

**Seismic Assistants, Ltd.
Knight Phase IV 3-D**

**Big Thicket National Preserve
Turkey Creek Unit
Vegetation Mapping and Sampling Plan**

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April 2006

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I. Introduction

Seismic Assistants Ltd. (SAL) is proposing a three dimensional seismic survey within the Turkey Creek Unit (TCU), Village Creek Corridor Unit (VCCU), and the Big Sandy Creek Corridor Unit (BSCCU) of the Big Thicket National Preserve (BTNP or Preserve). The project area is located approximately 8 miles north of Kountze, in Hardin and Tyler Counties, Texas, and includes approximately 7,949 acres of National Park Service (NPS) administered lands within the Turkey Creek unit. Because of the small sizes of the portions of the VCCU and BSCCU affected by the proposed project, these units are not included in the scope of the vegetation mapping and sampling program.

In general, the Vegetation Mapping and Sampling Plan will document existing vegetation in the Turkey Creek Unit, based on current characteristics of the vegetation during the spring and summer of 2006.

II. Objectives

To meet the National Park Service regulatory requirements and support environmental impact analysis, existing vegetation will be sampled and mapped according to U.S. Geological Survey/National Park Service Vegetation Mapping Program guidelines. The program emphasizes the collection of data on key environmental variables and includes the Standardized National Vegetation Classification System standard methodologies for data collection and analysis, as well as accuracy assessment procedures. Such data will support project planning, resource assessment, and biodiversity conservation.

III. Description of Ecological Model

Vegetation mapping will utilize the International Classification of Ecological Communities (ICEC): Terrestrial Vegetation of the Southeastern United States (NatureServe, 2006), a national standard for vegetation classification. The ICEC is a hierarchical classification system as follows:

System

Class (Forest, Woodland, Shrubland, Dwarf-shrubland, Herbaceous Vegetation, Nonvascular vegetation, Sparse Vegetation)

Subclass

Group

Subgroup

Formation

Alliance

Association

ICEC has assigned alphanumeric designations that correspond to the various hierarchy levels.

See **Table 1** for a breakdown of each level.

Table 1: A Summary of the ICEC Classification Hierarchy (NatureServe, 2006)		
Level	Primary Basis for Classification	Level Divisions and Examples
Class	The type, height, and relative percentage of cover of the dominant, uppermost vegetation	Seven Classes: Forest, Woodland, Shrubland, Dwarf-shrubland, Herbaceous, Nonvascular, and sparse vegetation
Subclass	For Forest Woodland, Shrubland, and Dwarf Shrubland classes: Leaf character	Tree sub classes in each: evergreen, deciduous, and mixed evergreen-deciduous (no mixed evergreen-deciduous, dwarf shrubland subclasses have been defined)
	For Herbaceous Class: persistence and growth form	Four subclasses: Perennial grasslands, perennial forb vegetation, annual grass and forb vegetation, and hydromorphic vegetation
	For Nonvascular Class: relative dominance of nonvascular vegetation type	Three subclasses: Lichens, mosses, and algae
	For Sparse Vegetation Class: particle sizes of the substrate features	Three Subclasses: Consolidated rock; boulder, gravel, cobble, or talus; unconsolidated material (soil, sand or ash)
Group	Varies by Class: leaf characteristics, broad climate types, presence and character of woody strata, major topographic position types or landforms	About 60 Groups Example: Temperate or Sub-polar Needle-leaved Evergreen forest
Subgroup	Relative human impact	Two sub groups: Natural/Semi-natural or Cultural (No culture types provided in NatureServe Explorer)
Formation	Additional structural and environmental factors including hydrology	Many Example: Saturated Temperate or Sub-polar Needle-Leaved Evergreen Forest

Table 1: A Summary of the ICEC Classification Hierarchy (NatureServe, 2006)		
Level	Primary Basis for Classification	Level Divisions and Examples
Alliance	Dominant/diagnostic species, usually of the uppermost or dominant stratum	Many Example: <i>Picea mariana</i> Saturated Forest Alliance
Association	Additional dominant/diagnostic species from any strata	Many Example: <i>Picea mariana</i> / <i>Alnus incana</i> / <i>Sphagnum</i> spp. Forest

The current study will map units down to the alliance level, which is based on floristics (species composition – named for the constant dominant or co-dominant species in the uppermost canopy layer) unlike the higher-level categories, which are based on physiognomy. Like the previous two studies conducted in the Lance Rosier (Blanton and Assoc., 2001) and Big Sandy Creek Units (PBS&J, 2003) of the Preserve, which mapped all alliances in the respective project areas, this study will map all alliances for all vegetation classes in the Turkey Creek Unit of the Big Thicket National Preserve. There are 90 alliances that could potentially be present in the study area (39 forest, 10 woodland, 7 shrubland, 33 herbaceous, and 1 nonvascular vegetation). See **Table 1, Appendix D** for all ICEC alliances that may appear in the Turkey Creek Unit.

On a Preserve-wide basis, Harcombe and Marks (1979) provided quantitative descriptions of vegetation types, correlated the patterns of distribution of vegetation types with major environmental gradients, and provided a map of 11 vegetation types. Their vegetation classification emphasized potential natural vegetation, rather than existing or actual vegetation types, with ground based sampling limited to 56 stands or a total area of 4.5 ha (11.1ac).

For the current study, an attempt was made to match the Harcombe and Marks (1979) categories to ICEC equivalent alliances. Each category correlated to at least one ICEC alliance as shown below:

- Cypress Tupelo Swamp: 5 ICEC alliances
- Floodplain Hardwood Forest: 8 ICEC alliances
- Floodplain Hardwood Pine Forest: 5 ICEC alliances
- Lower Slope Hardwood Pine forest: 3 ICEC alliances
- Mid Slope Oak Pine Forest: 4 ICEC alliances
- Sandhill Pine Forest: 2 ICEC alliances
- Upland Pine Forest: 3 ICEC alliances

- Upper Slope Pine Oak Forest: 5 ICEC alliances
- Wetland Baygall Shrub Thickets: 2 ICEC alliances
- Wet Pine Savannah: 1 ICEC alliance

Most significantly, there are two ICEC alliances that appear to match more than one of the Harcombe and Marks (1979) categories. First, ICEC Alliance II.A.4.N.a.1 – *Pinus palustris* / *Quercus* spp. Woodland Alliance (Longleaf Pine / Oak species Woodland Alliance), appears to correlate to two Harcombe and Marks (1979) vegetation types: Sandhill Pine Forest and Upland Pine Forest. Secondly, ICEC Alliance, I.C.3.N.a.24 - *Pinus taeda* – *Quercus* (*alba*, *falcata*, *stellata*) Forest Alliance [Loblolly Pine – (White Oak, Southern Red Oak, Post Oak) Forest Alliance], corresponds to four (Upper Slope Pine Oak forest, Mid Slope Oak Pine Forest, Lower Slope Hardwood Pine Forest and Floodplain Hardwood Pine Forest) Harcombe and Marks (1979) vegetation types. So, there are no clear, unique equivalents, i.e., some ICEC alliances may be included in more than one of the Harcombe and Marks (1979) vegetations types. This precludes the ability to simply use the Harcombe and Marks (1979) descriptions as mapping units. However, once collected, the raw field data could be used to map potential natural vegetation.

See **Table 2, Appendix D** for description of the Harcombe and Marks (1979) vegetation types or classes. The dominant, common, and important species for each of the main forest and woodland communities are included in this table. No matter which classification is used for mapping, **Table 2 in Appendix D** can be used to understand the vegetation types, which primarily correspond to topographic location. This is related to their position in the landscape (relative elevation) with respect to Turkey Creek. The highest areas east and west of the creek have sandy soils and support the driest vegetation types (i.e., proceeding from Upland Pine Forest, Upper Slope Pine Oak Forest, Mid Slope Oak Pine Forest, and Lower Slope Hardwood Pine Forest). The rest of the wooded vegetation types are in the floodplain of the creek and include the Floodplain Hardwood Forest and the Floodplain Hardwood Pine Forest, which parallel the creek, as well as scattered pockets of Cypress Tupelo Swamp and Wetland Baygall Shrub Thickets.

As described earlier in this section, Harcombe and Marks (1979) focused on potential natural vegetation, rather than existing vegetation in their review of the Big Thicket. In the project area within the Preserve, Harcombe and Marks (1979) mapped 11 vegetation types, compared with 90 possible alliances under the ICEC. However, the Harcombe and Marks (1979) map was used along with aerial photography, county soil survey maps, and topographic maps to produce an early draft of the existing vegetation types, within which all areas with distinctive photo-signature have been delineated. These delineated areas will be assigned to the appropriate ICEC alliance as fieldwork commences (see **Appendix A, Map 3** for the preliminary vegetation classes and areas).

IV. Methodology

Objectives

To meet NPS regulatory requirements and support environmental impact analysis, existing vegetation will be sampled and mapped according to U.S. Geological Survey/National Park Service National Vegetation Mapping Program guidelines. The vegetation analysis will characterize the existing vegetation occurring within the Turkey Creek Unit of the Big Thicket National Preserve (BTNP) prior to any seismic survey activity. Density, dominance, and frequency values will be determined for each species observed. Density refers to the number of individuals per sample area, dominance refers to the basal area per sample area, and frequency refers to the measure of commonness and distribution of a species within the sample area.

All vegetation mapping, survey, and data analysis results will be summarized in report format and provided to the NPS. Additionally, the ecological data results of this pre-operational vegetation mapping and sampling program will be used to analyze project impacts of the Knight Phase IV 3-D Seismic Survey within the Turkey Creek Unit of the BTNP during the post-operational vegetation sampling program.

Sampling Design

The total number of sample plots per polygon and preliminary vegetation class, as well as the locations of the sample plots were assigned using *Accuracy Assessment Procedures, NBS/NPS*

Vegetation Mapping Program (ESRI 1994), and the *Standardized National Vegetation Classification System* (The Nature Conservancy 1994). Based on the aerial interpretation of a 1995-1996 digital ortho-quarter quadrangle (DOQQ) with color infrared (CIR) film, 103 occurrences of distinct vegetation mapping units were identified within the project area (**Appendix A**). All preliminary vegetation classes contain at least one sample plot and the number of sample plots per potential alliance (vegetation class) was determined by the size and quantity of the alliance polygon(s) and in accordance with the guidelines outlined in the *Accuracy Assessment Procedures, NBS/NPS Vegetation Mapping Program* (ESRI 1994), and the *Standardized National Vegetation Classification System* (TNC 1994). The recommended number of sample plots per vegetation mapping unit was determined by the guidelines outlined in **Table 2**.

Table 2: Recommended Sample Plot Scenarios Based on Polygon Quantities and Vegetation Class Sizes as detailed in <i>Accuracy Assessment Procedures, NBS/NPS Vegetation Mapping Program</i> (ESRI 1994)			
Description	Polygons in Class	Area Occupied by Class	Recommended Number of Samples per Class
Abundant. Many polygons that cover a large area.	≥ 30	≥ 50 ha	30
Relatively Abundant. Class has few polygons that cover a large area.	< 30	≥ 50 ha	20
Relatively Rare. Class has many polygons that cover a small area. Many polygons area close to the minimum mapping unit (MMU).	> 30	< 50 ha	20
Rare. Class has few polygons, which may be wildly distributed Most or all polygons are close to the MMU.	≥ 5, ≤ 30	< 50 ha	5
Very Rare. Class has too few polygons to permit sampling. Polygons are close to the MMU.	< 5	< 50 ha	Visit all and confirm

All polygons greater than the minimum mapping unit (0.5 ha) contain at least one sample plot, and sample plots were distributed within preliminary vegetation classes and polygons based on the recommendations provided in **Table 2**. Two preliminary vegetation classes did not fit exactly into any of the descriptions contained in the recommended guidelines. These preliminary vegetation classes were allocated five plots each, the recommended number assigned to a ‘rare’ class. A single polygon has been initially classified as Floodplain Hardwood Forest preliminary vegetation class with an area of 83.94 ha, and two polygons have been preliminarily classified as Upland Pine Forest with a total area of 62.87ha. Based on the recommended guidelines, these two preliminary vegetation classes should fit into the ‘relatively rare’ category and be allotted 20 plots each; however, when looking at the area as a whole, they fit better into the ‘rare’ category due to the limited number of polygons and small area contained within each of them.

For these reasons, the two preliminary vegetation classes were allotted five sample plots each, which yields a near average plot density as compared to other vegetation classes. If twenty plots were placed in each of these vegetation classes, then the plot density would be very high as compared to other vegetation classes. For example, the Floodplain Hardwood Pine Forest, which consists of 746.14 ha, would have the same number of plots (20) as the Floodplain Hardwood Forest (83.94 ha) and Upland Pine Forest (62.87 ha). If plots were distributed as such, the Floodplain Hardwood Pine Forest vegetation class would have a plot density of one plot per 37.3 ha; whereas, the Floodplain Hardwood Forest and Upland Pine Forest would have plot densities of one plot per 4.2 ha and one plot per 3.14 ha, respectively. On the other hand, by categorizing the two vegetation classes as ‘rare’ and assigning them the recommended five plots each for this category, it brings the plot densities down to one plot per 16.78 ha and one plot per 12.57 ha, respectively, which is closer to the median plot density of the other vegetation classes. Please refer to the **Table 3** below for a list of all preliminary vegetation classes and total number of polygons and sample plots per class.

Table 3: Preliminary Vegetation Classes, Number of Polygons per Class, Total Area within the Class, and Number of Sample Plots per Class Allotted within the Turkey Creek Unit of the Big Thicket National Preserve			
Preliminary Vegetation Class	# of Polygons	Total Area (ha)	# of Sample Plots
Cypress-Tupelo Swamp	4	24.72	4
Floodplain Hardwood Forest	1	83.94	5
Floodplain Hardwood Pine Forest	3	746.14	20
Lower Slope Hardwood Pine Forest	6	218.35	20
Mid Slope Oak Pine Forest	7	267.51	12
Sand Hill Pine	3	36.71	3
Undetermined	10	205.39	16
Upland Grassland	1	2.36	1
Upland Pine Forest	2	62.87	5
Upper Slope Pine Oak Forest	27	1,187.88	27
Wetland Baygall Shrub Thicket	23	198.12	23
Wetland Undetermined	14	17.40	14
Wet Pine Savannah	4	166.76	20
Total	104	7,946	178

There are seven polygons delineated on the preliminary vegetation class map that are smaller than the minimum mapping unit (MMU). Each of these polygons are designated on the map as ‘Smaller than MMU’ and will be visited while en route to sampling plots. Notes on the ecology of these areas will be taken, depending upon the uniqueness of the area and differentiation from the surrounding area.

Furthermore, all sample plots were randomly placed initially, but were then shifted to the nearest seismic grid line to facilitate the impact analysis. In instances where a polygon was not intersected by a seismic line, the sample plot was left in its original location to facilitate definition of the potential vegetation alliance of the polygon. In this study, 15 sample plots could

not be placed on a seismic line without moving the plot into another preliminary vegetation class or polygon. Following previous studies conducted in other units in the BTNP, all pre-operational sample plots are not sampled during the post-operational vegetation assessment and impact analysis. As in previous studies, the sample plots that are not located on seismic lines will not be re-sampled during post-operational assessment and impact analysis.

An itemized list of sample plot locations is provided in **Appendix B**. Potential alliance polygons will be modified and updated during field survey efforts based on the data collected. Once the fieldwork is complete, a final map will be produced reflecting the corrected alliances within the project area.

Furthermore, a review of BTNP’s burn management schedule was conducted. Based on this review and discussions with BTNP staff, Fire Management Units (FMU) 3201 and 3601 will be burned in 2006. There are five sample plots within FMUs 3201 and 3601. FMU 3701 and 3702 will be mechanically treated in 2007. There are 23 sample plots within FMUs 3701 and 3702. Mechanical treatment could potentially have similar effects to burning in the subject areas, in that the shrub and herbaceous layers will be impacted. Due to the proposed burning and mechanical treatment schedule, the shrub and herbaceous layers will be sampled in only 10% of the sample plots within these FMUs.

Stratified Random Sample Method

At each of the sample plots determined based on the *Accuracy Assessment Procedures* (ESRI 1994) and the *Standardized Vegetation Classification System* (TNC 1994), four strata will be observed and sampled:

Table 4. Stratum and DBH Size Categories	
Stratum	Size
Overstory (canopy)	≥12 cm dbh
Midstory	2.5-12 cm dbh
Shrub	0.5-2.5 cm dbh
Herbaceous ¹	% Ground cover

¹Within the herbaceous sample plots, all woody vegetation <0.5 cm dbh should be calculated as percent ground cover. The shrub and herbaceous strata will be sampled in only 10% of plots that fall within the burn compartments.

Sample plot centers will be marked with electrical conduit (PVC pipe) and flagging. As well, the center of the northern boundary will be marked with electrical conduit to facilitate finding and orienting the exact plot in the post-operational vegetation assessment and impact analysis.

Figure 1 demonstrates the plot layout for the vegetation sample plots.

Overstory:

The sample will be at the pre-determined location using a 250m² plot (25m x 10m). Sample plot boundaries will be determined by measuring 12.5m directly north and south of the center point and 5m directly east and west of the center point. This will be done with the use of pre-measured rope or measuring tape. To calculate density, dominance, and frequency, each survey team will collect the following:

- Identify species
- Number of occurrences
- Basal coverage by collecting dbh

Midstory:

One sample will be at the pre-determined location using a 250m² plot (25m x 10m). This will be the same sample point and area as the overstory sample point. To calculate density, dominance, and frequency, each survey team will collect the following:

- Identify species
- Number of occurrences
- Basal coverage by collecting dbh

Shrub:

When conducting the verification of the shrub stratum the sample plot will be identified within the 25m² plot (5m x 5m). The center point will be the same as the overstory sample point and measured 2.5 m in each of the four cardinal directions. Density and frequency will be calculated at each shrub sample location. To calculate Density and Frequency, each survey team will collect the following:

- Identify species
- Number of occurrences

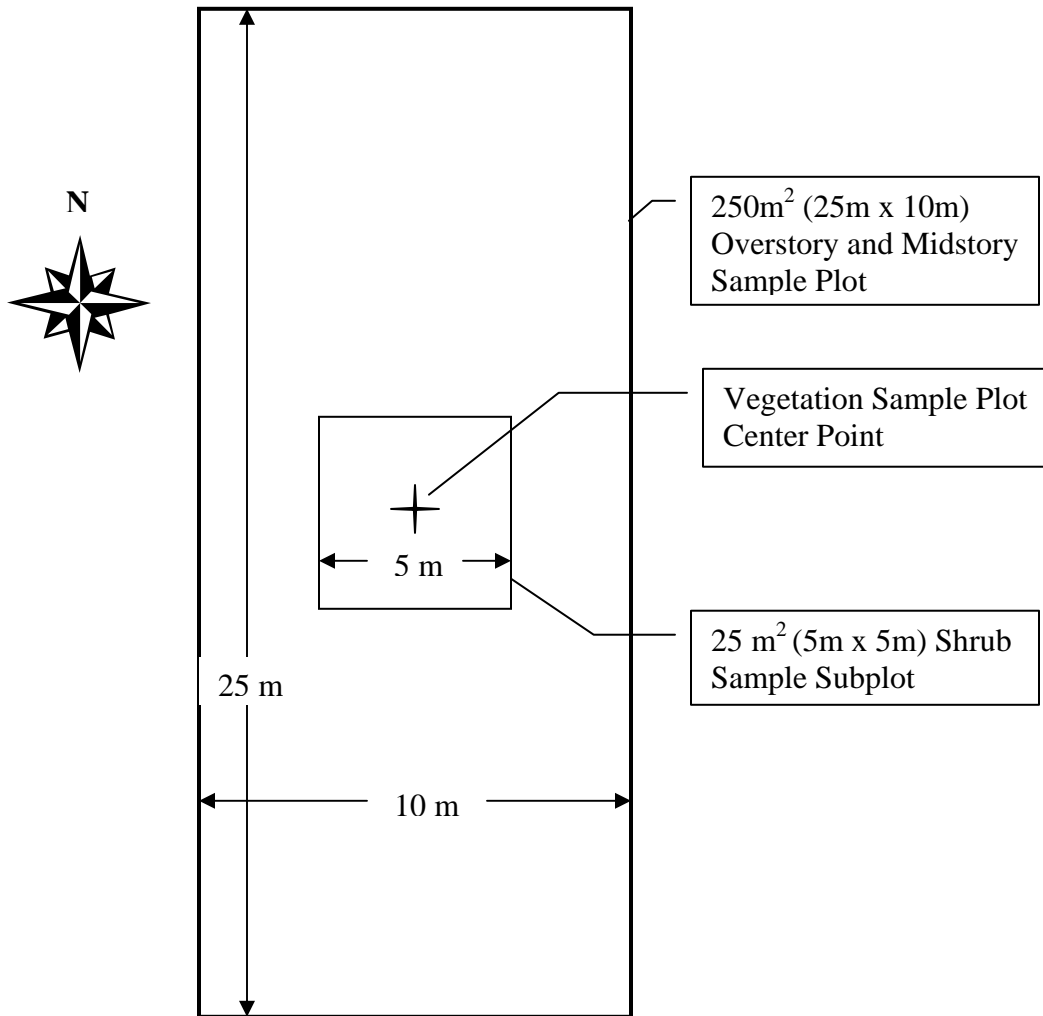


Figure 1: Diagram of the Vegetation Sample Plot Layout

Herbaceous:

When conducting the verification of the herbaceous stratum ten random sample plots within the 250m² overstory/midstory plot will be identified. Each sample plot will be selected randomly and center points will be recorded along with the direction (azimuth) and distance to the overstory/midstory plot center point to facilitate re-sampling, as near as possible, the same sample plot during the post-operational vegetation assessment and impact analysis. Each of the ten plots will be 1m² (1m x 1m) defined by pre-constructed quadrants. To calculate the species diversity, density and dominance, each survey team will collect the following:

- Notate the sample number (1 through 10)
- Notate the azimuth and distance of plot center to overstory plot center
- Identify all species and estimate % of species composition per plot

- Record estimated % of plot ground cover.

V. General Practices

Confidence Interval:

The final number of sample plots in each alliance for each stratum will be based on the principles of the species area curve as described in *The Study of Plant Communities: An Introduction to Plant Ecology* (Oosting 1950). The number of species accumulated in the sample plots will be plotted against the number or size of plots completed. This graph will produce a curved line that can be used to determine when adequate sampling of the alliance stratum has been achieved. The ratio of species to area directly controls the form of the graphed curve so each stratum for each alliance will be composed of different amounts of sample plots to adequately sample each. Adequate sampling will be defined as when a 10 percent increase in sample plots produces only a 10 percent or less increase of species accumulated. To ensure comprehensive coverage of each alliance stratum two additional sample plots will be performed after the 10 percent rule has been achieved for each alliance stratum. The species area curve was selected to determine the appropriate number of sample plots per alliance due to its ease of use during the field sampling efforts, and because the method will facilitate the accuracy necessary to meet the objectives of the project. Likewise, should any of the small polygons with a single plot in them appear to be different and unique as compared to the vegetation class in which it was originally assigned, then additional plots will be placed in these areas in order to facilitate the accuracy necessary to meet the objectives of the project.

Voucher Plants:

Voucher plant species will be collected in the field. Each field team will collect a representative sample of each new plant species encountered. However, all voucher species will be collected outside of the sample plot locations. All voucher species will be placed in labeled self-sealing plastic bags and provided to the field team lead at the end of each day. For each voucher specimen collected, the following information will be annotated: technical name, location, habitat, collected by, and date. Following completion of the project, all specimens will be turned over to the NPS for curation and final annotation in accordance with standard herbarium

practices. Voucher specimens will be properly stored and maintained by SAL until the plants are transported to NPS.

Threatened or Endangered and Rare Vegetation:

In the event that a survey team encounters any federally or state-listed threatened or endangered species or rare vegetation that has not been previously mapped, each team should record the geographic location (latitude/longitude), document the species present, and notate the boundaries on field maps. This includes Texas trailing phlox, pitcher plant bogs, long leaf pine communities, and any potential red cockaded woodpecker habitat.

Soil Verification:

Soil verification will be accomplished within each mapped unit soil type in Hardin and Tyler counties of the TCU, as well as in each preliminary vegetation class. Several soil sample sites will be selected for investigation based on mapped soils. Soil sample sites will coincide with several of the vegetation sample plots, which will be predetermined. Each field crew will be notified of where soil data is to be observed and recorded prior to beginning the field survey. In addition, these sample sites will coincide with the shrub and herbaceous sample plots.

Site Photographs:

Each team will take representative photographs of each alliance. Plot photos will be taken from the north end of the plot, looking south to the center point of the plot. Photographs of other unique habitats and other points of interest that are observed while en route to sample plots will be taken.

VI. Schedule

In order to implement the 3-D seismic survey, the vegetation sampling will commence mid to late April, 2006, (during early spring) and is expected to be completed by the first part of June, 2006. Data analysis and report preparation will be completed by August 2006. Seismic Assistants, Inc. proposes to begin the 3-D seismic survey in August 2006.

VII. Funding

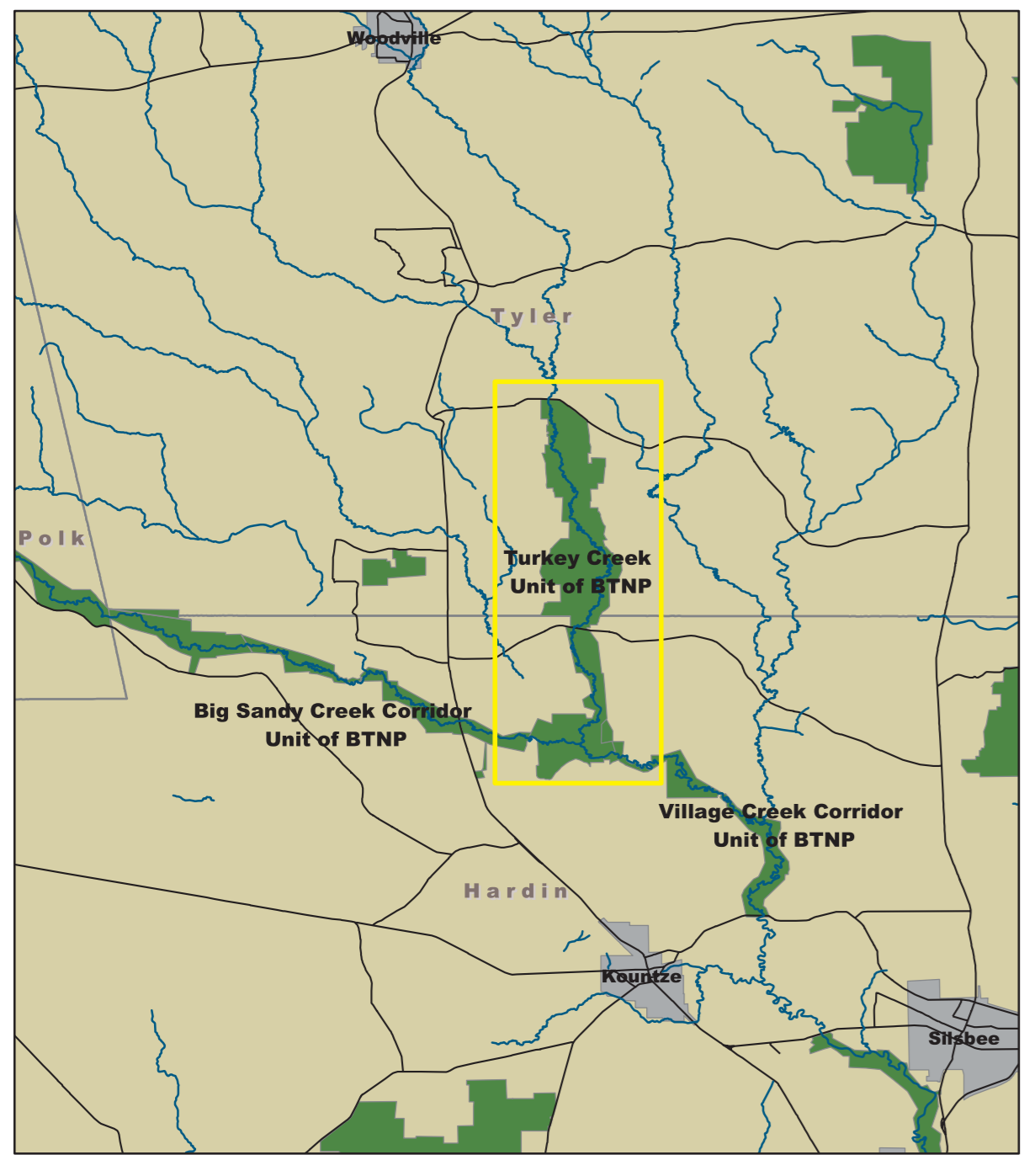
The vegetation analysis project is funded by Seismic Assistants, Ltd.

VIII. Literature Cited

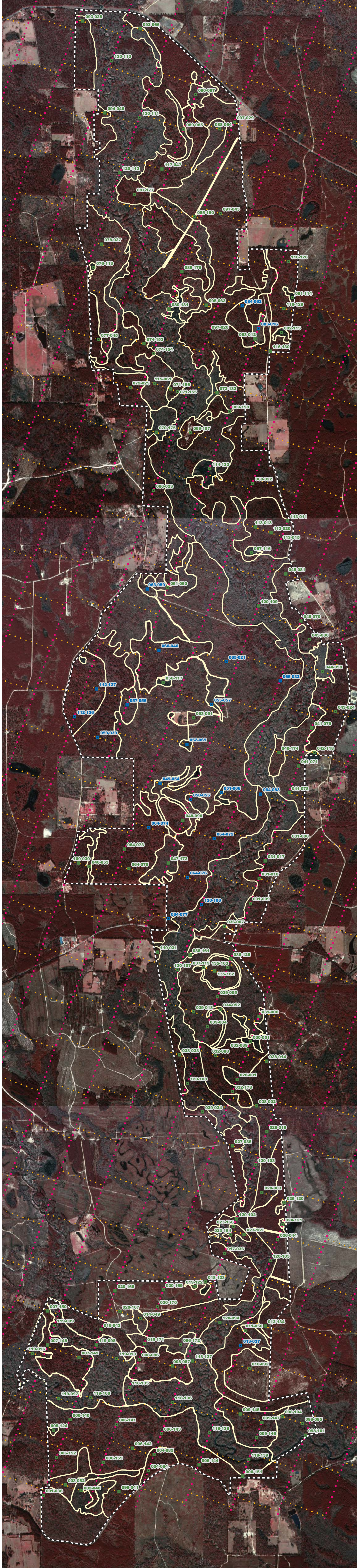
- Blanton & Associates, Inc. 2001. *Preliminary Draft, Pre-operational and Post-operational Vegetation Analysis of the Lance Rosier Unit of the Big Thicket National Preserve.*
- Environmental Systems Research Institute (ESRI), National Center for Geographic Information Analysis (NCGIA), and The Nature Conservancy (TNC). 1994. *Accuracy Assessment Procedures-NBS/NPS Vegetation Mapping Program.*
- Harcombe, P.A. and P.L. Marks. 1979. *Forest vegetation of the Big Thicket National Preserve.* Contract No. PX7029-8-0437. Report to the Office of Natural Sciences, Southwestern Region, National Park Service, Santa Fe, New Mexico.
- National Park Service, Big Thicket National Preserve. 2001. *Fire Monitoring Plan.*
- NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.7. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed March 28, 2006).
- The Nature Conservancy, Environmental Systems Research Institute. 1994. Final Draft, *Standardized National Vegetation Classification System—NBS/NPS vegetation mapping program.*
- Oosting, Henry J. 1950. *The Study of Plant Communities: An Introduction to Plant Ecology.* W. H. Freeman and Company, San Francisco, CA.
- PBS&J. 2003. *Big Thicket National Preserve Big Sandy Creek Unit Vegetation Mapping and Sampling Plan.* Prepared on behalf of the National Park Service and DESCO.
- Weakly, A.S., K.D. Patterson, S. Landaal, M. Pyne, and others (compliers). 1998. *International Classification of Ecological Communities: Terrestrial Vegetation of the Southeastern United States. Working Draft of March 1998.* The Nature Conservancy, Southeast Regional Office, Southern Conservation Science Department, Community Ecology Group. Chapel Hill, North Carolina.

Appendix A
Project Location Map

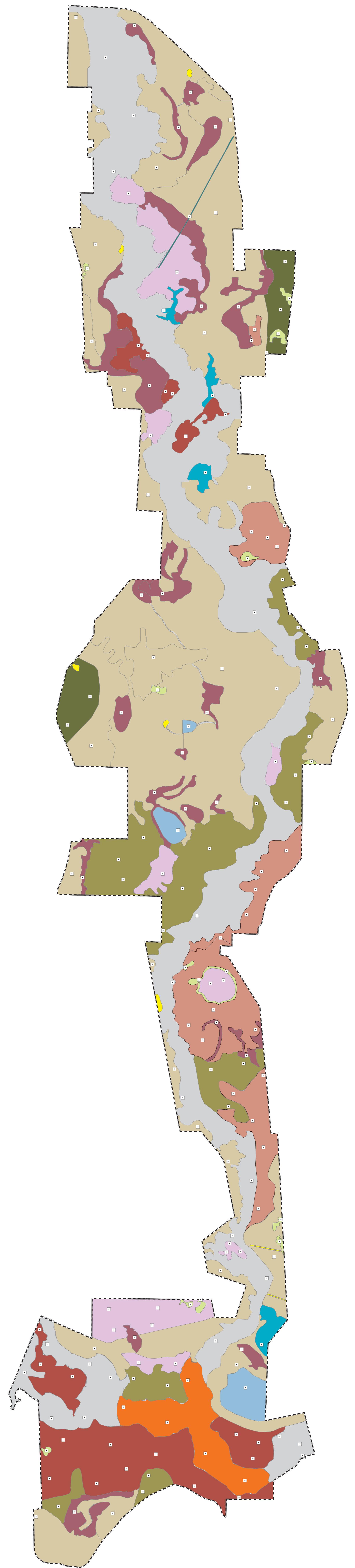
Map 1. Inset with Hardin and Tyler Counties, Texas



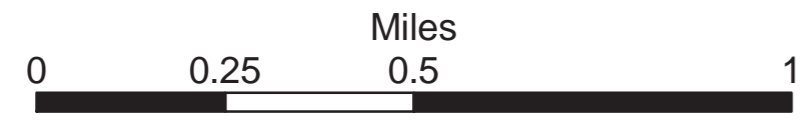
Map 2. Sample Point Location Map in Turkey Creek Unit, BTNP



Map 3. Preliminary Vegetation Classes in Turkey Creek Unit, BTNP



Appendix A. Maps
Pre-Operational Vegetation Mapping and Sampling Plan
Turkey Creek Unit of the Big Thicket National Preserve



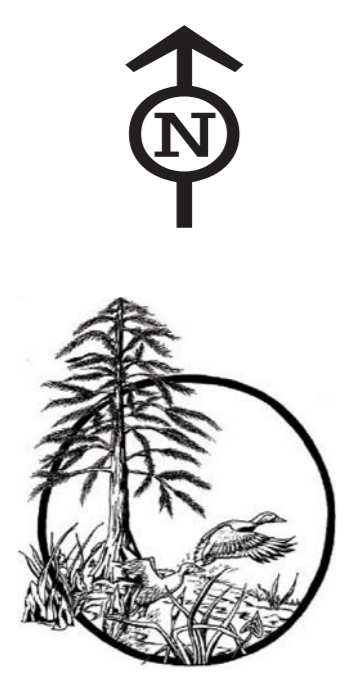
Legend For Map 2

Sample Points

- Tree Data Only
- Herbaceous Data
- Preliminary Vegetation Class Boundaries
- Pre-Plot Receiver Locations
- Pre-Plot Source Locations
- BTNP Boundary

Legend For Map 3

- Sample Point Locations
- Wetland Baygall Shrub Thickets
- Cypress-Tupelo Swamp
- Smaller than MMU
- Floodplain Hardwood Forest
- Floodplain Hardwood Pine Forest
- Lower Slope Hardwood Pine Forest
- Mid Slope Oak Pine Forest
- Pipeline Right-of-Way
- Sandhill Pine Forest
- Undetermined
- Upland Pine Forest
- Upper Slope Pine Oak Forest
- Undetermined Wetland
- Wetland Pine Savannah



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Appendix B
Sample Location Spreadsheet

Appendix B. Sample Point Locations

Point ID	Y coordinate	X Coordinate	Sample Point	Polygon ID	Vegetation Class	Seismic Type	Burn Unit	Soil	Herb Plot	Comments
001-038	-94.36146	30.46165	38	1	USPO	R			yes	
002-048	-94.35684	30.4622	48	2	BG	S			yes	
003-082	-94.3588	30.46276	82	3	MSOP	S			yes	
004-084	-94.34861	30.46439	84	4	MSOP	R			yes	
004-085	-94.34794	30.4661	85	4	MSOP	S/R X			yes	
005-124	-94.36031	30.46858	124	5	WL UNKNOWN	NEITHER			yes	
006-140	-94.35831	30.46971	140	6	LSHP	R			yes	
006-141	-94.35259	30.46928	141	6	LSHP	R			yes	
006-142	-94.35417	30.46521	142	6	LSHP	S			yes	
006-143	-94.35064	30.46677	143	6	LSHP	R			yes	
006-144	-94.34708	30.46836	144	6	LSHP	R			yes	
006-151	-94.34241	30.46507	151	6	LSHP	R			yes	
006-152	-94.33701	30.46393	152	6	LSHP	R			yes	
006-159	-94.3599	30.46569	159	6	LSHP	R			yes	
007-148	-94.36127	30.48124	148	7	LSHP	S/R X			yes	
007-149	-94.36115	30.47763	149	7	LSHP	R			yes	
007-150	-94.35729	30.47635	150	7	LSHP	S			yes	
008-086	-94.34988	30.47622	86	8	MSOP	R			yes	
008-087	-94.34579	30.47555	87	8	MSOP	S			yes	
009-145	-94.33538	30.46802	145	9	LSHP	S			yes	
009-146	-94.33744	30.47053	146	9	LSHP	R			yes	
009-147	-94.33475	30.46968	147	9	LSHP	S/R X			yes	
010-092	-94.33639	30.4754	92	10	SH	S	3601		yes	
011-050	-94.33687	30.47945	50	11	BG	R			yes	
012-134	-94.33449	30.47992	134	12	CT	S			yes	
013-037	-94.33749	30.47781	37	13	USPO	R	3601	no	no	

Appendix B. Sample Point Locations

Point ID	Y coordinate	X Coordinate	Sample Point	Polygon ID	Vegetation Class	Seismic Type	Burn Unit	Soil	Herb Plot	Comments
014-049	-94.3498	30.48055	49	14	BG	S			yes	
015-171	-94.34927	30.47788	171	15	UNKNOWN	R			yes	
016-042	-94.35463	30.47932	42	16	USPO	R			yes	
017-036	-94.33958	30.48761	36	17	USPO	R			yes	
018-123	-94.34191	30.48455	123	18	WL UNKNOWN	S			yes	
019-122	-94.34317	30.48404	122	19	WL UNKNOWN	NEITHER			yes	NO GRID NEARBY
020-167	-94.34775	30.48184	167	20	UNKNOWN	S			yes	
020-168	-94.35235	30.48128	168	20	UNKNOWN	R			yes	
020-169	-94.35298	30.48346	169	20	UNKNOWN	R			yes	
020-170	-94.34706	30.48364	170	20	UNKNOWN	R			yes	
023-164	-94.33885	30.48957	164	23	UNKNOWN	R			yes	
023-165	-94.3385	30.49048	165	23	UNKNOWN	S			yes	
023-166	-94.33722	30.48965	166	23	UNKNOWN	R			yes	
024-121	-94.33248	30.49076	121	24	WL UNKNOWN	R			yes	
025-120	-94.33235	30.49304	120	25	WL UNKNOWN	NEITHER			yes	NO GRID NEARBY
026-044	-94.33312	30.48912	44	26	USPO	R			yes	
027-035	-94.33881	30.49903	35	27	USPO	S			yes	
028-001	-94.33829	30.50612	1	28	WPS	R			yes	
028-002	-94.3351	30.49413	2	28	WPS	S			yes	
028-003	-94.3347	30.5081	3	28	WPS	S			yes	
028-014	-94.33456	30.50058	14	28	WPS	S			yes	
028-019	-94.3359	30.50332	19	28	WPS	R			yes	
029-034	-94.34249	30.50261	34	29	USPO	NEITHER			yes	NO GRID NEARBY
030-051	-94.33674	30.51014	51	30	BG	R			yes	
031-008	-94.33589	30.52752	8	31	WPS	S			yes	
031-009	-94.33223	30.53159	9	31	WPS	R			yes	

Appendix B. Sample Point Locations

Point ID	Y coordinate	X Coordinate	Sample Point	Polygon ID	Vegetation Class	Seismic Type	Burn Unit	Soil	Herb Plot	Comments
031-010	-94.33517	30.52938	10	31	WPS	S/R X			yes	
031-017	-94.33693	30.52486	17	31	WPS	R			yes	
032-088	-94.33883	30.50481	88	32	MSOP	S			yes	
032-089	-94.341	30.50862	89	32	MSOP	R			yes	
032-178	-94.33706	30.5093	178	32	MSOP	R			yes	
033-033	-94.34541	30.50864	33	33	USPO	S			yes	
034-052	-94.34043	30.51356	52	34	BG	S			yes	
035-162	-94.33924	30.51892	162	35	UNKNOWN	S			yes	
035-163	-94.34006	30.52239	163	35	UNKNOWN	R			yes	
036-125	-94.34258	30.51798	125	36	WL UNKNOWN	R			yes	
037-119	-94.34426	30.51928	119	37	WL UNKNOWN	S			yes	
038-161	-94.34204	30.51171	161	38	WL UNKNOWN	NEITHER			yes	
039-004	-94.34081	30.51487	4	39	WPS	R			yes	
039-005	-94.3357	30.51285	5	39	WPS	R			yes	
039-006	-94.34376	30.51324	6	39	WPS	R			yes	
039-007	-94.33363	30.54092	7	39	WPS	S			yes	
039-018	-94.33122	30.53952	18	39	WPS	S			yes	
040-174	-94.33232	30.53665	174	40	UNKNOWN	S			yes	
041-071	-94.32963	30.54358	71	41	MSOP	R			yes	
041-078	-94.32678	30.54535	78	41	MSOP	S/R X			yes	
041-079	-94.32928	30.54096	79	41	MSOP	R			yes	
042-118	-94.32837	30.54962	118	42	WL UNKNOWN	S			yes	
043-024	-94.33112	30.55495	24	43	USPO	S			yes	
044-058	-94.33008	30.55299	58	44	BG	S			yes	
045-070	-94.35678	30.52857	70	45	MSOP	R			yes	
045-080	-94.33304	30.55992	80	45	MSOP	NEITHER			yes	NO GRID NEARBY

Appendix B. Sample Point Locations

Point ID	Y coordinate	X Coordinate	Sample Point	Polygon ID	Vegetation Class	Seismic Type	Burn Unit	Soil	Herb Plot	Comments
045-081	-94.34709	30.52904	81	45	MSOP	S			yes	
046-053	-94.34533	30.53361	53	46	BG	S			yes	
047-173	-94.3482	30.53752	173	47	UNKNOWN	R	3702		yes	
048-090	-94.34443	30.53584	90	48	SH	R	3702		yes	
049-054	-94.34068	30.5366	54	49	BG	S	3702	no	no	
050-055	-94.34494	30.5417	55	50	BG	R	3702	no	no	
051-068	-94.3442	30.54451	68	51	BG	S	3702	no	no	
052-069	-94.34199	30.54596	69	52	BG	S	3702	no	no	
053-091	-94.34797	30.54824	91	53	SH	NEITHER	3701		yes	NO GRID NEARBY
055-057	-94.35235	30.5458	57	55	BG	S	3701		no	
056-117	-94.35592	30.54233	117	56	WL UNKNOWN	NEITHER	3701		yes	
057-056	-94.34852	30.55166	56	57	BG	R	3701	no	no	
059-039	-94.34754	30.5583	39	59	USPO	S	3701	no	no	
060-040	-94.35006	30.55815	40	60	USPO	S	3701	no	no	
061-060	-94.34147	30.53171	60	61	BG	R			yes	
063-059	-94.35246	30.53047	59	63	BG	NEITHER	3701	no	no	
064-072	-94.35189	30.52838	72	64	MSOP	S	3702	no	no	
064-073	-94.34951	30.53279	73	64	MSOP	R			yes	
064-074	-94.3447	30.52754	74	64	MSOP	S	3702		no	
064-075	-94.34698	30.52312	75	64	MSOP	S			yes	
064-076	-94.33586	30.53649	76	64	MSOP	S	3702	no	no	
064-077	-94.34025	30.55053	77	64	MSOP	S	3702	no	no	
064-083	-94.33359	30.54855	83	64	MSOP	S	3702	no	no	
065-021	-94.33732	30.56213	21	65	USPO	S	3702	no	no	
065-032	-94.34943	30.56862	32	65	USPO	R	3702	no	no	
066-023	-94.33725	30.56952	23	66	USPO	R			yes	

Appendix B. Sample Point Locations

Point ID	Y coordinate	X Coordinate	Sample Point	Polygon ID	Vegetation Class	Seismic Type	Burn Unit	Soil	Herb Plot	Comments
067-116	-94.34494	30.57482	116	67	WL UNKNOWN	NEITHER			yes	NO GRID NEARBY
068-022	-94.34018	30.57716	22	68	USPO	R			yes	
069-157	-94.34664	30.57922	157	69	LSHP	S			yes	
069-158	-94.34917	30.57484	158	69	LSHP	R			yes	
070-175	-94.34747	30.57946	175	70	UNKNOWN	S			yes	
071-155	-94.35245	30.57957	155	71	LSHP	S			yes	
071-156	-94.34177	30.5791	156	71	LSHP	S			yes	
072-025	-94.35082	30.58423	25	72	USPO	S			yes	
073-132	-94.34964	30.5832	132	73	CT	S			yes	
074-153	-94.35642	30.5846	153	74	LSHP	S			yes	
074-154	-94.35711	30.59225	154	74	LSHP	R			yes	
076-113	-94.35616	30.59477	113	76	WL UNKNOWN	NEITHER			yes	NO GRID NEARBY
077-045	-94.34778	30.58796	45	77	USPO	S			yes	
078-027	-94.33263	30.58931	27	78	USPO	S			yes	
080-131	-94.33395	30.58562	131	80	CT	R			yes	
081-114	-94.33717	30.58489	114	81	WL UNKNOWN	NEITHER			yes	NO GRID NEARBY
082-115	-94.33677	30.58601	115	82	WL UNKNOWN	NEITHER			yes	NO GRID NEARBY
083-012	-94.3388	30.58839	12	83	WPS	R	3201		yes	
083-016	-94.34478	30.59779	16	83	WPS	R	3201	no	no	
084-062	-94.34486	30.47782	62	84	BG	S	3201	no	no	
085-160	-94.34625	30.59193	160	85	PL ROW	S			yes	
086-172	-94.35222	30.60011	172	86	UNKNOWN	R			yes	
086-176	-94.34185	30.60718	176	86	UNKNOWN	R			yes	
087-177	-94.34626	30.6071	177	87	UNKNOWN	NEITHER			yes	
088-064	-94.34485	30.61078	64	88	BG	S			yes	
089-065	-94.35175	30.61771	65	89	BG	S/R X			yes	

Appendix B. Sample Point Locations

Point ID	Y coordinate	X Coordinate	Sample Point	Polygon ID	Vegetation Class	Seismic Type	Burn Unit	Soil	Herb Plot	Comments
090-067	-94.35881	30.61847	67	90	BG	R			yes	
092-066	-94.35596	30.60872	66	92	BG	S			yes	
093-028	-94.34324	30.58842	28	93	USPO	S			yes	
094-046	-94.34283	30.58562	46	94	USPO	S			yes	
095-063	-94.34004	30.60791	63	95	BG	S			yes	
097-026	-94.34163	30.59818	26	97	USPO	R			yes	
097-029	-94.32938	30.46837	29	97	USPO	S/R X			yes	
097-043	-94.32974	30.46959	43	97	USPO	S			yes	
098-095	-94.35219	30.46211	95	98	FHP	S			yes	
098-101	-94.33226	30.47035	101	98	FHP	R			yes	
098-104	-94.35806	30.52892	104	98	FHP	S			yes	
099-041	-94.34825	30.51955	41	99	USPO	S			yes	
109-030	-94.35881	30.54447	30	109	USPO	S			yes	
110-031	-94.35614	30.54746	31	110	USPO	NEITHER			yes	NO GRID NEARBY
112-126	-94.3329	30.56557	126	112	UP	R	3701	no	no	
112-127	-94.33688	30.56489	127	112	UP	S	3701	no	no	
113-011	-94.33377	30.56335	11	113	WPS	R			yes	
113-013	-94.34254	30.57102	13	113	WPS	S			yes	
113-015	-94.33493	30.56429	15	113	WPS	R			yes	
113-020	-94.34943	30.58004	20	113	WPS	S			yes	
114-133	-94.33321	30.59318	133	114	CT	R			yes	
115-061	-94.33368	30.58814	61	115	BG	S			yes	
116-128	-94.33529	30.58361	128	116	UP	S			yes	
116-129	-94.34886	30.60283	129	116	UP	S			yes	
116-130	-94.35107	30.47323	130	116	UP	S			yes	
117-047	-94.34577	30.47169	47	117	USPO	S			yes	

Appendix B. Sample Point Locations

Point ID	Y coordinate	X Coordinate	Sample Point	Polygon ID	Vegetation Class	Seismic Type	Burn Unit	Soil	Herb Plot	Comments
118-135	-94.34334	30.47611	135	118	FH	R			yes	
118-136	-94.36304	30.47673	136	118	FH	S/R X			yes	
118-137	-94.35268	30.4763	137	118	FH	S			yes	
118-138	-94.34114	30.4685	138	118	FH	R			yes	
118-139	-94.33631	30.4657	139	118	FH	R			yes	
119-093	-94.36037	30.47972	93	119	FHP	S			yes	
119-096	-94.35579	30.4721	96	119	FHP	S			yes	
119-097	-94.34005	30.48026	97	119	FHP	S			yes	
119-098	-94.35972	30.47198	98	119	FHP	R			yes	
119-099	-94.35521	30.4777	99	119	FHP	R			yes	
119-100	-94.33819	30.49126	100	119	FHP	S			yes	
120-094	-94.3412	30.51762	94	120	FHP	S			yes	
120-102	-94.33593	30.49705	102	120	FHP	R			yes	
120-103	-94.33397	30.4869	103	120	FHP	R			yes	
120-105	-94.34291	30.52466	105	120	FHP	R			yes	
120-106	-94.34577	30.51769	106	120	FHP	R	3702	no	no	
120-107	-94.33961	30.518	107	120	FHP	S			yes	
120-108	-94.34437	30.50563	108	120	FHP	R			yes	
120-109	-94.3364	30.55648	109	120	FHP	R			yes	
120-110	-94.35521	30.61429	110	120	FHP	R			yes	
120-111	-94.35169	30.60826	111	120	FHP	R			yes	
120-112	-94.35403	30.60237	112	120	FHP	R			yes	

Appendix C
Vegetation Sample Forms

Knight IV 3D
Turkey Creek Vegetation Sampling and Mapping
Data Form--General Sample Site Description

Sample Plot and Type: _____

Date & Time: _____

GPS Position-NAD 83 DATUM

Investigators: _____

Latitude: _____

Longitude: _____

Habitat Type: _____

Potential Alliance Classification: _____

Adjacent Habitat Type(s): _____

General Topography (position in the landscape): _____

Hydrology: _____

Soils: _____

Depth (inches)	Horizon	Matrix Color (Munsell, moist)	Mottle Color (Munsell, moist)	Mottle Abundance/Contrast	Texture, Structure, Concretion,

Hydric Soil Indicators:

- | | | |
|--|---|--|
| <input type="checkbox"/> Histosol | <input type="checkbox"/> Low-Chroma Colors | <input type="checkbox"/> Concretions |
| <input type="checkbox"/> Histic Epipedon | <input type="checkbox"/> Sulfidic Odor | <input type="checkbox"/> Aquic Moisture Regime |
| <input type="checkbox"/> Reducing Conditions | <input type="checkbox"/> Gleyed | <input type="checkbox"/> Other (explain below) |
| <input type="checkbox"/> High Organic Content in Sandy Soils | <input type="checkbox"/> Organic Streaking in Sandy Soils | |
| <input type="checkbox"/> Listed on Local Hydric Soils List | <input type="checkbox"/> Listed on National Hydric Soils List | |

Additional Comments: _____

Plot Photograph Number: _____

Other Photographs: Number _____

Description: _____

Additional Comments:

Unknown Species:

Designation	Stratum	Plot Number	Scientific Name

Plot or Site Sketch:

KNIGHT PHASE IV 3D

STRATA DATA FORM

PRE-OPERATIONAL VEGETATION ANALYSIS

PLOT COORDINATES:	DATE/TIME/TEAM:	SAMPLE PLOT #:
--------------------------	------------------------	-----------------------

SPECIES	SHRUB (0.5-2.5 cm)	LARGE WOODY (>2.5 cm dbh)

Comments:

NATIONAL PARK SERVICE NPS FORM 10 - 812
(JUNE 1982) Park Code _____

Technical Name _____ Cat.No. _____

Common Name _____ Acc.No. _____

Locality _____ Elevation _____

Habitat _____

Collected By _____ Date _____

CPO 897-860 HERBARIUM COLLECTION

NATIONAL PARK SERVICE NPS FORM 10 - 812
(JUNE 1982) Park Code _____

Technical Name _____ Cat.No. _____

Common Name _____ Acc.No. _____

Locality _____ Elevation _____

Habitat _____

Collected By _____ Date _____

CPO 897-860 HERBARIUM COLLECTION

NATIONAL PARK SERVICE NPS FORM 10 - 812
(JUNE 1982) Park Code _____

Technical Name _____ Cat.No. _____

Common Name _____ Acc.No. _____

Locality _____ Elevation _____

Habitat _____

Collected By _____ Date _____

CPO 897-860 HERBARIUM COLLECTION

NATIONAL PARK SERVICE NPS FORM 10 - 812
(JUNE 1982) Park Code _____

Technical Name _____ Cat.No. _____

Common Name _____ Acc.No. _____

Locality _____ Elevation _____

Habitat _____

Collected By _____ Date _____

CPO 897-860 HERBARIUM COLLECTION

Appendix D
Tables

Table 1: International Classification of Ecological Communities Alliances with Potential for Occurrence in the Turkey Creek Unit of the Big Thicket National Preserve (NatureServe 2006)²

Alliance Name Scientific Name / Common Name
Evergreen Forest
<i>Pinus taeda</i> – <i>Pinus echinata</i> Forest Alliance / Loblolly Pine – Shortleaf Pine Forest Alliance
Deciduous Forest
<i>Acer negundo</i> Temporarily Flooded Forest Alliance / Box-elder Temporarily Flooded Forest Alliance
<i>Acer rubrum</i> – <i>Fraxinus pennsylvanica</i> Seasonally Flooded Forest Alliance / Red Maple – Green Ash Seasonally Flooded Forest Alliance
<i>Betula nigra</i> – (<i>Platanus occidentalis</i>) Temporarily Flooded Forest Alliance / River Birch – (Sycamore) Temporarily Flooded Forest Alliance
<i>Celtis laevigata</i> – <i>Ulmus crassifolia</i> Temporarily Flooded Forest Alliance / Sugarberry – Cedar Elm Temporarily Flooded Forest Alliance
<i>Celtis laevigata</i> Forest Alliance / Sugarberry Forest Alliance
<i>Crataegus (aestivalis, opaca, rufula)</i> Seasonally Flooded Forest Alliance / (Eastern Mayhaw, Western Mayhaw, Rufous Mayhaw) Seasonally Flooded Forest Alliance
<i>Fagus grandifolia</i> – <i>Magnolia grandiflora</i> Forest Alliance / American Beech – Southern Magnolia Forest Alliance
<i>Fagus grandifolia</i> – <i>Quercus alba</i> Forest Alliance / American Beech – White Oak Forest Alliance
<i>Fagus grandifolia</i> Temporarily Flooded Forest Alliance / American Beech Temporarily Flooded Forest Alliance
<i>Fraxinus caroliniana</i> Seasonally Flooded Forest Alliance / Water Ash Seasonally Flooded Forest Alliance
<i>Fraxinus pennsylvanica</i> – <i>Ulmus americana</i> – <i>Celtis (occidentalis, laevigata)</i> Temporarily Flooded Forest Alliance / Green Ash – American Elm – (Northern Hackberry, Sugarberry) Temporarily Flooded Forest Alliance
<i>Nyssa aquatica</i> – (<i>Taxodium distichum</i>) Semipermanently Flooded Forest Alliance / Water Tupelo – (Bald-cypress) Semipermanently Flooded Forest Alliance
<i>Nyssa (aquatica, biflora, ogeche)</i> Floodplain Seasonally Flooded Forest Alliance / (Water Tupelo, Swamp Blackgum, Ogeechee Tupelo) Floodplain Seasonally Flooded Forest Alliance
<i>Platanus occidentalis</i> – (<i>Fraxinus pennsylvanica, Celtis laevigata, Acer saccharinum</i>) Temporarily Flooded Forest Alliance / Sycamore – (Green Ash, Sugarberry, Silver Maple) Temporarily Flooded Forest Alliance
<i>Populus american</i> Temporarily Flooded Forest Alliance / Eastern Cottonwood Temporarily Flooded Forest Alliance
<i>Quercus alba</i> – <i>Quercus (falcata, stellata)</i> Forest Alliance / White Oak – (Southern Red Oak, Post Oak) Forest Alliance
<i>Quercus alba</i> – (<i>Quercus nigra</i>) Forest Alliance / White Oak – (Water Oak) Forest Alliance
<i>Quercus falcata</i> Forest Alliance / Southern Red Oak Forest Alliance
<i>Quercus (laurifolia, phellos)</i> Seasonally Flooded Forest Alliance / (Diamondleaf Oak, Willow Oak) Seasonally Flooded Forest Alliance

Table 1: International Classification of Ecological Communities Alliances with Potential for Occurrence in the Turkey Creek Unit of the Big Thicket National Preserve (NatureServe 2006)²

Alliance Name Scientific Name / Common Name
<i>Quercus lyrata</i> – (<i>Carya aquatica</i>) Seasonally Flooded Forest Alliance / Overcup Oak – (Water Hickory) Seasonally Flooded Forest Alliance
<i>Quercus (michauxii, pagoda, shumardii)</i> – <i>Liquidambar styraciflua</i> Temporarily Flooded Forest Alliance / (Swamp Chestnut Oak, Cherrybark Oak, Shumard Oak) – Sweetgum Temporarily Flooded Forest Alliance
<i>Quercus muehlenbergii</i> – (<i>Acer saccharum</i>) Forest Alliance / Chinquapin Oak – (Sugar Maple) Forest Alliance
<i>Quercus phellos</i> Seasonally Flooded Forest Alliance / Willow Oak Seasonally Flooded Forest Alliance
<i>Quercus (phellos, nigra, laurifolia)</i> Temporarily Flooded Forest Alliance / (Willow Oak, Water Oak, Diamondleaf Oak) Temporarily Flooded Forest Alliance
<i>Quercus shumardii</i> – <i>Quercus pagoda</i> Forest Alliance / Shumard Oak – Cherrybark Oak Forest Alliance
<i>Quercus stellata</i> – <i>Pinus taeda</i> Depression Seasonally Flooded Forest Alliance / Post Oak – Loblolly Pine Depression Seasonally Flooded Forest Alliance
<i>Quercus stellata</i> – <i>Quercus marilandica</i> Forest Alliance / Post Oak – Blackjack Oak Forest Alliance
<i>Quercus texana</i> – (<i>Quercus lyrata</i>) Seasonally Flooded Forest Alliance / Nuttall Oak – (Overcup Oak) Seasonally Flooded Forest Alliance
<i>Salix nigra</i> Seasonally Flooded Forest Alliance / Black Willow Seasonally Flooded Forest Alliance
<i>Salix nigra</i> Temporarily Flooded Forest Alliance / Black Willow Temporarily Flooded Forest Alliance
<i>Taxodium distichum</i> – <i>Nyssa (aquatica, biflora, ogeche)</i> Seasonally Flooded Forest Alliance / Bald-cypress – (Water Tupelo, Swamp Blackgum, Ogeche Tupelo) Seasonally Flooded Forest Alliance
<i>Taxodium distichum</i> – (<i>Platanus occidentalis</i>) Temporarily Flooded Forest Alliance / Bald-cypress – (Sycamore) Temporarily Flooded Forest Alliance
<i>Taxodium distichum</i> Semipermanently Flooded Forest Alliance / Bald-cypress Semipermanently Flooded Forest Alliance
Mixed Evergreen-Deciduous Forest
<i>Fagus grandifolia</i> – <i>Magnolia grandiflora</i> Forest Alliance / American Beech – Southern Magnolia Forest Alliance
<i>Magnolia virginiana</i> – <i>Nyssa biflora</i> – (<i>Quercus laurifolia</i>) Saturated Forest Alliance / Sweetbay – Swamp Blackgum – (Diamondleaf Oak) Saturated Forest Alliance
<i>Pinus echinata</i> – <i>Quercus (alba, falcata, stellata, velutina)</i> Forest Alliance / Shortleaf Pine – (White Oak, Southern Red Oak, Post Oak, Black Oak) Forest Alliance
<i>Pinus taeda</i> – <i>Quercus (alba, falcata, stellata)</i> Forest Alliance / Loblolly Pine – (White Oak, Southern Red Oak, Post Oak) Forest Alliance
<i>Pinus taeda</i> – <i>Quercus (phellos, nigra, laurifolia)</i> Temporarily Flooded Forest Alliance /

Table 1: International Classification of Ecological Communities Alliances with Potential for Occurrence in the Turkey Creek Unit of the Big Thicket National Preserve (NatureServe 2006)²

Alliance Name
Scientific Name / Common Name
Loblolly Pine – (Willow Oak, Water Oak, Diamondleaf Oak) Temporarily Flooded Forest Alliance
Evergreen Woodland
<i>Pinus palustris</i> – <i>Pinus (elliottii, serotina)</i> Saturated Woodland Alliance / Longleaf Pine – (Slash Pine, Pond Pine) Saturated Woodland Alliance
<i>Pinus palustris</i> / <i>Quercus spp.</i> Woodland Alliance / Longleaf Pine / Oak species Woodland Alliance
<i>Pinus palustris</i> Woodland Alliance / Longleaf Pine Woodland Alliance
Deciduous Woodland
<i>Maclura pomifera</i> Woodland Alliance / Osage-orange Woodland Alliance
<i>Nyssa biflora</i> Seasonally Flooded Woodland Alliance / Swamp Blackgum Seasonally Flooded Woodland Alliance
<i>Populus deltoides</i> Temporarily Flooded Woodland Alliance / Eastern Cottonwood Temporarily Flooded Woodland Alliance
<i>Quercus muehlenbergii</i> Woodland Alliance / Chinquapin Oak Woodland Alliance
<i>Quercus stellata</i> – <i>Quercus marilandica</i> Woodland Alliance / Post Oak – Blackjack Oak Woodland Alliance
Mixed Evergreen-Deciduous Woodland
<i>Pinus (echinata, taeda)</i> – <i>Quercus (incana, margarettiae, arkansana)</i> Woodland Alliance / (Shortleaf Pine, Loblolly Pine) – (Bluejack Oak, Sand Post Oak, Arkansas Oak) Woodland Alliance
<i>Pinus (echinata, taeda)</i> – <i>Quercus (stellata, marilandica, falcata)</i> Woodland Alliance / (Shortleaf Pine, Loblolly Pine) – (Post Oak, Blackjack Oak, Southern Red Oak) Woodland Alliance
Evergreen Shrubland
<i>Arundinaria americana</i> Temporarily Flooded Shrubland Alliance / Giant Cane Temporarily Flooded Shrubland Alliance
<i>Cyrilla racemiflora</i> – <i>Ilex coriacea</i> – (<i>Cliftonia monophylla</i>) Saturated Shrubland Alliance / Titi – Big Gallberry – (Black Titi) Saturated Shrubland Alliance
Deciduous Shrubland
<i>Baccharis halimifolia</i> Saturated Shrubland Alliance / Groundsel-tree Saturated Shrubland Alliance
<i>Cephalanthus occidentalis</i> Semipermanently Flooded Shrubland Alliance / Buttonbush Semipermanently Flooded Shrubland Alliance
<i>Crataegus spathulata</i> Shrubland Alliance / Littlehip Haw Shrubland Alliance
<i>Salix nigra</i> Temporarily Flooded Shrubland Alliance / Black Willow Temporarily Flooded Shrubland Alliance
<i>Sarcobatus vermiculatus</i> Intermittently Flooded Shrubland Alliance / Black Greasewood Intermittently Flooded Shrubland Alliance
Perennial Graminoid Vegetation

Table 1: International Classification of Ecological Communities Alliances with Potential for Occurrence in the Turkey Creek Unit of the Big Thicket National Preserve (NatureServe 2006)²

Alliance Name Scientific Name / Common Name
<i>Andropogon gerardii</i> – (<i>Calamagrostis americana</i> , <i>Panicum virgatum</i>) Herbaceous Alliance / Big Bluestem – (Bluejoint, Switchgrass) Herbaceous Alliance
<i>Aristida palustris</i> – <i>Andropogon</i> (<i>capillipes</i> , <i>glaucopsis</i>) – <i>Rhynchospora</i> spp. Seasonally Flooded Herbaceous Alliance / Longleaf Three-awn – (White Bluestem, Chalky Bluestem) – Beaksedge species Seasonally Flooded Herbaceous Alliance
<i>Dichanthelium scoparium</i> Saturated Herbaceous Alliance / Broom Witchgrass Saturated Herbaceous Alliance
<i>Eleocharis quadrangulata</i> – <i>Sagittaria</i> spp. Seasonally Flooded Herbaceous Alliance / Squarestem Spikerush – Arrowhead species Seasonally Flooded Herbaceous Alliance
<i>Juncus effusus</i> Seasonally Flooded Herbaceous Alliance / Soft Rush Seasonally Flooded Herbaceous Alliance
<i>Muhlenbergia capillaris</i> Herbaceous Alliance / Hair-awn Muhly Herbaceous Alliance
<i>Panicum hemitomon</i> Seasonally Flooded Temperate Herbaceous Alliance / Maidencane Seasonally Flooded Temperate Herbaceous Alliance
<i>Panicum virgatum</i> – <i>Tripsacum dactyloides</i> Herbaceous Alliance / Switchgrass – Eastern Gammagrass Herbaceous Alliance
<i>Panicum virgatum</i> Temporarily Flooded Herbaceous Alliance / Switchgrass Temporarily Flooded Herbaceous Alliance
<i>Paspalum vaginatum</i> Temporarily Flooded Herbaceous Alliance / Seashore Crowngrass Temporarily Flooded Herbaceous Alliance
<i>Phragmites australis</i> Semipermanently Flooded Herbaceous Alliance / Common Reed Semipermanently Flooded Herbaceous Alliance
<i>Phragmites australis</i> Temporarily Flooded Herbaceous Alliance / Common Reed Temporarily Flooded Herbaceous Alliance
<i>Rhynchospora oligantha</i> – <i>Sarracenia</i> spp. – (<i>Aristida beyrichiana</i> , <i>Ctenium aromaticum</i>) – <i>Osmunda cinnamomea</i> / <i>Sphagnum</i> spp. Saturated Herbaceous Alliance / Feather-bristle Beaksedge – Pitcher plant species – (Southern Wiregrass, Toothache Grass) – Cinnamon Fern / Peatmoss species Saturated Herbaceous Alliance
<i>Schizachyrium scoparium</i> – <i>Bouteloua curtipendula</i> Herbaceous Alliance / Little Bluestem – Sideoats Grama Herbaceous Alliance
<i>Schizachyrium scoparium</i> – <i>Paspalum plicatulum</i> Herbaceous Alliance / Little Bluestem – Brownseed Crowngrass Herbaceous Alliance
<i>Schizachyrium scoparium</i> – <i>Sorghastrum nutans</i> Herbaceous Alliance / Little Bluestem – Yellow Indiangrass Herbaceous Alliance
<i>Schoenoplectus californicus</i> Semipermanently Flooded Herbaceous Alliance / Giant Bulrush Semipermanently Flooded Herbaceous Alliance
<i>Schoenoplectus pungens</i> Semipermanently Flooded Herbaceous Alliance / Threesquare Semipermanently Flooded Herbaceous Alliance
<i>Typha</i> (<i>angustifolia</i> , <i>latifolia</i>) – (<i>Schoenoplectus</i> spp.) Semipermanently Flooded Herbaceous Alliance / (Narrowleaf Cattail, Broadleaf Cattail) – (Clubrush species) Semipermanently

Table 1: International Classification of Ecological Communities Alliances with Potential for Occurrence in the Turkey Creek Unit of the Big Thicket National Preserve (NatureServe 2006)²

Alliance Name Scientific Name / Common Name
Flooded Herbaceous Alliance
<i>Typha domingensis</i> Seasonally Flooded Temperate Herbaceous Alliance / Southern Cattail Seasonally Flooded Temperate Herbaceous Alliance
<i>Zizaniopsis miliacea</i> Seasonally Flooded Temperate Herbaceous Alliance / Southern Wild Rice Seasonally Flooded Temperate Herbaceous Alliance
Perennial Forb Vegetation
<i>Adiantum capillus-veneris</i> Saturated Herbaceous Alliance / Southern Maidenhair Saturated Herbaceous Alliance
<i>Bigelowia nuttallii</i> Herbaceous Alliance / Nuttall's Rayless-goldenrod Herbaceous Alliance
<i>Justicia americana</i> Temporarily Flooded Herbaceous Alliance / Common Water-willow Temporarily Flooded Herbaceous Alliance
<i>Ludwigia peploides</i> Semipermanently Flooded Herbaceous Alliance / Floating Water-primrose Semipermanently Flooded Herbaceous Alliance
<i>Polygonum</i> spp. (section <i>Persicaria</i>) Seasonally Flooded Herbaceous Alliance / Smartweed species Seasonally Flooded Herbaceous Alliance
<i>Sagittaria latifolia</i> Semipermanently Flooded Herbaceous Alliance / Broadleaf Arrowhead Semipermanently Flooded Herbaceous Alliance
Hydromorphic Rooted Vegetation
<i>Brasenia schreberi</i> Permanently Flooded Herbaceous Alliance / Watershield Permanently Flooded Herbaceous Alliance
<i>Nelumbo lutea</i> Permanently Flooded Temperate Herbaceous Alliance / American Lotus Permanently Flooded Temperate Herbaceous Alliance
<i>Nymphaea odorata</i> – <i>Nuphar</i> spp. Permanently Flooded Temperate Herbaceous Alliance / White Water-lily – Yellow Pond-lily species Permanently Flooded Temperate Herbaceous Alliance
<i>Nymphoides aquatica</i> Permanently Flooded Herbaceous Alliance / Big Floating heart Permanently Flooded Herbaceous Alliance
<i>Potamogeton</i> spp. – <i>Ceratophyllum</i> spp. – <i>Elodea</i> spp. Permanently Flooded Herbaceous Alliance / Pondweed species – Coontail species – Waterweed species Permanently Flooded Herbaceous Alliance
Annual Graminoid or Forb Vegetation
<i>Sedum pulchellum</i> Saturated Herbaceous Alliance / Widow's-cross Saturated Herbaceous Alliance
Bryophyte Vegetation
<i>Sphagnum</i> spp. – <i>Pallavicinia lyellii</i> Saturated Nonvascular Alliance / Peatmoss species – <i>Pallavicinia</i> Saturated Nonvascular Alliance

²Downloaded from Nature Serve Explorer, March 2006. Searched database for all Texas Plant communities, and edited it for those communities that could potentially occur in the Turkey Creek Unit.

Table 2. Correlation of ICEC Alliances (NatureServe 2006) to Harcombe & Marks (1979) Vegetation Communities in the Turkey Creek Unit of the Big Thicket National Preserve

D= Dominant species; C = Common species; P = may be present

Vegetation Community (Harcombe & Marks, 1979)	General Description	Overstory	Understory / Shrub Layer	Herb Layer	Soils / Topography	Examples of Corresponding ICEC Vegetation Alliance
UPLAND FORESTS						
Sandill Pine Forest (SH)	Short, open woodlands on level, river terraces. Low tree density and basal area, low shrub density, sparse herb layer, and much exposed sand	D – bluejack oak and post oak C – widely scattered – loblolly pine, shortleaf pine, and longleaf pine	C – P – yaupon holly, flowering dogwood		Soils > 90% sand. On level, river terraces	*Longleaf Pine / Oak species Woodland Alliance -OR- *(Shortleaf Pine Loblolly Pine)- (Bluejack oak, Sand Post Oak, Arkansas Oak Woodland Alliance
Upland Pine Forest (UP)	Open stands of longleaf pine, highly variable height and density	Open stands of longleaf pine. C – loblolly and shortleaf pine P – bluejack oak, blackjack oak, southern red oak, post oak, and sweetgum	Highly variable (due to history, fire, etc). C _ saplings of overstory species, flowering dogwood, American beautyberry, southern wax myrtle, and winged sumac	If wood species absent from understory, herb layer is dense & diverse (composite, legumes, & grasses). D – bluestem grasses	On level-to-gently-rolling hilltops with sandy surface soils.	*Longleaf Pine / Oak species Woodland Alliance -OR- *Longleaf Pine Woodland Alliance -OR- *Post Oak – Blackjack Oak Woodland Alliance
Wetland Pine Savannah (WPS)	Occurs in areas with poor drainage, small depressions to broad swampy interdistributary flats.	D-longleaf pine and /or loblolly pine P-black gum, sweetgum, southern red oak	C-sweetbay, wax myrtle, titi	Grassy meadows which includes sedges, insectivorous plants, and orchids	Poorly drained soils	*Longleaf Pine - (Slash Pine, Pond Pine) Saturated Woodland Alliance

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Vegetation Community (Harcombe & Marks, 1979)	General Description	Overstory	Understory / Shrub Layer	Herb Layer	Soils / Topography	Examples of Corresponding ICEC Vegetation Alliance
SLOPE FORESTS						
<p>Upper Slope Pine Oak Forest (USPO)</p> <p>H&M Note: this type (USPO) corresponds to forester's loblolly-shortleaf pine forest type (USFS, 1969; SAF Type No.80)</p>	<p>Closed canopy with moderately well developed shrub layer. Distinguished from the Upper Pine Forest by the abundance of shortleaf pine (Peak importance in this type), and by importance of oaks in the canopy. Mockernut hickory, yaupon holly, black jack oak, American beautyberry, and sassafras reach their maxima in this type</p>	<p>D – shortleaf pine with some combination of the following as co-dominant: southern red oak, longleaf pine, loblolly pine, and blackjack oak C – post oak, sweetgum, white oak. Usually, the pines are more important than the hardwoods</p>	<p>C – yaupon holly, flowering dogwood, American beautyberry</p>			<p>*Loblolly Pine – Shortleaf Pine Forest Alliance -OR- *Shortleaf Pine – (White Oak, Southern Red Oak, Post Oak, Black Oak) Forest Alliance -OR- *Loblolly Pine – (White Oak, Southern Red, Post Oak) Forest Alliance -OR- *(Shortleaf Pine, Loblolly Pine) – (Bluejack Oak, Sand Post Oak, Arkansas Oak) Forest Alliance -OR- *(Shortleaf Pine, Loblolly Pine) / Post Oak, Blackjack Oak, Southern Red Oak) Woodland Alliance</p>
<p>Mid Slope Oak Pine Forest (MSOP)</p> <p>H&M Note: this type (MSOP) corresponds to forester's loblolly-shortleaf or loblolly hardwoods forest type</p>	<p>Generally taller, more closed canopy & greater proportion of hardwoods in overstory than USPO. Southern red oak, white oak, flowering dogwood, and yaupon holly reach</p>	<p>D – loblolly pine, southern red oak, shortleaf pine, and white oak. C – sweetgum, blackgum, and red maple</p>	<p>Dominated by understory species rather than canopy species saplings. D – flowering dogwood, yaupon, American holly, and red maple</p>			<p>*White Oak – (Southern Red Oak, Post Oak) Forest Alliance -OR- *Southern Red Oak Forest Alliance -OR- *Shortleaf Pine – (White Oak, Southern Red Oak, Post Oak, Black Oak) Forest Alliance</p>

Table 2. Correlation of ICEC Alliances (NatureServe 2006) to Harcombe & Marks (1979) Vegetation Communities in the Turkey Creek Unit of the Big Thicket National Preserve

D= Dominant species; C = Common species; P = may be present

Vegetation Community (Harcombe & Marks, 1979)	General Description	Overstory	Understory / Shrub Layer	Herb Layer	Soils / Topography	Examples of Corresponding ICEC Vegetation Alliance
(USFS, 1969; SAF Type No.82) Mid Slope Oak Pine Forest (continued)	their maximum importance in this type.					-OR- *Loblolly Pine (White Oak, Southern Red Oak, Post Oak) Forest Alliance
Lower Slope Hardwood Pine Forest (LSHP) H&M Note: Widely recognized as beech-magnolia (SAF No. 90) in lower slopes and ravines	Gentle-to-steep slopes near creeks. Greater canopy density and hardwood abundance than MSOP (dependent of stand history).	In north part of Big Thicket, American beech is conspicuous dominant, but absent in the southern part.	D – American holly, yaupon holly		Gentle-to-steep slopes near creeks	*American Beech – White Oak Forest Alliance
		D – Southern magnolia, loblolly pine, white oak, water oak C – laurel oak, willow oak, American holly				-OR- *American Beech – Southern Magnolia Forest Alliance -OR- *Loblolly Pine (White Oak, Southern Red Oak, Post Oak) Forest Alliance
FLOODPLAINS, FLATS, AND SWAMPS						
Floodplain Hardwood Pine Forest (FHP)	Occurs in active floodplains of smaller streams. Openness of understory distinguish this from LSHP (otherwise, much in common)	D – loblolly pine, American beech C – sweetgum, blackgum, southern magnolia, water oak	Paucity of shrubs. D - ironwood		Occurs in active floodplains of smaller streams.	*American Beech Temporarily Flooded Forest Alliance
						-OR-
						*(Southern Magnolia) Temporarily Flooded Forest Alliance
						-OR- *American Beech Temporarily Flooded Forest Alliance -OR- *(Swamp Chestnut Oak, Cherrybark Oak, Shumard Oak) –Temporarily

Table 2. Correlation of ICEC Alliances (NatureServe 2006) to Harcombe & Marks (1979) Vegetation Communities in the Turkey Creek Unit of the Big Thicket National Preserve

D= Dominant species; C = Common species; P = may be present

Vegetation Community (Harcombe & Marks, 1979)	General Description	Overstory	Understory / Shrub Layer	Herb Layer	Soils / Topography	Examples of Corresponding ICEC Vegetation Alliance
						Flooded Forest Alliance
<p>Floodplain Hardwood Forest (FH)</p> <p>H&M Note: Braun (1950) & Kulcher (1964) – Southern Floodplain Forests. Oak-Gum-Cypress type (USFS 1969). H&M think corresponds best with Sweetgum - Nuttall Oak – Willow Oak type (SAF No. 109)</p>	<p>Occurs in active floodplains of larger streams (and Neches River). Many overstory trees with very wide trunks. Open understory; overstory canopy often discontinuous, but filled in by midstory species (ironwood and/or American holly). Distinguished from FHP by the absence of American beech and southern magnolia (except along sloughs of upper terraces), reduced or absent loblolly pine and increased abundance and size of sweetgum and water oak.</p>	<p>D – water oak, sweetgum C – ironwood, (American beech and loblolly pine may occur on higher, less flooded terraces). Other C – swamp chestnut oak, blackgum, water hickory, red maple, American holly, and cherrybark oak.</p>	<p>Open understory, but where overstory canopy is open, midstory is dense and fills in with ironwood and American holly. Lower shrub level sparse. D – understory: Sebastian bush and possumhaw Vines – muscadine grape, rattan vine</p>		<p>In shallow back swamps and sloughs, common species: red maple, Carolina ash, buttonbush, water elm, and water hickory</p>	<p>*(Water Oak) Forest Alliance -OR- * (Willow Oak, Water Oak, Diamondleaf Oak) Temporarily Flooded Forest Alliance -OR- *(Diamondleaf Oak, Willow Oak) Temporarily Flooded Forest Alliance -OR- *Overcup Oak – (Water Hickory) Seasonally Flooded Forest Alliance -OR- *Willow Oak Seasonally Flooded Forest Alliance -OR- *Nuttall Oak – (Overcup Oak) Seasonally Flooded Forest Alliance -OR- *Swamp Blackgum Seasonally Flooded Woodland Alliance -OR- *Chinquapin Oak – (Sugar Maple) Forest Alliance</p>
<p>Cypress Tupelo Swamp (CT)</p>	<p>In deeper backswamps, sloughs, oxbows, and inlets of the Neches River.</p>	<p>D – cypress and tupelo Only other woody species: buttonbush, Carolina ash, and water elm. More common</p>	<p>P – buttonbush</p>		<p>In deeper backswamps, sloughs, oxbows, and inlets of the Neches River.</p>	<p>*Bald Cypress – (Water Tupelo, Swamp Blackgum, Ogeche Tupelo) Seasonally Flooded Forest Alliance -OR-</p>

Table 2. Correlation of ICEC Alliances (NatureServe 2006) to Harcombe & Marks (1979) Vegetation Communities in the Turkey Creek Unit of the Big Thicket National Preserve

D= Dominant species; C = Common species; P = may be present

Vegetation Community (Harcombe & Marks, 1979)	General Description	Overstory	Understory / Shrub Layer	Herb Layer	Soils / Topography	Examples of Corresponding ICEC Vegetation Alliance
<p>Cypress Tupelo Swamp (continued)</p> <p>H&M Note: SAF Types 101, 102, 103 (depending on whether cypress, tupelo occur separately or together)</p>	<p>Sizes range from many hectares to a few rows of trees.</p>	<p>around edges of swamp as is water hickory.</p>				<p>*(Water Tupelo, Swamp Blackgum, Ogeche Tupelo) Floodplain Seasonally Flooded Forest Alliance -OR- *Water Tupelo – (Bald Cypress) Semipermanently Flooded Forest Alliance -OR- *Bald Cypress Semipermanently Flooded Forest Alliance</p>
<p>Wetland Baygall Shrub Thickets (BG)</p> <p>H&M Note: Sometimes, baygalls are associated with sparse overstory of longleaf pine on poorly drained interdistributary flats, in a mosaic with open grassy meadows. In this case, the vegetation would be Wetland Pine Savanna</p>	<p>Frequently occur in depressional areas where water stands most of the year.</p>	<p>D – laurel oak and/or blackgum C and characteristic – sweetbay, red maple C – green ash, sweetgum, cypress</p>	<p>D – Titi, baygall holly, Depending on overstory, shrub layer may be relatively open or impenetrable</p>		<p>Frequently occur in depressional areas where water stands most of the year.</p>	<p>*Titi – Big Gallberry – (Black Titi) Saturated Shrubland Alliance -OR- *Sweetbay – Swamp Blackgum – (Diamondleaf Oak) Saturated Forest Alliance</p>