and Ralph Hall.
 South Central: Allens Creek, Bedias, Brushy Creek, Cuero II, Nueces Off-Channel, Palmetto Bend II, and Tehuacana.
 Far South: Brownsville Weir.

Table 5: Comparison of Sensitive Cultural Resources for Counties Containing Proposed Reservoir Sites, Aggregated by Regional Group.

County	Historic Cemeteries	Sawmills	Military Sites	Potential Total of National Register of Historic Places- Eligible Sites	Total Sensitive Sites	Regional Avg. (Total Sites / Counties in Region)	Variance from Regional Avg.	Study Area Avg. (Total Sites / Counties)	Variance from Study Area Avg.
Northwest									
Clay	25	0	0	2	27		-31.8		-173.9
Garza	4	0	0	139	143		+84.2		-57.9
Haskell	15	0	0	7	22		-36.8		-178.9
Palo Pinto	40	0	0	77	117		+58.2		-83.9
Shackelford	9	0	2	16	27		-31.8		-173.9
Throckmorton	11	0	1	5	17		-41.8		-183.9
Group Subtotal	104	0	3	246	353	58.8			-151.1
Northeast									
Anderson	367	83	2	48	500		+196.8		+299.1

County	Historic Cemeteries	Sawmills	Military Sites	Potential Total of National Register of Historic Places-Eligible Sites	Total Sensitive Sites	Regional Avg. (Total Sites / Counties in Region)	Variance from Regional Avg.	Study Area Avg. (Total Sites / Counties)	Variance from Study Area Avg.
Cherokee	134	409	0	89	632		+328.8		+431.1
Delta	31	5	0	57	93		-210.2		-107.9
Fannin	331	10	0	15	356		+52.8		-144.9
Franklin	75	9	0	28	112		-191.2		-88.9
Hopkins	70	12	0	50	132		-171.2		-68.9
Lamar	100	12	1	64	177		-126.2		-23.9
Red River	102	109	0	62	273		-30.2		+72.1
Smith	367	85	1	67	520		+216.8		+319.1
Titus	57	0	0	180	237		-66.2		+36.1
Group Subtotal	1634	734	4	660	3032	303.2			+102.3
South Central									
Austin	315	0	2	19	336		+154.6		+135.1
De Witt	62	0	0	57	119		-62.4		-81.9
Falls	77	0	0	16	93		-88.4		-107.9
Freestone	226	1	0	123	350		+168.6		+149.1
Gonzales	74	0	3	44	121		-60.4		-79.9
Grimes	151	43	0	86	280		+98.6		+79.1
Jackson	51	0	1	46	98		-83.4		-102.9
Live Oak	15	0	1	67	83		-98.4		-117.9
Madison	96	3	1	6	106		-75.4		-94.9
Walker	61	126	1	40	228		+46.6		+27.1
Group Subtotal	1128	173	9	504	1814	181.4			-19.5
Far South									
Cameron	176	0	9	41	226		0		+25.1
Group Subtotal	176	0	9	41		226			+25.1
TOTAL	3042	907	25	1451	5425			200.9	