ALTERNATIVE #4B
NET CHANGE FROM SUITABLE ACRES FROM CURRENT MGMT (ALT #1) TO ALTERNATIVE #4B

8.	**Forest Land Not Appropriate for Timber Production (Net change +23209)**		**86091**	
	~ RCW Colonies		6619 (No change)	MA #2, #6
	~ RCW Recruitment		3648 (No change)	MA #2, #6
	~ Other T&E (plus RCW expansion acres)		5107 (-2420 acres)	MA #1, #2
	~ Experimental Forest		2561 (No change)	MA #11
	~ Recreation Areas		6094 (+2084 acres)	MA #9
	~ Streamside Acres		50514 (+16032 acres)	MA #4
	~ Archaeological, Historical, & Scenic Special Management		11573 (+7638 acres)	MA #8
	~ Administrative Adjustment Acres		(-25 acres)	MA #10
9.	**NET UNSUITABLE FOREST LAND**			**132180**
10.	**TOTAL SUITABLE FOREST LAND**			**486643**
	~ Mgmt Area #1 Upland Forest*	162006		
	~ Mgmt Area #2 HMA - RCW/Pine Woodlands*	324637		

* Note: Acres in Mgmt Area less those acres within the Mgmt Area that are mgmt for RCW's or Other Pets

NOTE ALSO: Other Unsuitable acres have been moved between management areas but do not effect suitability therefore not included in this table.

ALTERNATIVE #5
NET CHANGE FROM SUITABLE ACRES FROM CURRENT MGMT (ALT #1) TO ALTERNATIVE #5

8.	**Forest Land Not Appropriate for Timber Production (Net change +3543**		**98214**	
	~ RCW Colonies		6619 (No change)	MA #2, #6
	~ RCW Recruitment		3648 (No change)	MA #2, #6
	~ Other T&E (plus RCW expansion acres)		3793 (-3734 acres)	MA #1, #2
	~ Experimental Forest		2561 (No change)	MA #11
	~ Recreation Areas		5348 (+1338 acres)	MA #9
	~ Streamside Acres		48358 (+13876 acres)	MA #4
	~ Archaeological, Historical, & Scenic Special Management		22581 (+18646 acres)	MA #8
	~ Wilderness (Not Congressionally Designatied)		5331 (+5331 acres)	MA #7
	~ Administrative Adjustment Acres		-25 (-25 acres)	MA #10
9.	**NET UNSUITABLE FOREST LAND**			**144303**
10.	**TOTAL SUITABLE FOREST LAND**			**474520**
	~ Mgmt Area #1 Upland Forest*	232350		
	~ Mgmt Area #2 HMA - RCW/Pine Woodlands*	242170		

* Note: Acres in Mgmt Area less those acres within the Mgmt Area that are mgmt for RCW's or Other Pets

NOTE ALSO: Other Unsuitable acres have been moved between management areas but do not effect suitability therefore not included in this table.

ALTERNATIVE #6
NET CHANGE FROM SUITABLE ACRES FROM CURRENT MGMT (ALT #1) TO ALTERNATIVE #6

8.	**Forest Land Not Appropriate for Timber Production (Net change +121740)**		**184522**	
	~ RCW Colonies		6619 (No change)	MA #2, #6
	~ RCW Recruitment		3648 (No change)	MA #2, #6
	~ Other T&E (plus RCW expansion acres)		1737 (-5790 acres)	MA #1, #2
	~ Experimental Forest		2561 (No change)	MA #11
	~ Recreation Areas		5348 (+1338 acres)	MA #9
	~ Streamside Acres		95516 (+61034 acres)	MA #4
	~ Archaeological, Historical, & Scenic Special Management		8603 (+4668 acres)	MA #8
	~ Wilderness (Not Congressionally Designated)		60515 (+60515 acres)	MA #7
	~ Administrative Adjustment Acres		-25 (-25 acres)	MA #10
9.	**NET UNSUITABLE FOREST LAND**			**230611**
10.	**TOTAL SUITABLE FOREST LAND**			**388212**
	~ Mgmt Area #1 Upland Forest*	186361		
	~ Mgmt Area #2 HMA - RCW/Pine Woodlands*	201851		

* Note: Acres in Mgmt Area less those acres within the Mgmt Area that are mgmt for RCW's or Other Pets

NOTE ALSO: Other Unsuitable acres have been moved between management areas but do not effect suitability therefore not included in this table.

ALTERNATIVE #7
NET CHANGE FROM SUITABLE ACRES FROM CURRENT MGMT (ALT #1) TO ALTERNATIVE #7

8.	**Forest Land Not Appropriate for Timber Production (Net change +121740)**		**184522**	
	~ RCW Colonies		6619 (No change)	MA #2, #6
	~ RCW Recruitment		3648 (No change)	MA #2, #6
	~ Other T&E (plus RCW expansion acres)		1737 (-5790 acres)	MA #1, #2
	~ Experimental Forest		2561 (No change)	MA #11
	~ Recreation Areas		5348 (+1338 acres)	MA #9
	~ Streamside Acres		95516 (+61034 acres)	MA #4
	~ Archaeological, Historical, & Scenic Special Management		35546 (+31611 acres)	MA #8
	~ Wilderness (Not Congressionally Designated)		33572 (+33572 acres)	MA #7
	~ Administrative Adjustment Acres		-25 (-25 acres)	MA #10
9.	**NET UNSUITABLE FOREST LAND**			**230611**
10.	**TOTAL SUITABLE FOREST LAND**			**388212**
	~ Mgmt Area #1 Upland Forest*	186361		
	~ Mgmt Area #2 HMA - RCW/Pine Woodlands*	201851		

* Note: Acres in Mgmt Area less those acres within the Mgmt Area that are mgmt for RCW's or Other Pets

NOTE ALSO: Other Unsuitable acres have been moved between management areas but do not effect suitability therefore not included in this table.

ALTERNATIVE #8
NET CHANGE FROM SUITABLE ACRES FROM CURRENT MGMT (ALT #1) TO ALTERNATIVE #8

8.	**Forest Land Not Appropriate for Timber Production (Net change +2393**		**86712**	
	~ RCW Colonies		6619 (No change)	MA #2, #6
	~ RCW Recruitment		3648 (No change)	MA #2, #6
	~ Other T&E (plus RCW expansion acres)		3753 (-3774 acres)	MA #1, #2
	~ Experimental Forest		2561 (No change)	MA #11
	~ Recreation Areas		6094 (+2084 acres)	MA #9
	~ Streamside Acres		49807 (+15325 acres)	MA #4
	~ Archaeological, Historical, & Scenic Special Management		14205 (+10270 acres)	MA #8
	~ Administrative Adjustment Acres		-25 (-25 acres)	MA #10
9.	**NET UNSUITABLE FOREST LAND**		**132751**	
10.	**TOTAL SUITABLE FOREST LAND**		**486072**	
	~ Mgmt Area #1 Upland Forest*	222764		
	~ Mgmt Area #2 HMA - RCW/Pine Woodlands*	232614		
	~ Mgmt Area #6 Longleaf Ridge*	30694		

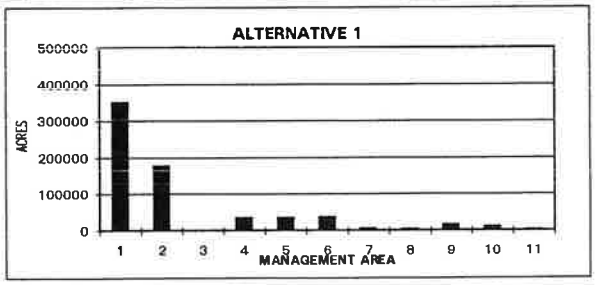
Of the acres within MA #2 and MA #6 silviculture methods will be limited to thinning on 50000 acres and only salvage on the 6525 acres of Hardwood.

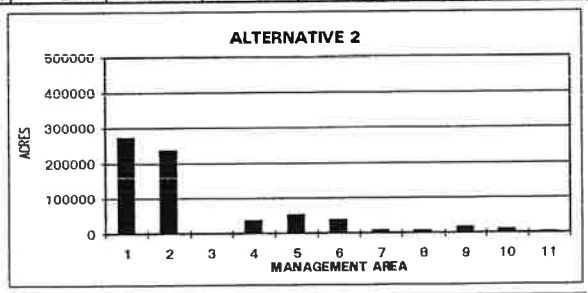
* Note: Acres in Mgmt Area less those acres within the Mgmt Area that are mgmt for RCW's or Other Pets

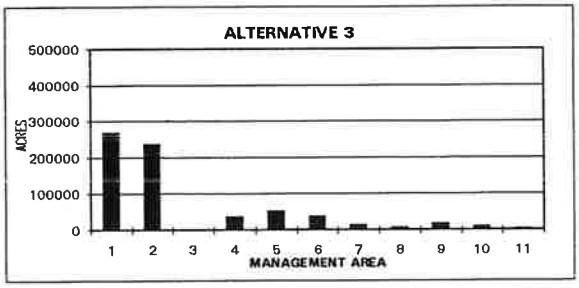
NOTE ALSO: Other Unsuitable acres have been moved between management areas but do not effect suitability therefore not included in this table.

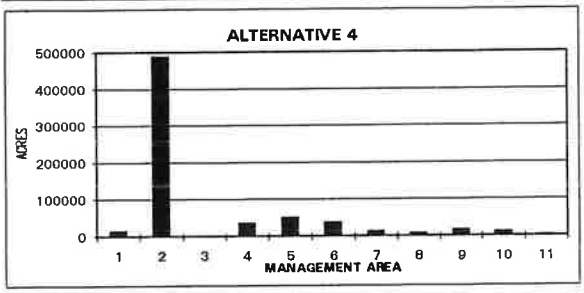
MANAGEMENT AREA ACREAGES

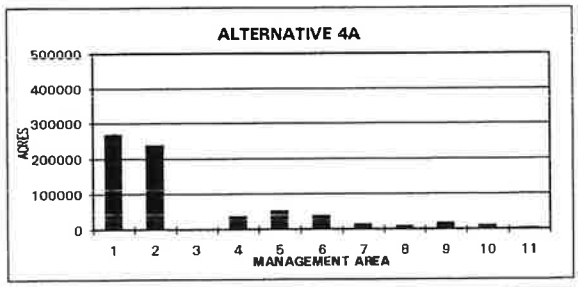
	MANAGEMENT AREAS	ALTERNATIVES									
		1	2	3	4	4a	4b	5	6	7	8
1	UPLAND FOREST	350600	270750	266909	13395	267014	163116	233384	187392	187392	217845
2	RCW/PINE WOODLANDS	176594	234885	234627	488622	235003	339901	255196	212824	212824	249928
6	LONGLEAF RIDGE	0	0	0	0	0	0	0	0	0	32319
3	GRASSLAND	35142	35142	35142	34992	34992	34992	35142	35142	35142	34492
4	STREAMSIDE ZONES	34482	52155	50918	50514	50514	50514	48358	95516	95516	49807
7	WILDERNESS/ROADLESS	37162	37162	37162	37162	37162	37162	42493	97677	70734	37162
8	SPECIAL AREAS	5067	7704	13040	12153	12153	12153	23161	9183	36126	15285
9	RECREATION	4334	5608	5608	6568	6568	6568	5672	5672	5672	6568
5	AQUATIC/MAJOR LAKES	16312	16312	16312	16312	16312	16312	16312	16312	16312	16312
10	ADMINISTRATIVE & SPECIAL	9687	9662	9662	9662	9662	9662	9662	9662	9662	9662
11	EXPERIMENTAL	2561	2561	2561	2561	2561	2561	2561	2561	2561	2561

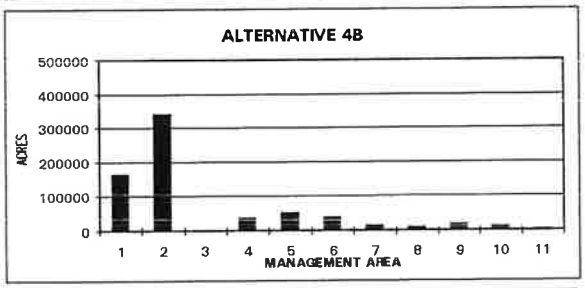


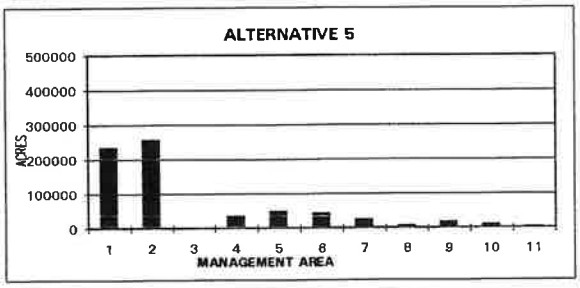


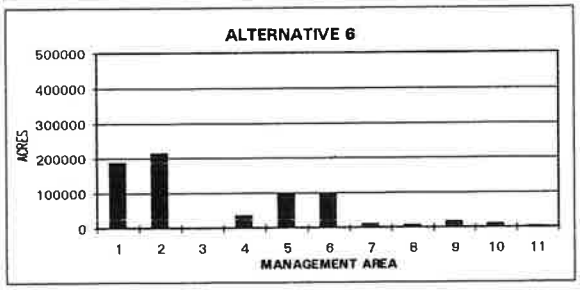


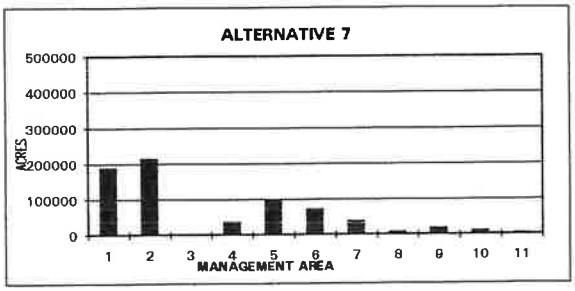


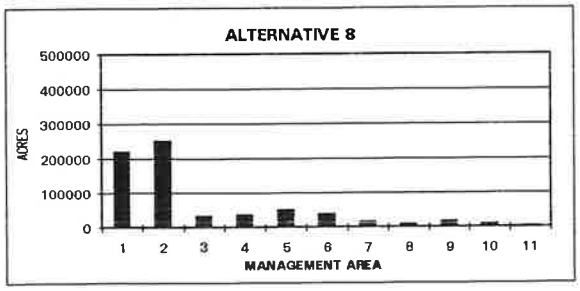












FOREST ALTERNATIVES- SPECIAL AREAS

AREA NAME/LOCATIONS	ALT.1	ALT.2	ALT.3	ALT.4,4A,4B	ALT.5	ALT.6	ALT.7	ALT.8	APPROX. ACRESÂ
ANGELINA NF									
Angelina River Bottom	N/A	N/A	Riparian	Same as 3	Same as 3	Same as 3	Same as 3	Same as 3	6,110
Angelina River Corridor	N/A	N/A	Special Area *	N/A	N/A	Riparian	Same as 6	N/A	950
Attoyac	N/A	N/A	Riparian	Same as 3	Same as 3	Wild & Scenic	Same as 6	Same as 3	3,580
Attoyac	N/A	N/A	Special Area	Same as 3	Same as 3	Same as 3	Same as 3	Same as 3	180
Ayish	N/A	N/A	Riparian	Same as 3	Same as 3	Same as 3	Same as 3	Same as 3	1,200
Ayish	N/A	N/A	Special Area	Same as 3	Same as 3	Same as 3	Same as 3	Same as 3	1,330
Boykin Springs	N/A	N/A	Special Area	Same as 3	Same as 3	RNA	Same as 6	Within LL Ridge	350
Big & Green Creeks	N/A	N/A	N/A	N/A	Special Area	Within LL Ridge	Same as 6	Same as 6	400
C-25,27,29/31,39	N/A	N/A	N/A	N/A	Special Area	N/A	N/A	N/A	1,060
Catahoula Barrens	N/A	N/A	Special Area	Same as 3	Same as 3	Within LL Ridge	Same as 6	Same as 6	580
Longleaf Ridge (LL Ridge)	N/A	N/A	N/A	N/A	N/A	Wilderness	Special Area	Same as 7	32,880
McGee Bend	N/A	N/A	N/A	N/A	Special Area	Same as 5	Same as 5	Within LL Ridge	690
Neches River Corridor	Wild & Scenic	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	785
Old Aldridge	N/A	Special Area	Same as 2	Same as 2	Same as 2	Within LL Ridge	Same as 6	Same as 6	600
Pophers Creek	N/A	N/A	N/A	N/A	Special Area	Same as 5	Same as 5	Same as 5	170
Turkey Hill	Wilderness	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	5,290
Upland Island	Wilderness	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	13,390
Yellowjacket Branch	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Special Area	589
TNH Sites	Inclusions	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	MA-8d Areas	27
SAM HOUSTON NF									

FOREST ALTERNATIVES- SPECIAL AREAS (continued)

AREA NAME/LOCATIONS	ALT.1	ALT.2	ALT.3	ALT.4,4A,4B	ALT.5	ALT.6	ALT.7	ALT.8	APPROX. ACRESÂ
Big Creek	Special Area	Same as 1	Alt. 1 + 3,630	Same as 3	Alt. 1 + 5,300	Same as 5	Same as 5	Alt. 1 + 500	1,420
Big Woods	N/A	N/A	Special Area	N/A	Wilderness	Same as 5	Same as 5	N/A	1,300
Henry Lake Branch	N/A	N/A	N/A	N/A	Wild & Scenic	Same as 5	Same as 5	N/A	150
Nebletts Creek	N/A	N/A	Special Area**	N/A	Same as 3	Same as 3	Same as 3	N/A	100
Winters Bayou Area	Special Area	Same as 1	Same as 1	Alt. 1 + 410	Wilderness	Same as 5	Same as 5	Alt. 1 + 617	***970
Winters Bayou Creek	N/A	N/A	N/A	Wild & Scenic	Same as 4	Same as 4	Same as 4	Same as 4	260
Harmon Creek	N/A	N/A	N/A	N/A	N/A	Wilderness	Same as 6	N/A	2,170
Little Lake Creek	Wilderness	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	3,810
TNH Sites	Inclusions	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	MA-8d Areas	9
DAVY CROCKETT NF									
Big Slough	Wilderness	Same as 1	Same as 1	Same as 1	Same as 1	Alt. 1 + 1,138	Same as 6	Same as 1	***3,640
Cochino Bayou	N/A	N/A	Special Area	Same as 3	Same as 3	Same as 3	Same as 3	Same as 3	270
Neches River Corridor	Wild & Scenic	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	1,165
Alabama Creek	N/A	N/A	N/A	N/A	N/A	Wilderness	Same as 6	N/A	12,040
TNH Sites	Inclusions	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	MA-8d Areas	10
SABINE NF									
Beech Ravines	Botanical	Same as 1	Alt. 1 + 500	Same as 3	Alt. 1 + 4,585	Wilderness	Same as 6	Scenic Area	***520
Colorow Creek	Botanical	Same as 1	Same as 1	Same as 1	Same as 1	RNA	Same as 6	Scenic Area	230
Bear Creek	N/A	N/A	Riparian	Same as 3	Same as 3	Same as 3	Same as 3	Same as 3	665
Fox Hunters Hill	N/A	N/A	N/A	N/A	Special Area	Same as 5	Same as 5	MA-8d (451)	850
Indian Mounds	Wilderness	Same as 1	Same as 1	Same as 1	Alt. 1 + 3,720	Same as 5	Same as 5	Same as 1	***11,040

FOREST ALTERNATIVES- SPECIAL AREAS (continued)

AREA NAME/LOCATIONS	ALT.1	ALT.2	ALT.3	ALT.4,4A,4B	ALT.5	ALT.6	ALT.7	ALT.8	APPROX. ACRESÂ
Mill Creek Cove	Special Area	RNA	Same as 2	Same as 2	Same as 2	Same as 2	Same as 2	Same as 2	225
Six Mile Creek	N/A	N/A	N/A	N/A	Special Area	Same as 5	Same as 5	N/A	410
Starke Tract	N/A	N/A	N/A	N/A	Special Area	Wilderness	Same as 6	MA-8d (448)	448
TNH Sites	Inclusions	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	MA-8d Areas	721
CADDO/LBJ GRASSLANDS									
Lake Fannin	Special Area	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	200
Crosstimbers	RNA	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	380
TNH Sites	Inclusions	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	Same as 1	MA-8d Areas	500

1.Total acres rounded to nearest five acres from data base.

*Angelina River Corridor South includes McGee Bend.
**Acres are partially included in MA-4, the remainder in MA-8
***Does not include acres added in various alternatives.

TABLE 3 PRESENT NET VALUE ANALYSIS OF SELECTED BENCHMARKS AND ALTERNATIVES RANKED ACCORDING TO HIGHEST PRESENT NET VALUE
(MILLIONS OF DOLLARS - 4% DISCOUNT RATE)

ALT/BM	PNV	PNB	PVC	BEN/COST RATIO	REC PNB	W/L PNB	RNG PNB	TMB PNB	S&W PNB	MIN PNB	REC PVC	W/L PVC	RNG PVC	TMB PVC	S&W PVC	MIN PVC	OTHER PVC 1/
MAXPNV	**2189**	**2809**	**620**	4.531	1471	53	7	1165	67	46	91	126	8	167	15	14	199
MAXTMB	**2066**	**2725**	**659**	4.135	1471	55	7	1077	69	46	91	135	8	196	15	14	200
ALT #1	**1989**	**2495**	**506**	4.931	1470	37	7	868	62	51	65	68	8	137	15	14	199
ALT #2	**1940**	**2536**	**596**	4.255	1471	46	7	899	67	46	91	127	8	145	15	14	196
ALT #3	**1919**	**2524**	**605**	4.172	1471	54	7	878	68	46	90	130	8	152	15	14	196
ALT #8	**1815**	**2453**	**633**	3.875	1472	60	7	803	67	44	104	135	8	160	15	14	202
ALT #4A	**1789**	**2444**	**655**	3.731	1472	55	7	797	67	46	104	139	8	171	15	14	204
ALT #4B	**1738**	**2390**	**652**	3.666	1472	56	7	744	67	44	104	140	8	168	15	14	203
ALT #4	**1689**	**2333**	**644**	3.623	1472	56	7	689	67	42	104	140	8	161	15	13	203
ALT #5	**1683**	**2265**	**582**	3.892	1471	55	7	627	66	39	90	130	8	124	15	13	202
ALT #7	**1548**	**2132**	**584**	3.651	1470	53	7	506	64	32	84	135	8	132	15	11	199
ALT #6	**1543**	**2043**	**500**	4.086	1470	54	7	417	64	31	90	101	6	76	15	11	201
MINLVL	**1462**	**1815**	**353**	5.280	1136	40	6	538	61	33	50	52	7	65	10	11	158
PNVMKT	**562**	**1183**	**621**	1.905	5	0	7	1165	0	6	91	126	8	168	15	14	199

1/ Other cost includes cultural resource, lands, protection, facilities, and GA

GROUPING SUMMARY BY ALTERNATIVE AND PERIOD.

ACTIVITY/ OUTPUT	UNIT OF MEASURE	PERIOD	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 4B	ALT 5	ALT 6	ALT 7	ALT 8
AT22 TRAIL CONST	MILE	1	195	211	211	455	455	455	195	195	216	455
		2	124	0	0	0	0	0	150	150	100	0
		3	0	0	0	0	0	0	0	0	0	0
		4	0	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0	0
RECREATION DEV AND DISP	RVD	1	25457055	25807055	25807055	26207055	26207055	26207055	25475273	25630273	25555273	26207055
		2	28977653	29275653	29275653	30707653	30707653	30707653	29086479	29263479	29140479	30707653
		3	32319146	32245146	32245146	33827146	33827146	33827146	32535940	32724940	32446940	33827146
		4	35364140	35290140	35290140	36872140	36872140	36872140	35563974	35771974	35484974	36872140
		5	38817906	38663906	38663906	40245906	40245906	40245906	38919257	39141257	38804257	40245906
FIRE	ACRES	1	354734	876588	893347	828279	996481	997159	909060	109497	942982	956956
		2	358932	892422	899807	843591	1011704	1028594	914457	111990	956329	974145
		3	363131	892569	906631	845508	1013310	1028843	932967	112025	956419	974394
		4	375958	909401	930739	847264	1034711	1071129	960830	112135	978263	1013191
		5	375383	915745	934317	847264	1031305	1068852	960830	112135	975564	1010802
CTSI T&E STRUC IMP	STRUCT	1	2520	2520	2520	2520	2520	2520	2520	2520	2520	2520
		2	2170	2170	2170	2170	2170	2170	2170	2170	2170	2170
		3	1890	1890	1890	1890	1890	1890	1890	1890	1890	1890
		4	1540	1540	1540	1540	1540	1540	1540	1540	1540	1540
		5	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260
CW23 WLDLF HAB IMP MAIN	ACRES	1	15596	15596	15596	15596	15596	15596	15596	15596	15596	15596
		2	15520	15520	15520	15520	15520	15520	15520	15520	15520	15520
		3	15456	15456	15456	15456	15456	15456	15456	15456	15456	15456
		4	15380	15380	15560	15380	15380	15380	15380	15380	15380	15380
		5	15318	15318	15318	15318	15318	15318	15318	15318	15318	15318
W/L SMALL (GRASS) SMALL GAME USER DAYS	WFUD	1	51113	51113	51113	51113	51113	51113	51113	51113	51113	51113
		2	54230	54230	54230	54230	54230	54230	54230	54230	54230	54230
		3	57471	57471	57471	57471	57471	57471	57471	57471	57471	57471
		4	63488	63488	63488	63488	63488	63488	63488	63488	63488	63488
		5	70127	70127	70127	70127	70127	70127	70127	70127	70127	70127
W/L BIG (GRASS) BIG GAME USER DAYS	WFUD	1	98279	98279	98279	98279	98279	98279	98279	98279	98279	98279
		2	108697	108697	108697	108697	108697	108697	108697	108697	108697	108697
		3	122088	122088	122088	122088	122088	122088	122088	122088	122088	122088
		4	134870	134870	134870	134870	134870	134870	134870	134870	134870	134870
		5	148974	148974	148974	148974	148974	148974	148974	148974	148974	148974

GROUPING SUMMARY BY ALTERNATIVE AND PERIOD.

ACTIVITY/ OUTPUT	UNIT OF MEASURE	PERIOD	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 4B	ALT 5	ALT 6	ALT 7	ALT 8
W/L FISH (GRASS)	WFUD	1	104816	104816	104816	104816	104816	104816	104816	104816	104816	104816
FISH USER DAYS		2	115784	115784	115784	115784	115784	115784	115784	115784	115784	115784
		3	127886	127886	127886	127886	127886	127886	127886	127886	127886	127886
		4	141269	141269	141269	141269	141269	141269	141269	141269	141269	141269
		5	156859	156859	156859	156859	156859	156859	156859	156859	156859	156859
BIG GAME	WFUD	1	457413	469524	470356	472107	458016	472653	467510	459973	468114	471023
		2	457479	469816	469531	471733	458015	472554	466037	458722	467033	471374
		3	457435	466968	468678	474213	458174	474564	467959	458734	468595	471914
		4	457655	468928	469968	475257	458144	475304	467679	457564	468216	473154
		5	457674	469287	470069	475299	458178	475788	467840	457650	468303	473658
W44	WFUD	1	229650	165257	158157	177677	170113	174500	173958	137541	143231	176278
SG USER DAY		2	199640	162978	165322	213213	198266	204092	199602	159775	169245	199056
		3	226150	156225	163575	226580	205742	213974	209929	177300	178550	202482
		4	230040	178745	185846	245187	228154	239803	231154	194688	188768	224492
		5	234470	205313	209906	247897	239875	252029	236171	206906	191046	230621
ET24P	ACRES	1	56538	36995	31250	1048	11362	7229	9924	11826	6117	14675
PLANTING		2	58612	23196	20354	9660	14930	12924	14183	1326	8829	16632
		3	60289	18409	18476	7854	12898	8519	6377	1534	5067	15699
		4	65218	9161	10551	9522	14299	11925	5976	1585	7659	14610
		5	64701	19556	17047	16658	17297	17828	13536	2015	11399	19220
LF 125	DAMS	1	320	320	320	320	320	320	320	320	320	320
DAMS ADMIN		2	320	320	320	320	320	320	320	320	320	320
		3	320	320	320	320	320	320	320	320	320	320
		4	320	320	320	320	320	320	320	320	320	320
		5	320	320	320	320	320	320	320	320	320	320
LF 22	STRUCT	1	1	2	2	3	3	3	3	3	3	3
FACILITY CONST		2	2	4	4	3	3	3	3	3	3	3
		3	3	2	2	2	2	2	2	2	2	2
		4	3	1	1	1	1	1	1	1	1	1
		5	1	1	1	1	1	1	1	1	1	1
ROAD MAINTENANCE	MILES	1	23800	23800	23750	22750	22750	22750	22250	21750	21750	22750
		2	23800	23800	23750	22750	22750	22750	22250	21750	21750	22750
		3	23800	23800	23750	22750	22750	22750	22250	21750	21750	22750
		4	23800	23800	23750	22750	22750	22750	22250	21750	21750	22750
		5	23800	23800	23750	22750	22750	22750	22250	21750	21750	22750

GROUPING SUMMARY BY ALTERNATIVE AND PERIOD.

ACTIVITY/ OUTPUT	UNIT OF MEASURE	PERIOD	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 4B	ALT 5	ALT 6	ALT 7	ALT 8
LT223 ROAD RECONST	MILES	1	671	624	654	932	933	870	677	639	505	821
		2	381	396	316	233	266	264	230	244	168	302
		3	12	18	20	25	20	20	75	15	76	20
		4	12	78	139	197	184	164	211	196	196	154
		5	12	18	15	20	20	20	15	15	15	20
JL 23 LANDLINE MAINT	MILES	1	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
		2	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800
		3	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600
		4	2510	2510	2510	2510	2510	2510	2510	2510	2510	2510
		5	2420	2420	2420	2420	2420	2420	2420	2420	2420	2420
JL 24 LANDLINE LOCAT	MILES	1	250	250	250	250	250	250	250	250	250	250
		2	150	150	150	150	150	150	150	150	150	150
		3	150	150	150	150	150	150	150	150	150	150
		4	150	150	150	150	150	150	150	150	150	150
		5	150	150	150	150	150	150	150	150	150	150
JL 261 LAND ADJ 1ST 100	ACRES	1	8160	8160	8160	8160	8160	8160	8160	8160	8160	8160
		2	8160	8160	8160	8160	8160	8160	8160	8160	8160	8160
		3	8160	8160	8160	8160	8160	8160	8160	8160	8160	8160
		4	8160	8160	8160	8160	8160	8160	8160	8160	8160	8160
		5	8160	8160	8160	8160	8160	8160	8160	8160	8160	8160
JL 263 LAND EXCHANGE	ACRES	1	16000	16000	16000	16000	16000	16000	16000	16000	16000	16000
		2	8000	800(	8000	8000	8000	8000	8000	8000	8000	8000
		3	4750	475(	4750	4750	4750	4750	4750	4750	4750	4750
		4	2500	250(	2500	2500	2500	2500	2500	2500	2500	2500
		5	2500	250(	2500	2500	2500	2500	2500	2500	2500	2500
NFML MIN/GEO LEASES	LEASES	1	710	666	666	634	666	647	647	647	584	647
		2	900	788	788	700	788	740	660	610	500	740
		3	960	841	841	748	841	790	705	569	535	790
		4	960	841	841	748	841	790	705	523	535	790
		5	960	841	841	748	841	790	705	482	535	790
NFCA MIN/GEO CASES	CASES	1	3800	3631	3630	3510	3631	3558	3558	3558	3316	3558
		2	3800	3428	3428	3135	3428	3268	3002	3100	2470	3268
		3	3800	3408	3352	3100	3408	3240	2960	2764	2400	3240
		4	3800	3408	3352	3100	3408	3240	2960	2588	2400	3240
		5	3800	3408	3352	3100	3408	3240	2960	2429	2400	3240

GROUPING SUMMARY BY ALTERNATIVE AND PERIOD.

ACTIVITY/ OUTPUT	UNIT OF MEASURE	PERIOD	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 4B	ALT 5	ALT 6	ALT 7	ALT 8
NFMC	CASES	1	60	56	56	53	56	54	54	54	48	54
MIN/GEO COMVAR		2	60	52	52	45	52	48	42	49	30	48
		3	60	52	52	45	52	48	42	44	30	48
		4	60	52	52	45	52	48	42	39	30	48
		5	60	52	52	45	52	48	42	35	30	48
												48
SPEC USE INC	PERMITS	1	9650	9650	9650	9650	9650	9650	9650	9650	9650	9650
		2	10400	10219	10219	10219	10219	10219	10400	10400	10400	10219
		3	11400	11003	11003	11003	11003	11003.2	11400	11400	11400	11003
		4	11400	10805	10805	10805	10805	10804.8	11400	11400	11400	10805
		5	12400	11537	11537	11537	11537	11536.8	12400	12400	12400	11537
ERO	TONS	1	1072741	3172604	2808755	1520673	1851681	1716168	1838100	1744679	1495309	2111078
EROSION RATE		2	1080141	2732962	2452391	1424140	1776269	1633763	1668036	1252847	1303044	2205093
		3	1035782	1997199	2154970	1449801	1729887	7933316	1458478	1155222	1279922	1880526
		4	1034759	1477507	1562040	1369368	1464811	1405685	1171622	1077382	1222792	1750625
		5	1009528	1974251	1895079	1672704	1835538	910355	1717183	1159095	1337435	1060565
SED	TONS	1	543676	599486	590676	563986	573406	581586	575636	440956	449316	591116
SEDIMENT DELIIVERY		2	584813	622223	601543	500613	533093	522783	487703	425083	375053	596243
		3	529019	486209	553039	568869	589339	587879	559949	402069	448699	544979
		4	617259	524129	567389	538089	543679	535209	510009	411759	422839	572999
		5	602599	528459	541849	539839	574889	578539	535879	416589	421999	583659
RCWP	ACRES	1	288960	296212	273797	234832	228323	231123	247228	200357	238226	259468
RCW WP ACRES		2	244095	200074	194487	229638	204989	213638	229498	169322	230692	230057
		3	302233	193383	209768	250075	235981	235955	260048	196266	279421	252216
		4	276360	250622	314588	423532	382817	383519	401633	331732	412735	356243
		5	260396	295888	361967	481363	445688	460102	468167	399351	477395	414212
PIWP	ACRES	1	59643	113954	117158	50438	68832	60701	71814	67061	82753	59884
PILEATED WP ACRES		2	150135	85922	123638	75502	124300	89552	142920	109404	175941	109286
		3	130901	83655	51636	97510	133428	124851	150197	131705	194615	139689
		4	165476	186396	264204	255042	321475	291312	319932	273181	359148	267343
		5	137699	225731	300539	343088	379077	367913	399224	362582	444415	314616
GRSQ	ACRES	1	45317	45108	45317	45317	45041	45317	45317	43377	45317	45317
GRAY SQUIRREL AC		2	44073	45050	45285	45317	45009	45285	45317	43345	45285	45285
		3	48271	51322	51610	51642	51190	51415	51642	49392	51480	51415
		4	49464	53948	54256	54986	53919	54345	54986	52276	54383	54345
		5	49592	55484	55814	57241	55477	56098	57001	54033	56224	56098

GROUPING SUMMARY BY ALTERNATIVE AND PERIOD.

ACTIVITY/ OUTPUT	UNIT OF MEASURE	PERIOD	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 4B	ALT 5	ALT 6	ALT 7	ALT 8
W67 (GRASS)	AUM	1	247393	247393	247393	247393	247393	247393	247393	247393	247393	247393
GRAZING USE		2	266655	266655	266655	266655	266655	266655	266655	266655	266655	266655
		3	276233	276233	276233	276233	276233	276233	276233	276233	276233	276233
		4	276233	276233	276233	276233	276233	276233	276233	276233	276233	276233
		5	276233	276233	276233	276233	276233	276233	276233	276233	276233	276233
LTSY	MCF/PER	15	274647	361365	312377	239722	283060	246435	249646	157922	183941	268649
LONG-TERM YIELD AS OF FINAL PERIOD (AFTER CONVERSION)	MMBF/YR	15	152.2	200.2	173.1	132.8	156.8	136.5	138.3	87.5	101.9	148.8
TIMBER	MMCF/PER	1	202.1	260.9	235.3	169.2	199.6	183.4	161.6	113.6	123.8	204.6
		2	205.7	269.9	235.9	169.2	199.6	183.4	161.6	113.7	124.2	204.6
		3	219.3	276.2	236.0	169.2	199.6	183.4	161.6	113.7	124.4	204.6
		4	253.9	296.7	236.0	169.2	199.6	183.4	161.6	113.7	124.4	204.6
		5	253.9	298.7	236.0	169.2	199.6	183.4	161.6	113.8	124.4	204.6
	MMBF/YR	1	112.0	144.5	130.4	93.8	110.6	101.6	89.5	62.9	68.6	113.4
		2	113.9	149.5	130.7	93.8	110.6	101.6	89.5	63.0	68.8	113.4
		3	121.5	153.0	130.7	93.8	110.6	101.6	89.5	63.0	68.9	113.4
		4	140.7	164.4	130.7	93.8	110.6	101.6	89.5	63.0	68.9	113.4
		5	140.7	165.5	130.7	93.8	110.6	101.6	89.5	63.1	68.9	113.4
X11	CORDS	1	17551	37952	46890	2369	9244	6232	8306	11212	3299	11878
FUELWOOD		2	19317	22789	43494	5877	11504	9553	10746	1791	5813	13261
		3	19317	18878	71542	3998	9400	5378	2988	2454	2494	12558
		4	19317	9484	28804	5470	10011	7805	2405	2446	3680	10359
		5	19317	16955	50564	12731	14428	14657	9987	2917	8586	16053
X80/81	ACRE/FT	1	926258	971301	977228	951122	959896	958280	953837	928167	925079	951808
INC H2O YIELD		2	937630	976008	969985	940802	954981	948946	939966	927811	912680	953942
		3	925873	942235	958661	971691	975045	975183	959414	928355	940320	961007
		4	952448	962734	970417	966000	973434	968044	956653	934115	939901	962414
		5	951412	961451	968018	964897	978126	972678	955858	934753	940583	967708

GROUPING SUMMARY BY ALTERNATIVE AND PERIOD.

ACTIVITY/ OUTPUT	UNIT OF MEASURE	PERIOD	ALT 1	ALT 2	ALT 3	ALT 4	ALT 4A	ALT 4B	ALT 5	ALT 6	ALT 7	ALT 8
UNDISCOUNTED COST	MM$/PER	1	198.8	249.8	254.1	268.4	276.2	272	241.9	216.8	239	267.5
		2	196.9	228.9	230.7	242.2	247.7	246.6	217.9	186.4	219.2	241.6
		3	196.9	224.8	227.6	240.7	245	243.2	220.2	187	224.2	238.5
		4	212.2	234.3	241.1	265.6	263.8	266.5	238.8	198.9	241.9	258.6
		5	222.0	250.7	254.8	279.5	275.8	280.8	250.2	204.6	253.0	272.0
ANNUAL BUDGET	MM$/YR	1	189.6	23.94	24.34	25.42	26.22	25.87	23.11	20.62	23.04	25.49
		2	19.06	22.09	22.4	23.65	24.17	24.06	21.24	18.06	21.44	21.72
		3	19.32	22.2	22.46	23.78	24.22	24.03	21.65	18.41	22.04	23.57
		4	20.92	23.04	23.63	25.99	25.84	26.13	23.29	19.32	23.62	25.36
		5	21.88	24.74	25.16	27.62	27.25	27.76	24.66	20.14	24.997	26.88
PNV @ 4%	MM$	10	1989	1948	1918	1689	1791	1738	1684	1542	1549	1815
RETURN TO COUNTY	MM$/YR	1	5.58	6.63	6.3	5.04	5.73	5.54	4.54	3.08	3.86	5.89

Appendix C

Part I - Minerals & Geology

Introduction

The National Forests in Texas and the Caddo National Grasslands lie in what is known geologically as the East Texas Basin. The LBJ Grasslands lie in the Fort Worth Basin. There are 283,806 acres leased for oil and gas on both the Forests and Grasslands in Texas and there was a backlog of lease requests. Even during times of low oil and gas demand and poor industry economics there remains a relatively steady level of leasing. Exploration on both U.S. and private rights also continues to be a routine activity. Levels of exploration interest fluctuate with economic conditions within the industry. Development of new plays or prospects (theories of occurrence) and drilling technologies also create renewed interest in the area.

Oil & Gas Situation

There are maps on file in the Supervisor's Office in Lufkin that show the potential of the Plan area for gas and oil production. Areas are classified as either high, medium, low, or unknown potential.

High Potential: Geologic environments that are highly favorable for the occurrence of undiscovered oil and/or gas resources. Includes areas previously classified as Known Geologic Structures (KGS). The area is on or near a producing trend and evidence exists that the geologic controls of reservoir, source, and trap necessary for the accumulation of oil and/or gas are present.

Moderate Potential: Indicates the geologic environment is favorable for the occurrence of undiscovered oil and/or gas resources; however, one of the geologic controls necessary for the accumulation of oil and/or gas may be absent.

Low Potential: The geologic, geochemical, and geophysical characteristics do not indicate a favorable environment for the accumulation of oil and/or gas resources. Evidence exists that one or more of the geologic controls necessary for the accumulation of oil and/or gas is absent.

Unknown Potential: A region where the geologic information is insufficient to otherwise categorize potential.

The relatively recent development of horizontal drilling technology, especially as it relates to Austin Chalk and Saratoga Formations, will quite likely increase potential on several areas of the National Forests from that originally mapped and referenced above.

Following is a brief description of the exploration and development potential for the four National Forests and two National Grasslands.

The National Forests in Texas lie in what is known geologically as the East Texas Basin. The US Geological Survey (USGS), in Open File 88-450K (Foote, Massingill and Wells, 1988), divided the basin into 8 oil and gas plays. These plays are:

(1) N.E. Texas basement structure play;
(2) Mexia/Talco fault system play;
(3) N.E. Texas salt anticline play;
(4) Tyler basin structural play;
(5) Tyler basin Woodbine-Eagle Ford play;
(6) West Tyler basin Cotton Valley play;
(7) Sabine Uplift gas play;
(8) Sabine Uplift oil play.

The USGS appraised 294 oil and gas fields within the East Texas Basin discovered between 1895 and 1985. These fields are designated as Class 6 and above (having recoverable quantities of more than 1 million barrels or more of oil (MMBO) and natural gas liquids (NGL) or more than 6 billion cubic feet of gas (BCF), using the USGS field size distribution system.

Class	Oil field size MMBBL (range)	Gas field size BCF (range)
1	0.06125 - 0.0625	0.1875 - 0.375
2	0.0625 - 0.125	0.375 - 0.75
3	0.125 - 0.25	0.75 - 1.5
4	0.25 - 0.5	1.5 - 3
5	0.5 - 1	3 - 6
6	1 - 2	6 - 12
7	2 - 4	12 - 24
8	4 - 8	24 - 48
9	8 - 16	48 - 96
10	16 - 32	96 - 192
11	32 - 64	192 - 384
12	64 - 128	384 - 768
13	128 - 256	768 - 1536
14	256 - 512	1536 - 3072
15	512 - 1024	3072 - 6144
16	1024 - 2048	6144 - 12288
17	2048 - 4096	12288 - 24576
18	4096 - 8192	24576 - 49152
19	8192 - 16384	49152 - 98304
20	16384 - 32768	98304 - 196608

Seventy-six percent of oil fields and 90 percent of gas fields are developed from size 6 or greater field classes. Forty-six percent of field class sizes 1 through 5 are able to be developed.

Structural, stratigraphic, and combination traps occur throughout the area. While most oil is produced from stratigraphic traps, most gas and natural gas liquids (NGL) are produced from combination traps.

Summary of Oil & Gas Potential on NFGT

Angelina National Forest - Approximately 15 percent of the Angelina National Forest is within the Tyler basin structural play; that acreage comprises about 3 percent of the total play area. The forest is located on the extreme east-southeast quadrant of the play. The closest Class 6 production within this play occurs some 35 miles to the west. Approximately 30 percent of the Angelina National Forest is also within the Sabine Uplift oil play; that acreage comprises approximately two percent of the total play. The closest Class 6 production within this play occurs approximately 20 miles to the west-northwest. The northernmost portion of the forest is also within the Austin-Buda fractured Chalk play of the Gulf Coast Basin. There are currently three horizontal oil and gas wells in the Brookeland Field. The average wellsite is 4.15 acres with 0.07 miles of new road built. The average total depth is 3300'. Seismic information indicates that future exploration will most likely be within the Brookeland Field. The *Atlas of Major*

Texas Oil Reservoirs (Galloway et. al. 1983) indicates that the Austin-Buda fractured Chalk lays under the northern portions of the Angelina and Sabine National Forests. However, extensive drilling into that formation has been occurring on and near the southern Sabine National Forest. Several Austin Chalk wells were drilled in the same general location in the early 1980's. At least three Austin Chalk wells were drilled on the southern half of the Angelina National Forest and leasing interest on the southern Angelina has been noted in the last few months. It is evident that the formation extends farther south than indicated in the cited reference.

Because of the production on the Forest, its location within two major plays of the East Texas Basin plays, as well as the Austin-Buda fractured Chalk play of the Gulf Coast Basin, the Angelina National Forest has high potential for occurrence.

Davy Crockett National Forest - One hundred percent of the Davy Crockett National Forest lies inside of the Tyler basin structural play; that acreage comprises 10 percent of the total play. About 50 percent of the Davy Crockett National Forests is within the Woodbine-Eagle Ford play; that acreage comprises some 15 percent of the total play. The Davy Crockett National Forest is also along the Austin-Buda fractured Chalk trend. This southwest-northeast trend contains approximately 50 percent of the forest. There are currently five vertical oil wells in the Laura Lavelle Field. The average well site is 0.53 acres with 0.03 miles of new road built. The average total depth is 1,800 feet. Possible future exploration is expected in the Laura Lavelle Field.

At least two Class 6 fields, Decker Switch and South Laura Lavelle, are part of the Tyler basin structural play within the Davy Crockett National Forest. There is no Class 6 production within the Davy Crockett National Forest within the Woodbine-Eagle Ford play. Because of the production on the forest, its location within two of the major East Texas Basin plays, as well as within the Austin-Buda fractured chalk play within the Gulf Coast Basin, the Davy Crockett National Forest has high potential for occurrence.

Sabine National Forest - Approximately 80 percent of the Sabine National Forest is within the Sabine Uplift oil play; that acreage constitutes about 6 percent of the total play area. Another 45 percent of the forest lies within the Sabine Uplift gas play; that acreage consists of approximately five percent of the total play area. The northern portion of the Sabine National Forest is within the Austin-Buda fractured Chalk play of the Gulf Coast Basin. There are currently seven horizontal and three vertical wells on this forest. The average pad size of the horizontally drilled wells in the Brookeland field is 7.25 acres with 0.06 miles of new access road built to each pad; the total depth averages 8,650 feet. The vertical wells drilled into the Saratoga Annona have an

average pad size of 1.26 acres with 0.04 miles of new road construction and their total depth approximates 2,630 feet.

At least three Class 6 fields, the Huxley, West Joaquin, and Hemphill, are located within the Sabine National Forest. In addition the presence of the Hemphill- Pineland, Brookeland, and Huxley known geologic structures (KGS), at a minimum, indicate the high potential of the Sabine National Forest.

Sam Houston National Forest - Although the Sam Houston National Forest is not located within any of the eight major plays delineated by the USGS, there is production from private mineral estates within the Forest. These reservoirs are located within the sandstones of the Upper Wilcox Group and the Yegua Formation. The traps are domal anticlines formed by regional growth faults of the Wilcox Fault Zone to the south of the Forest. The play is considered small and poorly known. There are currently four vertically drilled oil wells within the Coldsprings field that average 2.44 acres in pad size with 0.21 miles of access road built for each one. The average total depth for these wells is 12,200 feet.

The location of the following fields, Coldspring, Coline, Mercy SW, Morgas, Moroil, and Waverly, in addition to numerous KGS designations, indicates a high potential for development on the forest.

Caddo National Grassland - The Caddo National Grassland is not located within any of the eight major plays of the East Texas Basin delineated by the USGS. In fact, it is on the margin of the East Texas Basin. There is no production on the Caddo. A new discovery in the western section of the adjacent western county appears to be a southern continuation of a northern play. The potential of the Caddo National Grasslands is unknown.

LBJ National Grassland - The LBJ is located totally within the Lower and Middle Pennsylvanian fan delta sandstone and conglomerate play of the Fort Worth Basin. The location of the Boonsville and the South Alvord, in addition to the LBJ being essentially wholly within a KGS, verifies the high potential of the grassland. There are currently three vertically drilled gas wells on federal minerals which average 1.88 acres each in pad size and have 0.11 miles of new access road built. The average total depth of these wells is 6,650 feet.

According to Foote et. al. (1988), the East Texas Basin is a mature province. The potential for undiscovered recoverable crude oil and natural gas appears to be in currently producing areas, in extensions to currently productive trends, particularly into the deeper parts of the basin, and in the Morphlet and Werner Formations of Middle and Lower Jurassic Age 2 Hydrocarbons may be present also in Triassic (Eagle Mills Formation) and Paleozoic sedimentary strata.

There are currently (10/93) 274 oil/gas wells located on Federal surface. About 27 percent of those wells are drilled into private minerals. Not all wells are currently producing, being in varying stages of development, production, or plugging and abandonment.

With the exception of wilderness areas, leasing of U.S. mineral rights and their exploration and production will continue with an average of 40 to 60 new leases issued annually. The exercise of reserved and outstanding mineral rights under Federal surface will continue.

Table 1. Acres Available for Leasable Energy (Oil and Gas) Minerals[1]
(National Forests)

Alter-natives	Leasing with Standard Lease Terms And Conditions	CSU and TL Stipulations	Leasing With No Surface Occupancy	Unavailable due to Congressional Action[2]
1	None	381,477	40,036	25,642
2	None	366,339	55,074	25,642
3	None	363,550	57,863	25,642
4	None	364,053	57,640	25,642
4A	None	363,989	57,524	25,642
4B	None	363,252	58,261	25,642
5	None	358,350	63,164	25,642
6		No Leasing		
7	None	317,053	104,460	25,642
8	None	363,252	58,261	25,642

[1] Excludes private rights under U.S. surface, about 194,000 acres. Due to scattered pattern of mineral ownership the figures shown here are estimated based on percentage of U.S. rights in the Plan area.

[2] Additional lands would be added to this classification if areas recommended for wilderness study in Alternatives 5 and 7 were designated as wilderness through legislation.

Table 2. Acres Available for Leasable Energy (Oil and Gas) Minerals[1]
(National Grasslands)

Alternatives	Leasing with Standard Lease Terms & Conditions	Leasing with Stipulations, Notices, Limitations	Leasing with No Surface Occupancy
1	None	35,489	263
2-3	None	35,292	460
5-7	No Leasing		
4,4a,4b, & 8	None	35,142	610

[1] Excludes private rights under U.S. surface, about 1,622 acres. Due to scattered pattern of mineral ownership the figures shown here are estimated based on percentage of U.S. rights in the Plan area.

Reasonably Foreseeable Development Scenario

Background

There has been extensive exploration for and development of oil and gas resources both prior to and since the lands comprising the NFGT were acquired. This activity has continued to take place on the privately-owned mineral rights which have reverted to the government as well as on U.S. minerals that were acquired with the surface.

Generally, the oil and gas industry in Texas has grown very conservative and cautious since its experience in the "oil glut" of 1983, and has, since that time, been downsizing their operations, plugging or shutting-in (stopping production, turning the valve off) marginal wells and waiting for the price of oil to stabilize at a price somewhere over $20 a barrel. For the past several years, oil prices have been in the $11-15/barrel range. Similarly, exploration and development for gas production has been sluggish since gas deregulation and the slide of well-head prices towards a dollar per thousand cubic feet. Industry predictions are that serious new activity in gas won't occur until the wellhead price climbs to about $2.20/Mcf. As a result, the new wells being drilled are usually in-fill or step-out wells within/adjacent to currently producing fields. Industry has only drilled a few wildcat wells in this area because of the low prices for hydrocarbons.

New well site actions remained high on the NFGT through 1985 even during the crash of the oil industry in East Texas because other local factors controlled. The first factor was the continued developmental drilling in an extensively drilled, shallow field on the Davy Crockett National Forest. However, with the price of oil continuing to stay well

below $20/barrel, the amount of drilling activity has been historically low for the last several years. Refer to Exhibit 1 for more information.

Another factor accounting for the high numbers of private wells drilled in 1984 and 1985 was the impending reversion of minerals to the U.S. Some drilling was carried out solely for the purposes of retaining as much of the reverting mineral estate as possible just prior to the reversion date specified in the deed. Most of these wells were unproductive and were either plugged and abandoned (P&A'ed) shortly after the reversion date or are due to be P&A'ed.

Current Situation

As recognized in the analysis for the Forest Plan, the level of demand for oil and gas has been high on all the National Forests and the LBJ Grassland. Since there are proven occurrences of oil and gas under almost all of the NFGT the level of exploration and development activity has been almost entirely a function of the economic and political circumstances. As the prices of oil and gas have fluctuated, so has the level of interest in re-leasing parcels, applications for seismic permits, and exploration/development drilling.

The total number of producing wells has varied very little on the NFGT over the past six years. As wells have been plugged and abandoned there have been an equivalent number of new successful wells completed.

The only real fluctuation has been in the relative numbers of shut-ins to producing wells and even this variation may be due to different reporting/accountings of well status. Likewise, the total number of producing wells has not changed drastically. The dip in 1987 is, again, probably due to a different accounting of well status between shut-in or producing.

One factor which has been at work towards reducing the total number of existing wells on the oil and gas operations on Forest Service lands in Texas is a stronger effort by the Forest Service to encourage the plugging and abandonment and clean up of shut-in wells which were environmental hazards.

A new aspect affecting the level of exploration activities is the development of new drilling and recovery technologies. The two most important factors or developments over the past six years which have affected oil and gas exploration and production activities on the NFGT have been:

1. The reversion of almost 240,000 acres of mineral estate to the U.S.;

2. The new interest in horizontal drilling in the Austin Chalk formation which underlies parts of three of the National Forests in Texas.

Minerals Reversion Summary

The following table shows the gains in U.S. oil and gas minerals estate over the past six years which covers the time period when most of the potential reversions would occur. There are some minerals which are still private and held by production on various Forests and some minerals on both the Forests and Grasslands which will revert at some future date.

Forests	Action	1/1/85	1987	1988	1989	1/1/90	85-90
Angelina	Reverted to U.S.		677		310		987
Davy Crockett	Stayed Private	1,160					1,160
	Reverted to U.S.	60,167	169	98	555	1,160	62,149
Sam Houston	Stayed Private	11,690				11,046	22,736
	Reverted to U.S.	103,472	188		241	644	104,545
Sabine	Stayed Private	8,301			2,416	10,717	
	Reverted to U.S.	52,053			5,885	57,938	
Total New U.S.		215,692	1,034	98	1,106	7,689	225,619

Grasslands	Acres Since 1985 (Thru May, 1991)
LBJ	13,019
Caddo	586
Total U.S. Minerals Gains	13,605

Horizontal Drilling

Late in 1989 the industry began using a new technology called horizontal drilling to produce oil/gas from the Austin Chalk formation in south Texas. The early successes with this technology in Texas came in the Pearsall and Giddings fields. The Austin Chalk trends up through east Texas under all the National Forests with the exception of the Sam Houston National Forest. There had been a number of wells drilled vertically into the Austin chalk in east Texas including in the National Forests since the late 1970's. These operations were hit and miss because of the character of the formation.

The producing zones in the Austin Chalk consist of scattered fractures or cracks rather than a definable pool. Where there is a geologic feature

underlying the chalk that causes it to be fractured more than normal, the probabilities of a successful well increase. Horizontal drilling increases this probability because once the drill bit enters the chalk it is turned to travel laterally through this geologic formation to intercept multiple cracks. A well drilled vertically would have a chance of hitting only the single fracture lying directly below the surface location instead of encountering the series of fractures lying parallel to each other.

As these economically successful wells were being brought into production in the southern Austin Chalk fields, geologists and petroleum landmen began searching for other areas where similar successes could be realized. Beginning about April of 1990 one area of interest focused on the southern part of Sabine county including the Sabine National Forest. There are currently four oil producing Maersk sites, and five more sites that have already been approved. On the Angelina National Forest there are three oil and gas producing Tana Oil Company sites. And on the Tenaha Ranger District there are two gas producing Union Pacific Railroad Company (UPRC) sites. Along with existing U.S. and private leases which were being bought and sold there were thousands of acres of mineral rights, recently reverted to the U.S., which needed to be described properly and run through the new Bureau of Land Management (BLM) competitive sale system.

As of April 1, 1994, all of the horizontal wells drilled in the area have been successful. There is some speculation that horizontal drilling has potential for success in the nearby geological Saratoga Chalk formation.

Producing Fields on the National Forests & Grasslands

Brookeland Conglomerate Field

Angelina National Forest - Angelina Ranger District

Horizontal drilling in the Austin Chalk has increased leasing and exploration interest in parts of the Angelina National Forest. The district currently has three producing wells, two permitted future drill locations and four more planned but not yet permitted. The Angelina Ranger District and the Supervisor's Office have responded to requests for information about seismic exploration and drilling on private minerals in the far southeastern part of the Forest.

This forest has a relatively high percentage of outstanding private minerals or perpetual reservations of the minerals. Also, a relatively high percentage (almost 25 percent) of the total U.S. minerals estate underlies two proclaimed wilderness areas and will remain unavailable for leasing and exploration. Most of the available U.S. oil and gas rights are either under lease or the forest service has consented to lease and the areas are awaiting competitive sale. Future exploration activity depends on the outcome of any new wildcats using the new technologies, and/or economic forces. Future oil and gas wells would probably be horizontal wells drilled as wildcats or within the Brookeland Field.

Sabine National Forest - Yellowpine Ranger District

At the very southern end of the Yellowpine Ranger District is the Brookeland Field. Maersk Energy has drilled three horizontal wells into the Austin Chalk formation. They also have another half dozen wells permitted but not drilled. Union Pacific Resource Corporation has bought Maersk's interest and the permitted wells will be drilled within a short amount of time. Also on the southern portion of the Yellowpine Ranger District Petro-Hunt Corp. had a horizontal well that was just plugged in 1994. While the well was a decent producer Petro-Hunt had to pay too much for the lease and too much out in royalties to make a profit. The beginning production for the wells drilled into the Austin-Chalk formation produce an average of 600 to 800 barrels of oil and approximately 2-2.5 mcf of gas daily. The highest levels are encountered within the first six months with production tapering throughout that time. Toward the end of the life of an Austin-Chalk well it will produce about 30 to 50 barrels of oil. Depending on the lease hold and economics of the operation it is likely that the life of a well could be prolonged as a stripper if gas can still be economical to produce. It is anticipated that more wells will be drilled in the Brookeland Field by horizontal drilling. Presently, there are four interested operators that plan on drilling within the southern part of the Yellowpine Ranger District.

An intense interest in leasing reverted U.S. minerals resulted from this success. One U.S. parcel of 1,042 acres in this area received a bid of $540 per acre at a Bureau of Land Management (BLM) sale for a total bid premium on the parcel of $562,680. Currently, there are approximately three wells completed, a half dozen or so permitted, and another half dozen planned. It is estimated that a little less than half of these wells will be drilled on U.S. leases in the field with the balance being on private leases.

Since the Austin Chalk, (as well as other formations which might be better exploited by horizontal drilling) underlies other portions of the Sabine National Forest, increased exploration and development using this technology may be expected.

Laura Lavelle Field

Davy Crockett National Forest - Trinity Ranger District

Oil and gas development has been occurring in the Laura Lavelle field in the western part of the Trinity Ranger District since the early 80's. Mobil Oil is the original lease holder and operator. After a few test wells Mobil farmed out parts of their leases to smaller operators such as PAM Petroleum, Goldking, DeNovo, International Operating Services, Valley and Lomak. These operators, particularly PAM, were successful in developing this field of about 40 wells on U.S. leases and more on adjacent private land. The wells are generally located along a fault structure which is oriented in a west, south west/east, north east (WSW-ENE) line in the very western part of the Trinity Ranger District. The wells typically produce in the range of 10 to 20 barrels of oil/day and also produce quite a bit of water. At the present time this produced water is not particularly briny. There were two other areas of oil/gas exploration activity on the Forest. Three exploratory wells were drilled to a Total Depth (TD) of just over 9,000 feet on private mineral estate in what was called the Apple Springs (Buda) field in 1978. These wells were completed for gas but almost immediately the original operator ran into market problems and subsequent operators had no better luck. The wells were eventually plugged and abandoned.

Glen Rose/Petit Formations

Davy Crockett National Forest - Neches Ranger District

On the Neches Ranger District two wildcat wells came up dry in the eastern portion of the district in 1984. The production on the Neches is from fairly shallow zones (Carrizo and Wilcox sands, 1600-1700 feet). Odyssey Federal Inc. is currently drilling a well into the Petit formation. Strago Petroleum Corporation has a proposed well to be drilled into the Glen Rose formation. There have been a couple of successful wells completed just outside of the Davy Crockett National Forest in the far northwestern sector of the Neches Ranger District. The operator also has recently acquired U.S. leases on adjacent Federal minerals. This operator has made preliminary contacts with the district regarding his intention to drill at least two wells on U.S. minerals.

Saratoga Annona Field

Sabine National Forest - Yellowpine Ranger District

On the Yellowpine Ranger District in Sabine County, there remain six producing or producible wells on private minerals in the Hemphill field. These wells are marginal oil or gas wells. They have been completed to produce from various depths, and the present operator has expressed

an interest in trying to re-complete or off-set from these wells using horizontal technology.

East Bridges Field

Sabine National Forest - Tenaha Ranger District

Oil and gas exploration and development drilling on the Tenaha Ranger District has been sporadic over the past six years. Most of the activity has been associated with attempts to produce gas from either the Fredericksberg Lime or Paluxy Sand in the Earnest Hill field. A number of these wells have been plugged and abandoned or are shut-in because the market price is too low to pay for a pipeline. Union Pacific Railroad Corporation currently has horizontal wells into the E. Bridges Field that have an approximate total depth of 10,000 feet and produce gas.

Center Field

Sabine National Forest - Tenaha Ranger District

There is also a vertical well drilled by Winston into the Center Field (Saratoga Formation). The Tenaha Ranger District has a a total of eight producing Federal wells. Other producing fields include Center, Huxley, and Earnest Hill.

Coldsprings/Coline/Mercy

Sam Houston National Forest - San Jacinto Ranger District

Oil and gas activity on this National Forest has been limited to reworking of old wells on private minerals with an occasional development well or wildcat well being drilled. In this area, the target is for natural gas. There have been no wells drilled on Federal leases on this Forest in the last six years. This lack of U.S. drilling can be attributed to the fact that, until 1985, most of the mineral estate was privately owned. Additional mineral rights reverted to the U.S. in 1990.

On the San Jacinto Ranger District, there are two fields which were first developed prior to U.S. acquisition of the surface in the late thirties. The Mercy Oil Field in the southern end may have had as many as 30 oil wells producing at one time from the Wilcox and Yegua formations at depths of about 8,000 to 9,000 feet. These wells have watered out over the years, and the remaining eight producing oil wells in this field within the forest boundaries are now classified as "strippers." Generally, this means that they produce less than 15 barrels of oil a day (when they actually can pump). They also produce a lot of very salty water with

each barrel of oil. The ratio of salt water to oil can be as high as 20 to 1. The Coline field is situated about 12 miles north of the Mercy field near Coldspring, Texas. There are eight wells producing on private minerals-Forest Service surface in this field. There are approximately an additional half dozen producing wells located adjacent to Forest Service land. Depending on the zone from which the operator produces some of the rock formations produce only oil while others produce only natural gas. The last development well on U.S. surface in this field was drilled in 1988.

The wildcat wells that have been drilled in this area were vertically drilled to total depths (TDs) of 11,800 and 12,400 feet by Royal Oil and Gas Corp. There are also two vertical wells that are drilled by Famcor Oil and Gas into the Coldsprings field that have total depths of approximately 12,500 feet.

Morgas/Moroil/Morian

Sam Houston National Forest - Raven Ranger District

On the Raven Ranger District in Walker County, there are three oil fields within U.S. Forest Service boundaries which are still producing. These wells are all on private mineral estate. Thornberry Oil and Gas has four Federal mineral interest wells that were vertically drilled and produce either oil or gas.

The Morgas/Moroil field has seven very marginally producing gas wells and one oil well. The Waverly field has one stripper oil well.

The Morian/Sam Houston field has about six wells which may or may not be producing economically. These wells are also located on private minerals within the forest surface ownership.

The last exploratory well drilled on this district was P&A'ed as a dry hole in 1986. There has been some new exploratory drilling on private lands adjacent to where the Raven and San Jacinto Districts meet in the north part of the forest.

Boonsville Conglomerate Field

LBJ National Grasslands

Oil and gas activity is widespread on the LBJ and production is from two fields which are in the same area. There are over 60 producing wells now located on U.S. minerals. The majority of these wells were producing for private mineral owners until roughly 1987. At this time, mineral reservations in the numerous acquisition deeds began to expire. In contrast to the reservation language used in the National Forest

deeds, the Grassland deeds required the minerals to revert to the U.S. even if production was occurring.

Oil is produced in the Alvord South-Caddo Conglomerate (ASCC) Field (5,000 to 7,000 feet) and the Bryson Sands (3,000 feet). The wells not involved in the ASCC Unit are strippers. A major portion of the ASCC unitized field is undergoing secondary (waterflood) recovery and, beginning a couple of years ago, tertiary recovery. Mitchell Energy, the major operator, had constructed a carbon dioxide injection plant in the field which was a key part of the tertiary production activity; however, Mitchell is no longer using the tertiary recovery method. These recovery systems call for most of the wells to be alternately switched from producing to injection wells.

The most recent drilling activity is in the Boonesville (Bend Conglomerate) at depths of 6,000 to 8,000 feet for gas. In the LBJ area, approximately 75 percent of production from this field is gas. The most recent completion in this field on U.S. minerals was the Mitchell Energy's Gage Brothers "A" #5. This well is reportedly capable of producing 8MMcf of gas/day. Mitchell has plans to drill more development wells in this field. Even though the market is very poor nationwide for gas development activities, Mitchell evidently has a favorable local market. There is a possibility that Mitchell and some other operators in the area will try using the new horizontal drilling technology in Barnett Shale formation at depths of 7,000 to 8,000 feet.

EXHIBIT 1

WELL ACTIVITY ON THE NFGT - FY84 THRU FY93

NF	Dist	Producing Wells at end of FY Pvt / US	New Wells Drilled Producers Pvt / US	New Wells Drilled Dry Pvt / US	Producing Wells at end of FY Pvt / US	New Wells Drilled Producers Pvt / US	New Wells Drilled Dry Pvt / US
		FY84			FY85		
ANG	Ang	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
DC	Nec	0 / 0	0 / 0	0 / 7	0 / 0	0 / 0	0 / 1
	Tri	3 / 7	0 / 2	1 / 3	0 /13	0 / 8	0 / 6
SAB	Ten	0 / 2	0 / 0	0 / 2	0 / 3	0 / 3	0 / 1
	YP	17 / 0	7 / 0	5 / 0	18 / 0	2 / 0	12 / 0
SH	SJ	14 / 0	1 / 0	0 / 0	16 / 0	0 / 0	0 / 0
	RAV	13 / 0	0 / 0	1 / 0	10 / 0	0 / 0	0 / 0
GRL	CAD	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	LBJ	78 / 5	2 / 0	0 / 0	73 / 5	2 / 0	1 / 0
	Total	**125 / 14**	**10 / 2**	**7 / 12**	**117 / 21**	**4 / 11**	**13 / 8**
		FY86			FY87		
ANG	Ang	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	1 / 0
DC	Nec	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	Tri	0 /15	0 / 4	0 / 3	0 /21	0 / 8	0 / 3
SAB	Ten	0 / 7	0 / 0	0 / 1	0 / 3	0 / 0	0 / 0
	YP	8 / 0	0 / 0	0 / 0	7 / 0	0 / 0	0 / 0
SH	SJ	16 / 0	0 / 0	1 / 0	16 / 0	0 / 0	1 / 0
	Rav	10 / 0	0 / 0	1 / 0	10 / 0	0 / 0	0 / 0
GRL	Cad	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	LBJ	73 / 5	1 / 0	0 / 0	64 / 4	2 / 0	1 / 0
	Total	**107 / 27**	**1 / 4**	**2 / 4**	**97 / 28**	**2 / 8**	**3 / 3**

WELL ACTIVITY ON THE NFGT - FY84 THRU FY93 (continued)

NF	Dist	Producing Wells at end of FY Pvt / US	New Wells Drilled Producers Pvt / US	New Wells Drilled Dry Pvt / US	Producing Wells at end of FY Pvt / US	New Wells Drilled Producers Pvt / US	New Wells Drilled Dry Pvt / US
		FY88			FY89		
ANG	Ang	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
DC	Nec	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	Tri	0 /27	0 / 5	0 / 1	0 /29	0 / 2	0 / 2
SAB	Ten	0 / 7	0 / 0	0 / 0	0 / 6	0 / 1	0 / 0
	YP	7 / 0	0 / 0	0 / 0	6 / 0	0 / 0	0 / 0
SH	SJ	15 / 0	0 / 0	0 / 0	16 / 0	1 / 0	1 / 0
	Rav	9 / 0	0 / 0	0 / 0	12 / 0	0 / 0	0 / 0
GRL	Cad	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	LBJ	65 / 4	2 / 0	0 / 0	49 /12	0 / 0	0 / 0
	Total	**96 / 38**	**2 / 5**	**0 / 1**	**83 / 47**	**1 / 3**	**1 / 2**
		FY90			FY91		
ANG	Ang	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
DC	Nec	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	Tri	0 /35	0 / 6	0 / 1	0 /35	0 / 1	0 / 0
SAB	Ten	0 / 5	0 / 0	0 / 1	0 / 5	0 / 0	0 / 1
	YP	6 / 0	0 / 0	0 / 0	6 / 2	0 / 2	0 / 1
SH	SJ	17 / 0	1 / 0	1 / 0	17 / 0	0 / 0	0 / 0
	Rav	12 / 0	0 / 0	0 / 0	12 / 0	0 / 0	0 / 0
GRL	Cad	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	LBJ	20 /43	0 / 1	0 / 0	0 /62	0 / 1	0 / 0
	Total	**55 / 83**	**1 / 7**	**1 / 2**	**35 / 104**	**0 / 4**	**0 / 2**

WELL ACTIVITY ON THE NFGT - FY84 THRU FY93 (continued)

NF	Dist	Producing Wells at end of FY Pvt / US	New Wells Drilled Producers Pvt / US	New Wells Drilled Dry Pvt / US	Producing Wells at end of FY Pvt / US	New Wells Drilled Producers Pvt / US	New Wells Drilled Dry Pvt / US
		FY92			FY93		
ANG	Ang	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
DC	Nec	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	Tri	0 / 3	0 / 0	0 / 1	0 /25	0 / 4	0 / 0
SAB	Ten	0 / 6	0 / 1	0 / 1	0 / 8	0 / 2	0 / 1
	YP	6 / 4	0 / 2	0 / 0	6 / 7	0 / 3	0 / 0
SH	SJ	18 / 0	1 / 0	0 / 0	19 / 0	1 / 0	0 / 0
	Rav	12 / 0	0 / 0	0 / 0	12 / 0	0 / 0	0 / 0
GRL	Cad	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0
	LBJ	0 /62	0 / 1	0 / 0	0 /62	0 / 1	0 / 1
	Total	**36 / 104**	**1 / 4**	**0 / 2**	**37 / 102**	**1 / 10**	**0 / 2**

To develop an unconstrained reasonably foreseeable development (RFD) scenario, it is necessary to deal with the uncertainties by making assumptions. The assumptions must be reasonable, supportable, and based on best present knowledge. The basic assumption used in coming up with this RFD is that the price of oil/gas will not increase or decrease appreciably from what it has been over the past several years. Consequently, the current level of drilling activity will be expected to continue at the same rate for the duration of this planning period. Should the price of oil rise to $20/barrel or higher, more wells would be drilled than this RFD predicts. If the price drops below $10/barrel, drilling in the forest would essentially cease.

The power of Organization of Petroleum Exporting Countries (OPEC) to arbitrarily raise oil prices is very weak. For the last few years, the countries making up this cartel have failed to cut back oil production even though the organization votes to do so. Additionally, non-OPEC countries (e.g., England, Norway, Canada) have stepped up their petroleum production to the point that there is a surplus of oil on the world market that will not soon be used up. The former Soviet Union has arrested its decline in oil production with the infusion

of Western capital and technology and is adding more to the world petroleum market.

It must first be understood that any decision by the Forest Service to lease or not lease Federal minerals usually will NOT affect the location or rate of drilling or development of the private minerals within or near the boundaries of the National Forest System lands. Thus, most of what is reasonably foreseeable oil and gas exploration and development in this portion of Texas will occur regardless of what leasing decisions the Forest Service does or does not make at this time because there is so much private mineral estate both within and adjacent to the forest boundaries. If the Federal minerals are not available to drill on, the companies would have private mineral rights to develop. In fact the presence of unleased Federal acreage within or near areas of discovery and/or development may encourage some private mineral owners or their lessees to drill near, and drain, the federal acreage before it can be leased and developed.

Situation

Crude Oil

Crude oil pricing is critical to future oil and gas development. Since 1979, year to year price movements have been as high as 43 percent upward and 50 percent downward. The most recent long-range projections published by the Department of Energy and Energy Information Administration (DOE/EIA) were developed prior to the Iraqi invasion of Kuwait. The *Annual Outlook for Oil and Gas 1990*, published in early 1990, projected crude oil price increases by the year 2000 in base, low, and high scenarios (Table 3). Other independent forecasts developed by DRI/McGraw-Hill, the Gas Research Institute, and the American Gas Association also predicted rapidly increasing oil prices after 1990 as non-OPEC crude production peaks and slowly declines. What has happened, however, is that added production by OPEC and non-OPEC nations has kept the world market inundated with available oil and world oil usage has not increased appreciably. This has resulted in oil prices dropping to 20 year lows. For crude oil prices to rise to the $20/barrel level, a major disruption in Middle East production must take place or world demand must consistently increase. Neither of these are likely to happen in the near future.

Table 3. World Crude Oil Prices and Gross National Produce Assumptions 1988-2010

Assumptions	1988	1989	1995	2000	2005	2010
World Crude Oil Price *(1989 dollars per barrel)*						
Base	15.27	18.07	20.40	27.80	32.90	36.90
Low Price	15.27	18.07	14.30	19.80	23.90	25.90
High Price	15.27	18.07	25.90	33.90	41.90	47.40
Gross National Product *(Billion 1982 dollars)*						
Base	4,024	4,142	4,783	5,392	6,066	6,799
Low Growth	4,024	4,142	4,585	5,088	5,654	6,297
High Growth	4,024	4,142	4,985	5,697	6,514	7,331

Source: *Annual Outlook for Oil and Gas 1990*

Economic Growth

A second factor influencing the rate of oil development in the East Texas Basin is the U.S. economies rate of growth as measured by changes in the gross national product. Table 3 displays the gross national product assumptions for the base, low, and high scenario projections. The base case economic growth projections assume an annual growth rate of 2.4 percent per year. Under the low and high growth assumptions, the economy grows at annual rates of approximately 2.0 and 2.8 percent, respectively. In general, the greater the increase in the gross national product, the higher the demand will be for all energy.

Demand

U.S. petroleum demand is another primary factor that influences oil production. As indicated above it is clearly linked to economic growth, but other factors such as price and environmental and national security issues will also affect demand. The U.S. has the most stringent environmental rules regarding petroleum production in the world, and development from Federal lands is constrained even more than from private lands. This tends to make oil companies look overseas for spending on exploration and development. Within the United States, development would likely occur on private lands prior to taking place on federal lands.

Lower world oil prices result in increased domestic demand but reduced domestic production. And oil prices are and have been at 20-year lows for the past few years. Consequently, demand is met by increased imports. In 1993, the U.S. imported 48 percent of its total oil needs, the highest percentage ever in the history of the nation. Conversely, when world oil prices are high, domestic production is stimulated, but domestic demand is reduced.

Environmental and national security issues may also stimulate conservation and use of alternative fuels. The DOE/EIA has included some growth in the demand for nonrenewable energy forms in the forecasts presented in the *Annual Energy Outlook 1990*. However, the forecasts do not attempt to specifically quantify environmental concerns or address new policy initiatives.

Historically, demand has been measured by consumption patterns (as product supplied); forecasts are made with the same methodology. Consumption has increased since the early 1980s, although less dramatically than during the 1970s. As forecast by the DOE/EIA in the *Annual Outlook for Oil and Gas 1990*, petroleum consumption is projected to increase moderately from 17.2 million barrels per day in 1989 to 18.8 million barrels per day in the year 2000 under the base price scenario. Product demand will be higher under a low price scenario than under a high price scenario, but in all cases there are some increases.

It is important to point out that despite predicted growth in demand and predicted continued reliance on petroleum as the principal source of energy for the U.S., use of petroleum is projected to decline in relation to other energy sources. In 1993, petroleum accounted for about 42 percent of the U.S. energy market. By 2010, it is projected to make up about 39 percent according to the *Annual Outlook for Oil and Gas 1990*. This is a continuation of a present trend; in 1978 petroleum accounted for 49 percent of the U.S. energy market.

Petroleum Imports

Petroleum imports to the U.S. have been increasing in the past and this trend is projected to continue over the next ten years. Petroleum imports in 1993 were about 8.5 million barrels of oil/day which represents an all time high. The concerns about the dependency on foreign oil are not, however, likely to create a climate more favorable to domestic exploration and production within this planning period.

Domestic Production

Despite forecasts of higher prices and increased demand, domestic production was predicted to decline according to the DOE/EIA *Annual Outlook for Oil and Gas 1990*. (see Table 4). Price is the most important factor affecting U.S. production. As current oil/gas fields are

being produced and depleted, new fields are not being discovered to make up the difference. This is because the low oil prices do not make it economical to explore for and develop new fields due to the current cost of labor, equipment, and environmental constraints. Yet even the high price scenario through the year 2010 (as projected in the *Annual Energy Outlook 1990*) indicate lower U.S. production. Under that scenario, prices are expected to go as high as $47.40 per barrel by 2010, but domestic production is projected to decline. The graph 'Total U.S. Crude Production 1970-2010' illustrates a production decline under all projected pricing scenarios developed by the DOE/EIA in 1990.

Table 4. Crude Oil and Natural Gas Production, 1988 - 2010, Base Case

Production	1988	1989	1995	2000	2005	2010
Crude Oil (*million BPD*)						
Lower-48 Onshore	5.07	4.74	4.10	3.91	3.66	3.36
Lower-48 Offshore	1.05	1.02	0.97	1.01	1.08	1.03
Alaska	2.02	1.87	1.28	0.96	0.65	0.46
Total Crude Oil	8.14	7.63	6.34	5.88	5.39	4.85
Natural Gas (*trillion CF*)						
Lower-48 Onshore						
Nonassociated						
Conventional	8.56	8.70	10.21	11.96	11.26	9.85
Unconventional	1.03	1.22	2.12	2.70	3.28	3.62
Associated-Dissolved	2.26	1.97	1.75	1.70	1.59	1.48
Lower-48 Offshore	4.79	4.80	4.46	3.86	3.41	3.27
Alaska	0.36	0.34	0.40	0.40	0.82	1.66
Total Natural Gas	16.99	17.03	18.95	20.62	20.37	19.88

[1] Having recoverable quantities of at least 1 million barrels of oil and natural gas liquids or more than 6 billion cubic feet of gas.

Source: *Annual Outlook for Oil and Gas 1990*

Natural Gas

Natural gas production which had been declining since 1973 has increased since 1986. This upward trend is expected to continue into the next century, especially since the Clinton administration is emphasizing the use of natural gas as a clean, environmentally preferred fuel. Table 4 indicates recent historical information for production, consumption,

and price, and forecasts that data through the year 2010. Both domestic production and imported natural gas are anticipated to increase substantially over the next ten years. Domestic production is projected to increase from an estimated 17 trillion cubic feet in 1989 to a level greater than 24 trillion cubic feet in 2000. The price of natural gas is predicted to rise from the 1988 average of $1.76 per thousand cubic feet at the wellhead to $3.23 per thousand cubic feet in 2000, an average annual increase of 8 percent under the DOE/EIA base case scenario. The rise in natural gas prices is attributable to the depletion of natural gas reserves combined with an increased demand for gas. The price rise in the forecast is less than the 14 percent average annual real increase in wellhead prices of gas from 1975 to 1984. Canadian natural gas imports are assumed to be priced competitively with U.S. production throughout the forecast period.

Assumptions Carried Forward - Economic Factors

1. World oil prices will remain relatively stable in the $12-$15/barrel range over the next decade. Any increase in world demand will be absorbed by the new production coming on line in both OPEC and non-OPEC countries.

2. Short-term fluctuations in oil prices are unlikely to turn around the downward domestic production trends over the next 10 years.

3. Any new legislative or regulatory requirements related to oil exploration, development, processing, and consumption imposed in the next decade will have a negative effect on development in the National Forests in Texas.

4. Natural gas prices will increase in accordance with the DOE/EIA base case scenario. National price increases of 8 percent per year do not exceed previous peak periods. Consequently it is projected that without higher price increases or other external factors, gas exploration will continue in the same manner.

Historical Activity

There is presently oil and gas leasing on the NFGT. On September 30, 1981 there were 202,960 total acres under lease; on December 4, 1986 there were 208,464 total acres under lease; and on May 5, 1991 there were 199,900 total acres under lease within the NFGT. Therefore, in the last 10 years there have been approximately 200,000 acres of lands consistently under lease for oil and gas within the NFGT. In April of 1994, there were 283,806 acres leased on both the forests and grasslands. Of this total approximately 21,632 acres are held by production (hbp).

At present, approximately 7,069 acres within the LBJ and Caddo National Grasslands are under lease for oil and gas. Of this total approximately 1,136 acres are hbp on the LBJ. Much of the mineral acreage within the LBJ Grasslands which has active oil and gas development has been private minerals which have just recently reverted to Federal ownership. Those minerals have been leased for the continuation of existing oil and gas production and to conduct any additional drilling and production activities which may be essential for the conservation and protection of the federal mineral resource.

The following is a listing of the number of new leases issued on the NFGT by fiscal year (FY) for the last four years:

FY 1990	33
FY 1991	47
FY 1992	61
FY 1993	Approximately 14+

Drilling

There has been extensive exploratory and development (in-fill) drilling for oil and gas resources prior to and since the tracts of land comprising the NFGT were acquired and up to the termination of the privately-owned mineral reservations. The following is a listing of the number of oil and gas wells drilled on private and U.S. mineral estates by FY since 1984:

FY 1984	31
FY 1985	36
FY 1986	11
FY 1987	16
FY 1988	8
FY 1989	7
FY 1990	11
FY 1991	6
FY 1992	7
FY 1993	13

Producing Wells

The total number of oil and gas wells producing from private and U.S. minerals within the administrative boundaries of the NFGT has been fairly consistent, as the following list indicates:

FY 1984	139
FY 1985	138
FY 1986	134
FY 1987	125
FY 1988	134
FY 1989	130
FY 1990	138
FY 1991	139
FY 1992	140
FY 1993	139

Although the total number of producing wells has remained fairly constant since FY 1984, the number of U.S. producing wells has increased while the number of private wells has decreased. This is due to the mineral reversions which are occurring on the NFGT. Also, while new wells are being drilled and put into production, wells that are marginal producers or are environmental hazards are being plugged and abandoned.

Unconstrained Reasonably Foreseeable Development (RFD) Scenario

Based upon an analysis of the data listed on EIS-Chapter III, it is possible to reasonably forecast some exploration and development trends for the specific National Grasslands and Forests of Texas over the next 10 years. Using the last four years activity (during which the petroleum prices and operational constraints are expected to remain fairly constant), below is the anticipated reasonably foreseeable development by forest and Ranger District. By saying "unconstrained," we mean that geology/economics rather than Forest Plan alternative determine the number of wells anticipated.

Location	Producing Wells/Yr		Dry Holes/Yr	
	U.S.	Private	U.S.	Private
Brookeland Field				
Angelina RD	1	1	0	0
Yellowpine RD	2	0	1	0
Laura Lavelle Field				
Trinity RD	2	0	0	0
Glen Rose/Petit Formation				
Neches RD	1	0	0	0
Saratoga Annona Field				
Yellowpine RD	0	1	0	1
East Bridges Field				
Tenaha RD	1	0	0	0
Center Field				
Tenaha RD	0	0	1	0
Coldsprings/Coline/Mercy				
San Jacinto RD	0	1	0	0
Boonsville Conglomerate Field				
LBJ National Grasslands	1	0	0	0
Average distribution would be:	8	3	2	1

Also estimated are two wildcats: one vertical and one horizontal for a total of 16 wells and producers.

Reasonably Foreseeable Development (RFD) For Each Known Field

Brookeland Field -

Angelina Ranger District - It is expected that 1 producing well/year will be drilled on Federal leases within the Brookeland Field. The average length of new access road is 0.06 miles or 0.23 acres. The well pad needed for a wildcat or Austin-Chalk well has in the past averaged 4.13 acres. After the production is established and the unneeded portion of the drill site is reclaimed, the area of unreclaimed disturbance ranges from 2.0 acres for the federal sites and up to 4.0 acres for the private sites.

Yellowpine Ranger District - It is expected in the RFD that 3 wells/year will be drilled on Federal leases within this field. One of the three wells drilled per year will be a dry hole. These wells are horizontal and have an average depth of 8,770 feet. Because these wells are deep and

permitteed for two wells per site, the area disturbed for the drill pad will be larger by an average of 8.2 acres. The access road length would be about 0.06 miles or 0.23 acres. The total area initially disturbed for 30 wellsites over the next ten years would be approximately 252.9 acres. Since ten of the wells would be dry holes, they would be reclaimed and the acres reduced by that amount while the smaller area needed for producing wells brings the ultimate surface area of disturbance down to approximately 86.6 acres/year.

Laura Lavelle Field -

Trinity Ranger District - The RFD foresees 2 wells/year being drilled and that both will be producers. These will likely be in the Laura Lavelle Field and the average length of road is 0.33 miles or 1.28 acres. The average depth to the target formation is 1,800 feet and a drill pad of approximately 0.55 acres would be needed to accommodate a rig that size. The expected total surface disturbance would be 3.66 acres/year initially. However, after production is established, only about half of the original drill pad is needed for the well head and production facilities. Thus, the area of surface disturbance minus the reclaimed areas totals 3.11 acres/year.

Glen Rose/Petit Formation -

Neches Ranger District - It is expected that 1 producing well/year will be drilled on Federal leases, and it will likely be in the Petit or the Glen Rose Formation. The average length of new access road is 0.09 miles or 0.35 acres. The well pad needed for this size rig ranges from 3.0 acres to about 6.5 acres with the average in the past being 3.67 acres. After the production is established and the unneeded portion of the drill site is reclaimed, the area of unreclaimed disturbance ranges from 1.85 acres for the smaller sites and up to 3.6 acres for the larger sites with the average in the past being 2.19 acres/year.

Saratoga Annona Field -

Yellowpine Ranger District - It is expected in the RFD that 2 wells/year will be drilled on private minerals and one will be a dry hole. The wells are vertical and the area disturbed for the drill pad averages 5.3 acres. The access road length would be about 0.08 acres. The total area initially disturbed for twenty wellsites over the next ten years would be approximately 107.6 acres. Since 10 of the wells would be dry holes, they would be reclaimed and the acres reduced by 80.3 acres while the area needed for producing wells is reduced to 27.3 acres.

East Bridges Field -

Tenaha Ranger District - The RFD anticipates that 1 producing well/year will be drilled in Federal minerals. The well is a horizontal well with an average depth of 8,450 feet which will require a drill pad of approximately 4.88 acres with an average road length of 0.05 miles (0.19 acres). Initial surface disturbance is expected to be 50.70 acres over the next ten years. The area for the producing Federal well would be reduced after reclamation to 26.30 acres for production.

Center Field -

Tenaha Ranger District - The RFD anticipates that 1 dry hole/year will be drilled in Federal minerals. The well is a vertical well with an average well depth of 2,627 feet which will need a drill pad about 1.26 acres and an average new road length of 0.06 miles (0.23 acres). Initial surface disturbance is expected to be 14.90 acres over the next ten years. Since all of the wells are expected to be dry holes they will be completely reclaimed.

Coldsprings/Coline/Mercy Field -

San Jacinto Ranger District - The RFD foresees one producing well/year being drilled on private lands within the Forest. The average length of new road is 0.21 miles (0.8 acres) and the depth to formation is 12,500 feet in the Coldspring field. The average drill pad size is expected to be 2.4 acres which tends to be larger on private minerals than on Federal lands. The initial disturbance expected over the next ten years is about 32.0 acres. Once production is established, the surface of the drill pad is partially reclaimed and reduces to about 20.0 acres for the next ten years.

Boonsville Conglomerate Field -

LBJ Grasslands - It is expected that 1 producing well/year will be drilled on Federal leases, and it will likely be in the Boonsville field. The average length of new access road is 0.11 miles or 0.43 acres. The target formation is Fan Delta Sandstone Conglomerate which lies 6,700 feet below the surface. The well pad needed for this size rig ranges from 1.0 acre to 4.0 acres with the average in the past being 1.8 acres. The initial disturbance anticipated is about 22.3 acres. After the production is established and the unneeded portion of the drill site is reclaimed, then the area of unreclaimed disturbance equals about 13.3 acres over the next ten years.

The composite amount of new disturbance for unreclaimed roads and drill pads over the next ten years will be 27.27 acres. However, the total net surface disturbance associated with oil/gas development will show a net decrease as the formerly producing wells cease economic production, are plugged and abandoned, and the sites rehabilitated. As of 1993, the forest had 139 producing wells, and many of these are marginally profitable. A large number of them will be P&A'd as the petroleum bearing trap/structure is depleted or the costs of operating the well becomes too great. Also, while initial disturbance occurs from new sites being created the overall negative environmental effects will be minimal with the mitigating measures and stipulations that are required of the operators.

There are positive economic impacts resulting from well drilling activities. Lessees/operators usually contract locally for road and drill pad construction. They purchase food, fuel, lodging and other supplies from local sources and may subcontract certain parts of the operation to local well servicing companies. Most of the salaries paid the workers is spent in the local area. Laborers for construction, operation, and maintenance of the proposed wells and pipelines would be recruited from the local area. The Bureau of Land Management has estimated that the average rig hand generates $200/day to the local community for salary spent and supplies/services purchased. A typical well drilling operation will have an average of 20 workers which would translate into about $4,000/day spent in the local area. Since the average East Texas well takes 3 weeks to drill, this would mean that some $84,000 per well goes into the local economy. Additionally, there is a multiplier effect so that additional jobs are created in the non-oil/gas section because of the money generated from oil/gas development. Still another economic benefit from the industry are the taxes (sales/franchise) it pays to the local, State, and Federal coffers.

Other money generated comes from lease bonus bids, rentals, and production royalties. The State of Texas receives 25 percent of all Federal revenues received from oil/gas activities. In Fiscal Year 1993, the Minerals Management Service, U.S. Department of Interior, recorded that 295,954.14 barrels of oil were produced from Federal leases on the Texas National Forests having a value of $5,390,500.38. Another 2.23 trillion cubic feet of natural gas came from these leases with a value of $3,339,800.57. This totals to $8,730,300.95 and the Federal royalty (12.5 percent) amounted to just under $1.1 million. According to the charts for "Well Activity on the NFGL - 1984-1993", there were 102 wells producing oil/gas on Federal leases in 1993. The average value of production from each well was $85,600. Combined with the local economic benefits, each producing well can be expected to generate about $170,000 during it 1st year in operation.

New Wildcat Field

In the next 10 years, it is likely that new geophysical techniques will be perfected that will allow better interpretation and delineation of petroleum bearing structures. Also, new geological theories on where oil/gas traps may be found could emerge to indicate new areas for exploratory drilling outside of currently producing fields. An example of this can be found in drilling off the Gulf Coast. A company decided to test the idea that there may be oil and gas deposits to be found beneath this salt layer, and a recently completed well has confirmed this to be so.

In the next 10 years in which this may occur, the following description is, by necessary, fairly generic. Some of the assumptions used in constructing this development scenario are: there will be two fields containing one well each/year; one field will be drilled using horizontal drilling technology; the other will involve vertical drilling; and sixteen of the twenty wells will produce economic quantities of oil and gas (8 of the 10 wells in each field). Consequently, this scenario envisions an average of two well (one horizontal and one vertical) drilled per year during the next 10 years.

Drilling Process and Associated Impacts

The combined surface disturbance associated with horizontally drilled locations average about 7.5 acres of area cleared and graded. For vertically drilled wells, the pad/reserve pit area is much smaller, approximately 1.5 acres. Access roads to the drill pad locations are approximately 30 feet wide The average length of new access road expected to be constructed is about 0.3 miles.

Drilling a horizontal well takes anywhere from four to six weeks to drill and complete. Vertical wells take somewhat less time, about one to three weeks.

Mud will be used as the circulating medium. Mud pumps would be needed to force mud down the drillpipe, thereby forcing the rock cuttings out of the wellbore, through the shale shaker, and into the reserve pit. The fluid is then recirculated back through the drillstem to repeat the process. Water used to make the mud would normally be obtained from a water well drilled on site, but it could be pumped to the drill pad from a nearby pond, lake, or stream through a pipe laid on the surface.

For producing wells, pipelines/flowlines will need to be constructed to transport the oil/gas from the well head to storage and distribution points. For the most part, these are buried in the access road right-of-way and must comply with the Federal Safety Standard for Gaslines,

49 CFR, Title 192. About 0.25 acres of new disturbance result per each new well drilled.

There are a number of environmental impacts, both adverse and beneficial, which can reasonably be expected to occur during the drilling of a well. As a result, each lease has a list of stipulations which requires the lessee/operator to avoid and/or mitigate any adverse impacts to surface resource values. The environmental analysis written as a result of the proposed application for permit to drill (APD) requires additional, site specific mitigating measures the driller must meet in order to address local resource impacts. Many of the Forest Plan standards and guidelines preclude locations where drilling could take place, for example, red-cockaded woodpecker (RCW) cluster sites and riparian zones.

The Forest Service has the authority to relocate the drilling site anywhere within 200 meters (656 feet) of the originally proposed location. This helps to mitigate most concerns regarding visual sensitivity, steep slopes, unstable soils, and sensitive species. Seasonal drilling restrictions also serve to alleviate resource concerns, especially with regard to seasonally wet areas and animal species mating/nesting/hatching times. The normal process of saving and stockpiling topsoil to be used in reclaiming part (if a producer) or all (if the well is a dry hole) lessens the concern about erosion and sedimentation.

Positive economic impacts resulting from the drilling include wages paid to the workers, a portion of which is spent in the local communities for food, lodging and recreation. The drilling company infuses money into the local area by contracting out services. The counties will receive 25 percent of all royalties derived from the production of oil/gas in addition to the taxes paid by the company and its personnel. See the previous section on the dollar value associated with the drilling of a well for specific amounts.

General Impacts of Projected Future Development

This section describes the cumulative impacts of the anticipated oil and gas development in wildcat areas (places where there are no current or past fields) within the forest on Federally owned mineral rights during the life of this Forest Plan. The following assumptions were used in this analysis:

Since Texas is a mature oil and gas producing province which has been extensively drilled and produced we expect two wildcat plays to develop in the next ten years. One will be drilled horizontally and one will be drilled vertically. Of those drilled, 2 of the horizontal and 2 of the vertical will be plugged and abandoned because they are either dry or not economical to produce. We predict 10 wells will be drilled horizontally and 10 will be drilled vertically over the next ten years. On average, the amount of surface disturbance associated with horizontal

wells is 7.5 acres and the amount of surface disturbance associated with vertical wells is 1.5 acres. Water required for the circulating medium will be obtained from a nearby pond, lake or stream near the area or from a water well drilled on site. Flowlines and pipelines used to transport the oil and gas are usually buried adjacent to the road right-of-way. The horizontal wildcat wells will, in all likelihood, be drilled to test new areas in the Brookeland field Austin-Chalk. In that regard the impacts will likely be similar to those associated with the Brookeland field on the Angelina and Yellowpine Ranger Districts. The vertical wells will, in all likelihood, be deep wells, over 10,000 feet; and have impacts similar to those listed for the Neches Ranger District.

Over the 10-year life of the Forest Plan, an initial surface disturbance from drilling oil/gas wells outside of the currently producing areas would total some 90 acres or 9.0 acres per year. Assuming that two horizontal and two vertical wells will be non-producers and their associated road and drill pad is re-claimed, the total unreclaimed disturbance narrows back 72 acres. Additionally, once production is established, the size of the drill pad needed for production operations is less than that required for drilling the well. This will reduce the unreclaimed surface disturbance by another 34-36 acres overall. The average disturbance would then become 36-38 acres over the next ten years.

Standard Operating Procedures

This section describes the current standard operating procedures for oil and gas leasing and development on the National Forests and Grasslands in Texas. It is included to provide the reader a better understanding of some of the standard methods and practices used to protect the environment during leasing and development phases. The contents should be viewed as a general overview and not as a detailed statement of all of the standards and procedures. Such details are appropriately contained in various Federal Onshore Oil and Gas Orders and Regulations.

Oil and gas rights on acquired lands are subject to leasing and development under the Mineral Leasing Act for Acquired Lands of August 7, 1947, as amended (30 U.S.C. 351-359)

The Federal Onshore Oil and Gas Leasing Reform Act of 1987 requires that all federal oil and gas leases be subject to competitive bidding. Sales are held quarterly by the Bureau of Land Management (BLM), New Mexico State Office (NMSO) and include eligible lands in the NFGT which have received nominations from either industry, the public, or the Forest Service. The leasing procedure begins with the BLM receiving expressions of interest for specified lands. They send these to the Forest Service Regional Office along with a listing of expired/terminated leases and ask for consent to lease the nominated tract(s). The Regional Office forwards this listing to the NFGT for their recommendation on the consent to lease decision and for any lease development stipulations.

Standard Lease Terms and Conditions

Federal oil and gas leases include standard lease terms, most of which are designed to protect surface resources. The standard terms are found on the back of the lease form (see Exhibit 1). These stipulations include the following requirements pertaining to environmental protection:

> **Sec. 6. Conduct of Operations** - Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands , including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Mining Operations - To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 9. Damage to Property - Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 12. Delivery of Premises - At such time as all or portions of this lease are returned to lessor, lessee shall place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

Leasing Process

The Forest reviews the direction in the Forest Plan for a specific lease proposal and determines if that area is available for leasing. A determination is also made as to what, if any, stipulations need to be added to the leasing recommendation. There are three stipulation forms available for attaching to leases: *Controlled Surface Use Stipulation, No Surface Occupancy Stipulation*, and *Timing Limitation Stipulation* (see Exhibits 2, 3, and 4). Each of these stipulation forms, when used, is completed with the specific stipulation details the limitation, locations, etc., as fits the local situation. Exhibit 5 is a list of local stipulation titles currently used to add specificity to the stipulation forms referenced above. When special needs, beyond the scope of existing stipulations, are identified for a specific lease proposal the Forest develops additional local stipulations to fit the situation. Exhibit 6 is a sample *Notice to Lessee* used to highlight a special feature or area that the lessee should be aware of as potentially affecting operations. Exhibit 6 shows the types of notices which may be given. The forest then recommends consent to the Regional Office on those lands available for leasing and provides any stipulations and/or notices to be attached to the lease. The consent and the stipulations are sent to the BLM and are collated and published for the upcoming sale. Forty-five days before the lease auction, a notice of the sale is posted in the Supervisor's Office and at the BLM. At the sale, each lease tract is offered in an auction

with oral bidding. The minimum bid is $2.00/acre. Those parcels not receiving the minimum bid will be offered non-competitively (over-the-counter) beginning the day after the auction and will be available for non-competitive leasing for a period of two years. The primary term for both competitive and non-competitive leases is ten years. Either type of lease can be extended beyond the primary term by active production of commercial quantities of oil or gas or by active drilling operations. Unitization or Communitization Agreements with adjacent productive leases can also create lease extensions without development of the lease surface.

Lease Rights

Once a Federal oil and gas lease is issued, the lessee has the right to explore and develop the petroleum resource subject to the stipulations attached to the lease. However, merely because a lease has been issued does not mean it will be developed. Nationwide, only 10 percent of all oil and gas leases issued have ever had any development occur on them. If an Application for a Permit to Drill a well (APD) is received, the Forest will then do a site-specific environmental analysis on it to determine if additional operating stipulations are needed.

A lessee has a right to use the leased lands as necessary to explore for, drill for, mine, extract, remove and dispose of all the leased resources in a leasehold. This is subject to relevant Federal regulations (e.g. 36 CFR 228E, 43 CFR 3160, etc.), stipulations attached to the lease, restrictions derived from specific, non-discretionary statutes, and such reasonable measures as may be required by the authorized officer to minimize adverse impacts to other resource values, land uses, or users not addressed in the lease stipulations at the time operations are proposed. Such conditions are considered consistent with the lease rights granted provided that they do not require relocation of proposed operations by more than 200 meters or require that the operations be sited off the leasehold. When measures not included in the lease terms are added to an operational permit, they are included as Conditions of Approval (COA's).

Waivers, Exceptions or Modifications

A lessee may request a modification, waiver, or one time exception of a No Surface Occupancy Stipulation, or any other stipulation. The Forest Service may authorize the BLM to grant the change if: 1) the change is consistent with Federal law and the Forest Plan, 2) management objectives which led to the stipulation can be met following the change, and 3) the environmental impact of the change is acceptable. If the change "substantially modifies" the terms of the lease, public notice must be given at least 30 days before the results of an environmental analysis are approved (Federal Onshore Oil and Gas Leasing Reform Act of 1987).

Geophysical Exploration - Application

Should the lessee choose to exercise his exploration and development rights, the first logical step would be to locate subsurface hydrocarbon traps and/or structures through the use of geophysical investigations. Seismic exploration lines may be laid out in grid, parallel, or perpendicular arrays over the target area. The operator must contact the forest and file an application giving location, timing, and geophysical method (shot-hole, vibroseis, etc.) to be used. The forest will analyze the proposed action and issue a seismic exploration permit which includes operating requirements designed to mitigate surface impacts. No fee will be charged if the entire survey is restricted to the land leased to the operator. If part of the survey extends onto unleased land, land leased to another party, or land where the U.S. does not own the mineral rights then the forest will charge a fee for that portion of the geophysical investigation off the leasehold. Lessees of Federal oil and gas rights do not have exclusive surface rights for geophysical surveys; non-lessees may also do geophysical surveys on lands leased to someone else. A bond may be required to ensure compliance with the permit stipulations.

Geophysical Exploration

An oil and gas lease is not required for geophysical exploration to occur; it may take place prior to or subsequent to leasing. Exploration activities may occur across the same area many times and continue over a period of years. Generally, geophysical lines are run on widely spaced intervals and become more narrowed and concentrated in smaller geographic areas as the target area is better defined. A separate permit is issued by the forest for each geophysical request, and it will include specific mitigating measures for public safety warnings, wildlife concerns, sensitive areas, underground aquifers, property protection (fences, wells, buried utility lines, etc.), and site reclamation.

One method of geophysical exploration, vibroseis, uses large trucks equipped with metal plates (occasionally surfaced with wooden boards) which are lowered from beneath each vehicle to the ground. With some or all of the weight of the truck resting on the plate, a hydraulic system vibrates the plate which transfers the energy into the ground to be picked up by seismic detectors (geophones) arrayed along the line of survey. An instrument truck equipped with a seismograph records the seismic information. From two to eight vibroseis trucks are used in tandem. Unless the topography is relatively flat and open, the trucks are restricted to existing roads and trails. Little surface resource disturbance occurs with this type of geophysical exploration.

Another way to impart energy into the ground for the seismograph to record is by use of explosives. This can be accomplished by setting off charges in a hole, on, or above the surface. Shot-point cluster surveys

are the most commonly used method of explosive seismic surveys in Region 8. The most common method in Texas is single explosions in evenly spaceholes along a more or less straight line. The spacing would generally be 10-20 holes per mile of line with depths commonly reaching 50-100 feet. An explosive is placed in each hole and detonated with the resulting shock waves recorded by geophones and passed on to the seismograph. Shot-point cluster uses the technique of drilling shallow holes and shooting several small charges simultaneously instead of one large charge. The holes are drilled to depths of 10 feet or less. An explosive is placed in each hole and detonated with the resulting shock waves recorded by geophones and passed on to the seismograph. Shot holes are usually drilled with a vehicle-mounted drill. The seismic exploration equipment commonly used in East Texas includes articulated wheeled-tractors sometime called swamp-buggies. The tractors have large balloon tires and are very maneuverable, capable of crossing most forested terrain in east Texas. They operate in tandem. One carries a hydraulically operated drill and drill pipe and the other carries drilling water, mud, and explosives. In very sensitive areas smaller, portable drills are occasionally used and may be carried by ATVs or even backpacked. However, the environmental advantage of the portability of these drills is offset by the need to drill clusters of shot holes to gather the same information as in deep shotholes.

The use of helicopters to ferry people, equipment and materials is a common practice in some areas of the nation due to difficult terrain but is not a practical method of off-road access here. With mitigating measures there is not a significant amount of disturbance to warrant this expensive method of transportation in Texas.

Exploration - Drilling

Lands included in issued oil and gas leases may be explored and developed, subject to lease stipulations, additional site-specific environmental analysis and a Forest Plan conformance determination. On the NFGT, most wells must be drilled to depths of 1600 feet or more to intersect the possible target horizons.

The first phase of the operation is construction of the access road. Transporting and setting up a drill rig capable of reaching these depths requires an access road sufficient to handle semi-trucks and trailers of heavy equipment and a daily traffic of 20-30 vehicles or more. Existing or abandoned roads are upgraded and used as much as possible. An average of 0.1 miles of new road is built to support the drilling operation. Surfacing is almost always required. Drainage must be provided for the entire road. Usually this is accomplished by use of drainage ditches and culverts.

The second phase is construction of the well pad and reserve pit. The well pad is needed to set up and operate the rig. The dimensions and

layout of a well site vary based on the depth of the well, the natural contour of the land, and the surface resource values involved. In the planning area, the total well site area varies depending on whether it is a vertical or horizontal well. Vertical wells require less space ranging from less than one acre to 3 1/2 acres. Horizontal wells require more surface occupancy and range from 4 to 9 acres. The surface soil material is removed from the construction site and stockpiled. This material is used later for reclamation. The area of the well pad that supports the drilling rig substructure must be level and capable of supporting the rig. Ideally, the rig should be located on cut material as opposed to less stable fill material. The site is designed to drain with "rig fluids" channeled toward the reserve pit while normal runoff from rainwater drains off the location. The pad is slightly sloped so that rain water drains off the location. Runoff water from off-site areas is diverted away from the well site by ditches, waterbars, or terraces above and below the cut slopes.

Reserve pits are normally a part of a well site and are used for storage or disposal of water, drilling mud, and cuttings. This pit is located in cut material. The reserve pit should be constructed below original ground level to prevent failure of the pit dike. The depth of the bottom of the reserve pit is dependent upon the location of clay layers, which if present, are used as a liner. If there is no natural clay layer available, a plastic or bentonite liner is used to prevent seepage of the fluids into the soil zones. Dikes around the reserve pit are compacted. In certain soils and in floodplains portable tanks rather that reserve pits are used to store drilling fluids in order to avoid undesirable infiltration or high water conditions.

Water for drilling is either hauled or piped to the rig from rivers, creeks, reservoirs, and water wells, or else a water well is drilled on the well pad. Drilling is accomplished by rotating a bit at the end of the drill string under pressure or bearing a controlled portion of the drill string weight. Drilling mud (a mix of water and other constituents, usually bentonite) or rarely, air, is circulated through the drill string. As the bit cuts into the rock, the cuttings are pushed up the hole by the circulating medium (drilling mud or air). In a mud system, the mud is separated from the cuttings and recycled for further drilling, and the cuttings are deposited in the reserve pit or a collector bin. When drilling with air the cuttings are normally blown into the reserve pit. Cuttings, mud, and waste drilling fluids may all be contained in the reserve pit. When total depth of the hole is reached 1) logging, which measures porosity, permeability, and saturation of the formation, or 2) drill stem testing, which allows the potential production of a formation to be measured, is conducted. This is either accomplished in open or cased holes. Open hole logging and testing is conducted when there is integrity of the wellbore.

Casing with steel pipe and cementing the pipe in place prevents caving of the hole, seals off other formations, and protects ground water aquifers. If the well is capable of producing commercial quantities of oil and/or gas, production casing is installed and the casing is perforated to allow oil/gas from the formation to enter it. Sometimes the formation has to be stimulated by fluid fracture or acid dissolution to increase the flow capacity of the formation. If producible oil and/or gas is discovered, the well will be shut-in until production facilities are installed. If commercial quantities of hydrocarbons are not encountered, the well will be plugged and abandoned, and the well site reclaimed.

Once the drilling rig is set-up, drilling usually takes place on a 24-hour day, seven days/week basis. In the planning area drilling is usually completed within two days for shallow wells and up to 45 days for horizontal wells or deeper conventional wells.

DRILLING - Analysis and Decision Making

Onshore oil and gas operations on Federal minerals are subject to Federal regulations contained in Title 43 CFR Part 3160. These regulations are administered through the Bureau of Land Management (BLM). Under the Reform Act, the Forest Service is responsible for administration of oil and gas operations as it pertains to surface use on National Forest lands. The regulations pertaining to National Forest System lands are contained in Title 36 CFR 228 Subpart E. The requirements for approval of drilling operations are specifically contained in Onshore Oil and Gas Order No. 1 (43 CFR 3164). Chapter 2, "Procedural Guidelines for Oil ad Gas Operations" of the *Oil and Gas Surface Operating Standards for Oil and Gas Exploration and Development* summarizes the agencies' requirements and regulations. Prior to the approval of any drilling activities on the lease, the operator must obtain a permit from BLM. The permitting process begins when the applicant submits either an Application for Permit to Drill (APD) or a Notice of Staking (NOS) to the BLM, Tulsa District Office (TDO). An NOS may also be filed with the Forest Service. These two options are available under Order No. 1. Notice of an APD or NOS must be posted in the affected Forest Service and BLM offices at least 30 days prior to approval. Upon receipt of either an APD or an NOS, an onsite inspection is conducted. The onsite inspection is integral to the environmental analysis conducted on the proposed drilling operation.

Onsite Inspection:

On National Forest System lands, the Forest Service coordinates the onsite inspection. Participants would normally include the Forest Service, applicant, earth-work contractor and drilling contractor. The Forest Service participants often include specialists in various disciplines such as engineers, wildlife biologists, archeologists, soil and watershed

specialists, etc. Other participants might include BLM and/or other interested parties. The purpose of the on-site inspection is to gather and exchange information about the site, discuss alternatives to meet Forest Service mitigating requirements, and determine what additional information is required for the environmental analysis. The site visit will result in development of site-specific Conditions of Approval (COAs) that will be required for approval of the APD.

APD Option:

The APD includes a Drilling Plan and a Surface Use Plan of Operations (SUPO). The Drilling Plan provides information on the probable subsurface geologic conditions and includes specific information regarding the drilling, testing, casing, and cementing programs. The BLM reviews and approves the drilling plan. The applicant's proposal for use of the surface is provided in the SUPO. This plan provides a detailed description of the existing roads, proposed access road location and design, location of existing wells, proposed production facilities, water supply, construction materials, waste disposal, ancillary facilities, well site layout, plans for surface reclamation, surface ownership, lessee's or operators representative, and any other additional information that may be helpful in processing the APD. The Forest Service must approve the SUPO before the BLM can approve the APD. If the application process starts with the filing of an APD, then an onsite inspection is scheduled and the SUPO is reviewed onsite. Proof of bond coverage must also be submitted prior to the approval of an APD.

NOS Option:

A NOS (Notice of Staking) is a simple notice that a proposed well site has been staked. It may be filed with either the Forest Service or BLM. The NOS satisfies the 30 day posting requirement. It includes general information concerning the name and address of the operator and the well name and location. It also includes an appropriate map. Upon receipt of the NOS, an onsite inspection is conducted. The inspection is the basis for developing the site-specific contents of the SUPO contained in the APD which, under this method, is filed after the inspection.

Both the APD and NOS options arrive at the same end point through interdisciplinary participation and development of Conditions of Approval.

The Forest Service and BLM have developed a Memorandum of Understanding describing the agency actions and relationships to each other for the APD processing and approval.

Environmental Review:

Once a complete APD is submitted, the Forest Service, in conjunction with the BLM, will complete the environmental analysis of the proposed operation and prepare an appropriate environmental document under the National Environmental Policy Act of 1969 (NEPA). The appropriate level of analysis and type of NEPA documentation will be based on the nature and scope of individual proposals. On existing leases, the lessee has the right to explore the leasehold subject to the terms of the lease. The analysis does not determine whether drilling will or will not occur. This allocation was previously made through the Forest Plan or other leasing analysis. Site-specific analysis of the drilling proposal determines the environmental consequences of the proposed drilling and a reasonable range of alternatives to that proposal, and it is the basis for developing appropriate Conditions of Approval relative to resource protection and/or enhancement.

The Forest Service is designated as the lead agency for the environmental analysis of a proposed drilling operation occurring on national forests and is responsible for completion of the NEPA document relative to the surface resources. BLM completes the document relative to the subsurface resources (geologic hazards, ground water, and other mineral resources), and other surface/subsurface resources that may be impacted due to technical drilling/production operations. Results of public scoping and Forest Service/BLM input are considered in the analysis. Mitigating measures to supplement those stated in the lease stipulations are needed and are included in the SUPO that becomes part of the Conditions of Approval of the APD.

Upon completion of the NEPA document, the Forest Service will complete a decision document pertaining to the approval/disapproval of the SUPO and the BLM will complete a decision document for approval/disapproval of the APD. The approved SUPO is sent to the BLM along with the Forest Service consent to approve the APD. Along with the consent to BLM, the Forest Service advises BLM of the bond amount necessary to restore the site and asks BLM to assure that amount is available prior to issuing the APD approval.

The process of on-site review, environmental analysis, and development of mitigating requirements is handled by the affected Ranger District with specialized support and advice available as needed from the Forest Supervisor's Office. The District Rangers have been delegated the authority to approve SUPOs and communicate directly with BLM in this process.

DEVELOPMENT

A producing well will usually generate additional drilling to determine the size and extent of the reservoir. Associated with reservoir or field development are more roads (some upgraded to all-weather travel), utility corridors for pipelines and powerlines, and space for storage tanks and separators.

Production Facilities:

If the well is a commercial producer, then a portion of the original site is needed for continued operation and access for the life of the well (some over 40 years). Areas of the drill site no longer needed for production are reclaimed and the site stabilized to prevent soil erosion. If the well is a gas producer, production will then be shut-in waiting for construction of a pipeline into the site, which will often follow the access road corridor. If the well produces oil, or both oil and gas, the oil may be either trucked out or be moved to market through a pipeline. If by pipeline, the well may be shut-in until pipeline construction is complete. Producing well sites will normally have a metal pipe with valves exiting from the well (commonly called a "Christmas tree"), if the well is free-flowing. Free-flowing wells are usually gas wells. In a non-flowing well, the petroleum is brought to the surface using artificial lift (pump) methods. Depending on whether the well is a gas producer only, a gas and oil producer, or an oil producer only, the nature of the production facilities vary. For a gas well, a small tank collects condensates or oily distillates, and a gas/liquid separator is installed on the pipeline. With several producing gas wells there will be the need for added facilities to produce, treat, and transport the natural gas. From the well, gas would be piped to offsite production treatment facilities before being sent to market. Where several oil wells are in close proximity, a single tank battery may be used to store produced water and oil for removal from the site. Dehydrators and separators are used to separate the gas, oil, and water. This facility is typically located on the well pad. Meters are used to measure the amount of oil and gas produced before it is put into a transmission pipeline. Any produced water would be temporarily stored in tanks and must be properly disposed of according to federal and state standards. In some cases, the water is removed from the site and disposed of by injecting it down an injection well and into an approved formation (subsurface layer of rock) capable of absorbing the fluid.

Either pipelines or trucks may be used to move oil from the production facilities to market. Gas is moved by pipeline, sometimes called a trunk line, to the main transmission line from the area. Trunk lines are generally 6 to 8 inches in diameter and are buried, as are transmission lines which vary in diameter from 10 to 36 inches. The area required to construct a pipeline varies depending on size of pipe, topography, and whether existing utility corridors are used. Normally, gathering

and trunk flow lines require from 5 to 30 feet of right-of-way. Larger transmission lines will require more space for construction.

Well Spacing:

Well spacing depends on the State's regulations and the type of hydrocarbons found, and varies from 10 acres for shallow oil wells to 640 acres for gas wells. In additions to spacing, State of Texas rules also serve to protect reservoirs in adjacent leases by governing how far a well must be from the lease (ownership) line.

FIELD DEVELOPMENT - Analysis and Decision Making

Based on the exploration well results, a lessee/operator may want to continue development of the field. If the area to be developed is intermingled with private land then wells and other facilities may also be sited on private land. Each additional planned well site on U.S. land must be proposed through submittal of an application to the BLM. Off-lease facilities are always under the sole authority of and permitted by the Forest Service and on-lease facilities other than wells may be authorized by either agency. If the Forest Service permits an on-lease facility in support of mineral operations it coordinates with the BLM, and, of course, BLM coordinates with and obtains Forest Service concurrence when BLM is going to authorize the facility. An environmental analysis is required prior to any decision regarding a proposal of new surface disturbance. All facilities used for production, treatment, and transmission of oil and gas are considered leasehold facilities to the point where the product is sold. This includes facilities that are off-lease and authorized under an off-lease special use permit. Such facilities include storage tanks and processing facilities, sales facilities, all pipelines upstream from such facilities, and other facilities to aid production such as water disposal lines and gas or water injection lines. When subsequent operations result in new surface disturbance, the proposal is subject to the same type of environmental review process used prior to drilling the first well. The application is reviewed and evaluated by the Forest Service to assess the surface impacts of the proposal and appropriate NEPA documentation is prepared. The cumulative impacts of field development would be considered in the evaluation and, in some cases, an additional environmental analysis may be needed to assess the potential effects of the anticipated field development. This type of analysis would assess the potential effects of field development, production activities, and pipelines. If the cumulative impacts of the proposed development appear to significantly exceed the level as projected in the Forest Plan, then additional planning analysis will be required. The environmental analysis typically results in documentation in either an EA or EIS, depending on the scope of the proposal.

ABANDONMENT AND RECLAMATION

Well abandonment operations may not be started without prior approval of the BLM. In the case of newly drilled dry holes, failures, and emergency situations, oral approval may be obtained from the authorized officer subject to written confirmation by application.

Well plugging and abandonment requirements vary with the type of geologic rock formations drilled into, the presence of subsurface water, well depth, and other factors. Generally, the area below the surface casing is filled with heavy drilling mud and cement plugs are installed at various points to protect aquifers and known oil and gas producing formations. A cement plug is installed at the top of the surface casing. A pipe monument (dry hole marker) giving the location and name of the well is required unless waived. If waived, the casing may be cut off below ground level.

A reclamation plan is included as part of the SUPO of the APD. If the well is a dry hole or commercial production ceases, then the entire site is restored according to the reclamation plan. Reclamation normally involves contouring of the site, spreading of stockpiled topsoil, and a combination of seeding, mulching, liming, and fertilizing to revegetate the site. All surface equipment and facilities are removed. The access road will be reclaimed unless it has been determined that it is needed for forest administrative purposes. All pits must have liquids removed and then backfilled to a safe and stable condition. All other excavation must be closed by backfilling once dry and graded to conform, as much as possible, to the surrounding terrain.

Site preparation prior to seeding may include ripping, scarifying, contour furrowing, terracing, reduction of steep cut and fill slopes, waterbarring, etc. The disturbed sites should be prepared to provide a seedbed for re-establishment of desirable vegetation and reshaped to blend with the natural contour. Stockpile topsoil is spread. Mulching, fertilizing, tree planting, fencing, or other practices may be required.

Reclamation and abandonment of pipelines and flowlines may involve replacing fill in the original cuts, reducing and grading cut and fill slopes to conform to the adjacent terrain, replacement of surface soil material, waterbarring and revegetating in accordance with normal rehabilitation practices. Pipelines associated with production may be abandoned in place if the District Ranger determines the impact of removal is greater than leaving it in place.

Before the period of liability of the bond is terminated, the Forest Service must be satisfied that the drill site and road have been adequately rehabilitated. No new leases will be issued to a person or company who is in material non-compliance with reclamation requirements on existing leases. (See 30 U.S.C. 226).

ADMINISTRATION

When on-the-ground well development or geophysical activities begin the administrative duties commence. For wells these include marking timber for removal from a site to be cleared, inspection of work in progress during road and pad development, regular visits during drilling and more routine visits during production operations. At close-out and reclamation time intensity of visits increases to assure correct application of requirements. For geophysical work administration can consist of a visit or two during operations and a thorough inspection when work is completed. A prework conference is a common practice to assure all parties understand the terms of the governing permits. These types of rights are explained below.

Needed correction action is usually documented in writing although minor problems caught early may be dealt with verbally on-site. Persistent or flagrant failures or overt acts of violations are dealt with as the circumstances indicate. Criminal misdemeanor citations are an option. The Texas Railroad Commission, EPA, and Texas Parks and Wildlife Department are sources of support and expert advice as needed for particular problems. BLM will be consulted where their expertise is useful for a resolution of an administrative problem.

Reserved and Outstanding Rights Activities

This section focuses on leasing, exploration, development and administration of non-U.S. owned mineral rights. The purpose of this section is to discuss how the Forest Service manages exploration and development on reserved and outstanding rights (ROR) under U.S. surface.

There are currently about 219,086 acres of private mineral rights under U.S. surface. Of these, about 29,253 acres will eventually revert to the United States per the terms of the deed acquired by the U.S. The balance will always be in private ownership unless acquired by the U.S. in a later action.

An important difference in administration of ROR is that exercise of those rights is not a privilege, but a right owned by a private party. As such, the U.S. has no role in leasing, and the BLM is not involved in approval of an Application for Permit to Drill (APD). Since there is no lease or approved APD, there is no contractual agreement to be met in the case of outstanding rights. Reserved rights are subject to State laws and the Secretary's Rules and Regulations which were made part of the deed of acquisition when the land was purchased by the United States. Under the terms of the most common version of the Secretary's Rules and Regulations, the 1911 version, a permit is not required. Later versions require a permit, but one must be issued if the operator agrees to abide by the reasonable requirements for surface protection. Thus

issuance of a permit is never discretionary and a NEPA decision is not made.

When an operator proposes a well on reserved or outstanding mineral rights, the Forest Service, as the surface owner, reviews the proposal and conducts the same resource studies as are done for wells into U. S. minerals. Using this information, recommendation for mitigating measures are developed. If significant conflicts between surface values and the operator's plans are discovered, the U.S. will request modifications of the plans to reduce or eliminate the conflicts. This process will result in an operating plan for the specific location proposed. Except for differences particular to the specific site, the expectation is that the operating plan will attempt to implement the same requirements as are used for activities on U. S. minerals. This operating plan will be part of the permit the Forest Service will request the operator's to accept prior to commencing operations.

For more than 15 years it has been the local practice to obtain a permit for all ROR mineral activities. The practice of obtaining a signed permit for those activities not legally requiring a permit will be continued where the operator is willing to accept such. In reserved mineral cases, a minerals operation permit will be approved and for outstanding minerals a minerals operations plan will be negotiated. If an operator should refuse to accept a permit, as is possible for exercise of rights not specifically requiring a permit, the operator will still be required to develop an operating plan for Forest Service review and recommendations.

Administration of operations on ROR is with the same intensity as on U.S. rights. Due to the fact that the regulations for operations on U.S. rights do not apply to ROR activities, the Forest Service theoretically is somewhat constrained when necessary to resort to legal action in the case of uncorrected or purposeful violations of the permit. In practice, we have been able to use other regulations to prosecute in the few instances flagrant or persistent violations have occurred. The net result is that there is little observable difference between modern operations on either U.S. rights or ROR.

Geophysical exploration permits frequently involve a mix of ROR and U.S. minerals. Except that exploration on U.S. rights by a lessee is at no charge, the standards and enforcement are the same regardless of who owns the mineral rights.

Exhibit 2

CONTROLLED SURFACE USE STIPULATION #1A
NATIONAL FORESTS IN TEXAS

Surface occupancy or use is subject to the following special operating constraints.

Portions of this lease contain riparian areas (floodplains, wetlands). As a minimum these areas are established as 66 feet from an intermittent stream, 100 feet from perennial streams, and 100 feet from the normal pool level contour of lakes. Site-specific proposals for surface-disturbing activities within these areas will be analyzed. Such analysis could result in establishment of protective requirements or limitations for the affected site.

On the lands described below:

Tract _____

For the purpose of:

To meet visual quality objectives and protect riparian areas in accordance with the *National Forests and Grasslands in Texas Final Land and Resource Management Plan*, as amended, May 20, 1987.

Any change to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Exhibit 3

NO SURFACE OCCUPANCY STIPULATION #2A
NATIONAL FORESTS IN TEXAS

No surface occupancy or use is allowed on the lands described below (legal subdivision or other description.

_____ Recreation Area except hand-laying of electronic gear or apparatus could be further considered. Proposals for drilling sites within 1000 feet or less from the recreation area may be subject to special requirements or limitations, such to be determined on a case-by-case basis.

For the purpose of:

To meet visual quality objectives and to protect recreation values in accordance with the *National Forests and Grasslands in Texas Final Land and Resource Management Plan*, as amended May 20, 1987.

Any change to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Exhibit 4

TIMING LIMITATION STIPULATION #1A
NATIONAL FORESTS AND GRASSLANDS IN TEXAS

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

Site-specific proposals for activities within these areas will be analyzed. Such analysis could result in establishment of protective requirements, limitations for the affected site, or possibly require relocation of the activities during the specified time period.

March 1 to June 30

On the lands described below:

Entire lease

For the purpose of (reasons):

To protect Turkey nesting areas, in accordance with the *National Forests and Grasslands in Texas Final Land and Resource Management Plan*, as amended May 20, 1987.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Exhibit 5

OIL AND GAS LEASING STIPULATIONS
NATIONAL FORESTS AND GRASSLANDS IN TEXAS

Controlled Surface Use Stipulations

CSU #1A - Riparian Areas on Forests
CSU #1B - Trails
CSU #1C - Toledo Bend Reservoir Shoreline
CSU #1D - Sam Rayburn Reservoir Shoreline
CSU #1E - Grasslands Streams
CSU #1F - Grasslands Eroded Areas
CSU #1G - River Bottom Areas
CSU #1H - Texas Natural Heritage Program Areas
CSU #1I - Grasslands Flood Control and Erosion Control Structures

No Surface Occupancy Stipulations

NSO #2A - Recreation Areas
NSO #2B - Scenic Areas
NSO #2C - Lake Conroe
NSO #2D - Research Natural Areas

Timing Limitation Stipulations

TLS #1A - Turkey Nesting Areas

NOTICE TO LESSEE
NATIONAL FORESTS AND GRASSLANDS IN TEXAS

NTL #3A - Red-cockaded woodpeckers
NTL #3B - Cemeteries
NTL #4A - Toledo Bend Concurrence with Sabine River Authority & COE
NTL #4B - Sam Rayburn at Recreation Areas Concurrence with COE
NTL #5 - Wilderness Areas

Red-cockaded woodpecker clusters. Portions of the land in this lease are, or may be, occupied by clusters of the endangered red-cockaded woodpecker. Exploration and development proposals may be limited or modifications thereof required if activity is planned within the boundaries of a red-cockaded woodpecker colony as it then exists. In addition, similar but less stringent limitations or modifications may be required in the event of an occupancy proposal within 1200 meters of a colony boundary. Upon receipt of a site specific proposal, the Forest Service will provide current inventory records of colony locations and may require that localized surveys be performed to assure no uninventoried colonies are present.

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Appendix D

Evaluation of Roadless Areas

This appendix contains an evaluation of 17 identified roadless areas on the National Forests and Grasslands in Texas (NFGT). The purpose of this appendix is to present a detailed and site-specific evaluation of the areas of the Forest that have been tentatively identified as being essentially unroaded or undeveloped. It includes a description of the resources, physiographic and biologic features, and the present management situation for each area.

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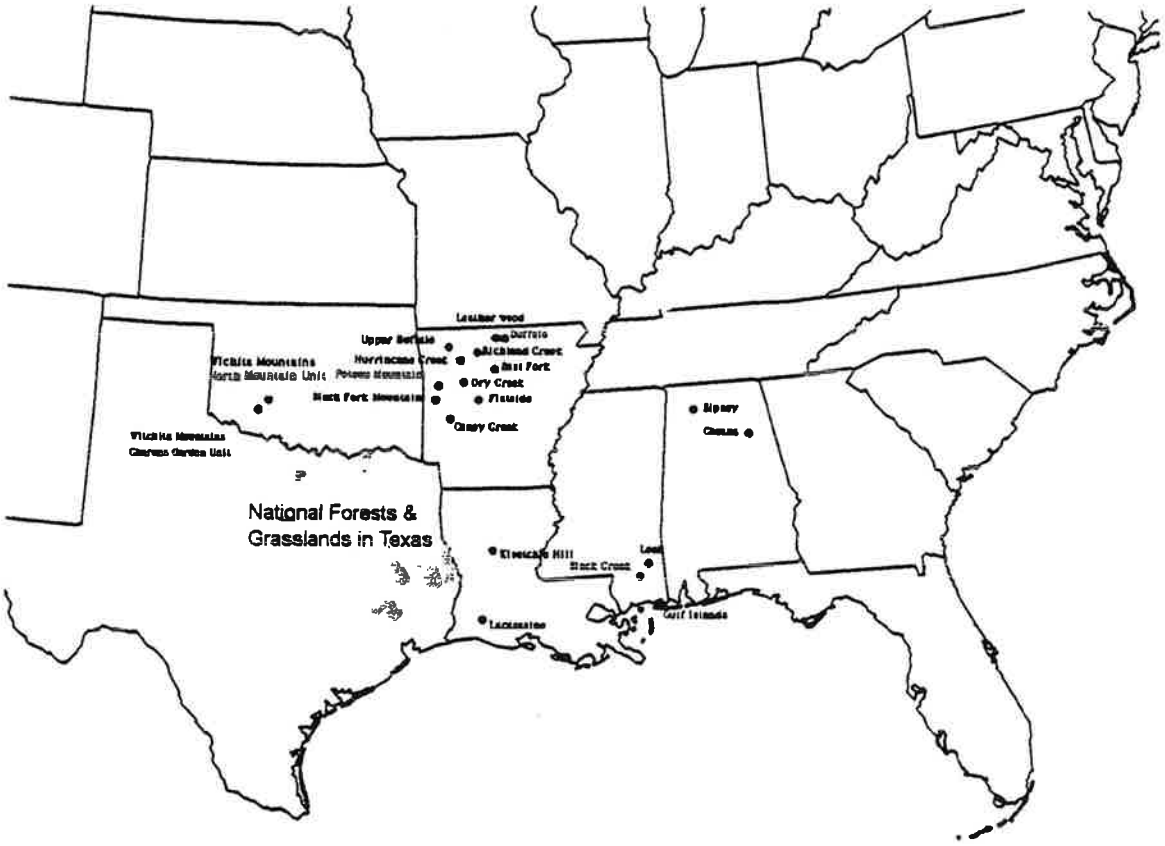
Jordan Creek

National Wilderness Preservation System



Appendix D

Evaluation of Roadless Areas

Purpose

This appendix contains an evaluation of 17 identified roadless areas on the National Forests and Grasslands in Texas (NFGT). The purpose of this appendix is to present a detailed and site-specific evaluation of the areas of the Forest that have been tentatively identified as being essentially unroaded or undeveloped. It includes a description of the resources, physiographic and biologic features, and the present management situation for each area.

Background

This evaluation of roadless areas has been conducted in a setting following some important background legislation and activities. These include: the Wilderness Act; the Eastern Wilderness Act; the second Roadless Area Review and Evaluation (RARE II); the National Forest Management Act; and the Texas Wilderness Act of 1984.

The 17 roadless areas were identified in RARE II or in scoping for the Forest Plan Revision. All but one of the roadless area proposals received during scoping for the Forest Plan Revision identified areas previously identified in RARE II. The one area not previously identified, Longleaf Ridge, overlaps one RARE II study area (Jordan Creek) and part of another (Graham Creek).

Parts of five of the original RARE II study areas were designated wilderness with passage of the 1984 Texas Wilderness Act. However, none of the designated wildernesses encompassed all of any of the study areas.

Wilderness Act of 1964.

The 1964 Wilderness Act establishes the National Wilderness Preservation System, defines wilderness, and provides for activities which may occur within designated Wilderness areas.

The Act defines wilderness as an area where the earth and its community of life are untrammeled by humans, where a person is a visitor who does not remain...an area of undeveloped Federal land containing its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of human work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) ...is of sufficient size as to make it practical for its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, education, scenic, or historical value.

The Act provides that rights of access to non-National Forest lands surrounded by a wilderness will be granted the landowner. In addition, the Act provides that subject to valid existing rights, minerals in lands within wilderness are withdrawn from mineral production. Forest Service proposals for wilderness are recommendations only. Final decisions on wilderness designation have been reserved by the Congress itself.

Eastern Wilderness Act.

On January 3, 1975, Congress passed the Eastern Wilderness Act. This Act established several wilderness areas in states east of the 100th meridian (none in Texas but some in adjoining states), reaffirmed the importance of wilderness in the eastern United States, and eliminated the 5,000-acre minimum size requirement that was included in the 1964 Wilderness Act.

Roadless Area Review and Evaluation (RARE II).

In January, 1979, the Forest Service issued nationally a Final Environmental Impact Statement (FEIS) documenting a review of 62 million acres of roadless and undeveloped areas. The purpose of RARE II was to determine which areas were suitable for wilderness.

The RARE II Environmental Impact Statement (EIS) was the basis for recommending that Congress designate 15.1 million acres as wilderness; that about 36 million acres should be managed for multiple-use purposes other than wilderness; and that the remaining 10.8 million acres needed further planning before a decision could be made. This EIS was subsequently challenged and the Federal court ruled that the RARE II EIS was inadequate for this purpose.

National Forest Management Act.

In September 1983, the National Forest Management Act (NFMA) Regulation [36 Code of Federal Regulations (CFR) Part 219.17] was revised, directing that unless otherwise provided by law, roadless areas within the National Forest System will be evaluated and considered for recommendation as potential wilderness during the Forest Planning process (including Forest Plan Revisions).

Roadless areas subject to evaluation include those previously inventoried in RARE II, in a unit plan or in a Forest Plan which remain essentially roadless and undeveloped, and which have not yet been designated as wilderness or non-wilderness by law.

Texas Wilderness Act **- On October 30, 1984, the Texas Wilderness Act was signed into law [Public Law 98-574). This act added five wilderness areas from the National Forests and Grasslands in Texas to the National Wilderness System. The Act stated "that review and evaluation . . . shall be deemed for the purposes of the initial land management plans . . . to be an adequate consideration of the suitability of such lands for inclusion in the National Wilderness Preservation System and the Department of**

Agriculture shall not be required to review the wilderness option prior to the revisions of the plans . . ." [Public Law No. 98-574, sec. 5(b)(2)].

The Texas Wilderness Act of 1984 established 34,346 acres of wilderness in Texas. On October 29, 1986, Congress passed Public Law 99-584 which made technical corrections to the boundaries of the previously established wilderness areas. As a result of this law, the acreage of wilderness increased to 36,347 acres. Since then, some private inholdings in the existing wilderness areas have been acquired through land exchange. This has increased the wilderness acreage to the present day total of 37,162 acres.

Evaluation of This Appendix

Many of the roadless areas have had several slightly different proposed boundaries. For this Revision, a boundary encompassing all particular proposals for that roadless area was established. Enclosed in this appendix are reports on 17 roadless areas in Texas. The evaluation reports that follow rate the potential of the 17 roadless areas in three categories:

Capability.

The qualities that make a roadless area available or not available for wilderness.

Availability.

The non-wilderness resources and demands of the area.

Need.

The amount of wilderness in the area and region.

The roadless areas total about 69,000 acres. Those roadless areas that are found to be capable of being wilderness could be recommended to Congress for designation as wilderness. All of the 17 roadless areas have several qualities in common; one is the amount of existing wilderness in the surrounding area. There are 84,012 acres of wilderness in the State of Texas; 37,162 acres of which are within the boundaries of the National Forests and Grasslands in Texas. In addition, there are 22,524 acres in neighboring Oklahoma; 17,046 acres in neighboring Louisiana; and 128,362 acres in neighboring Arkansas. Existing wilderness acreages are shown in Table D-1.

Another quality the 17 roadless areas have in common is landform. All areas are located in the Western Gulf section of the Coastal Plain Physiographic Province [U.S. Geological Survey (USGS) 1946]. Based on the U.S. Forest Service (USFS) Region 8 Soil Resource Inventory (R-8 1977), all of the specific landforms found (e.g. ridgetops, floodplains,

stream terraces, etc.) in these areas are also found in other wilderness areas on the Forest.

Most of the roadless areas occur in the NFGT's Mixed Forest Ecosystem [same as: Bailey's (1980) Southeastern Mixed Forest Ecoregion or Texas Natural Heritage Program's (TNHP's) (Orzell 1991) Mixed Pine-Hardwood Forest Ecological Region]. This ecosystem is also represented by several existing wilderness areas in Texas and surrounding states. A few of the roadless areas occur in NFGT's Longleaf Dominated Ecosystem [same as: Bailey's Beech-Sweetgum-Magnolia-Pine-Oak Forest Ecoregion or TNHP's Longleaf Pine Forest Ecological Region]. This ecosystem is also represented in existing wilderness areas on the Forest and in wilderness areas in other states.

Each of the evaluation reports were prepared using a "standard" format and procedure. This format, also utilized for evaluating roadless areas on other Forests in the Southern Region, involved evaluating the roadless areas capability, availability, and need by addressing a standard set of criteria. The criteria, listed in Forest Service Handbook 1909.12 (Land Management Planning Handbook), are shown below:

1. The land is regaining a natural, untrammeled appearance.

2. Improvements existing in the area are being affected by the forces of nature rather than humans and are disappearing or muted.

3. The area has existing or attainable National Forest ownership patterns, both surface and nonsurface, that could ensure perpetuation of identified wilderness values.

4. The location of the area is conducive to the perpetuation of wilderness values. Consider the relationship of the area to sources of noise, air, and water pollution, as well as unsightly conditions that would have an effect on the wilderness experience. The amount and pattern of Federal ownership is also an influencing factor.

5. The area contains no more than a half mile of improved road for each 1,000 acres, and the road is under Forest Service jurisdiction.

6. No more than 15 percent of the area is in non-native, planted vegetation.

7. Twenty percent or less of the area has been harvested within the past 10 years.

8. The area contains only a few dwellings on private lands and the location of these dwellings and their access needs insulate their effects on the natural conditions of Federal lands.

Each of the roadless area evaluations was prepared by a District Interdisciplinary (ID) Team; reviewed for consistency, objectivity and accuracy by the Forest ID Team, the Planning Team and Forest Management Team; and reviewed for consistency, objectivity, and completeness by members of the Southern Region's ID Team. Each area description has a listing of the gross area, which includes all lands bounded within the boundaries of the analysis area; and net area, which is the actual Forest Service ownership within the analysis area.

In addition to containing evaluation reports, this appendix also contains tables summarizing some of the key attributes of the roadless areas and maps showing the general vicinity and specific location of the roadless areas. More detailed maps are contained in the planning records in the Forest Supervisor's Office, 701 North First, Lufkin, Texas 75901.

Summary and Conclusions

All alternatives developed in the NFGT Forest Plan Revision contain existing wilderness areas. Roadless areas evaluated in this appendix were included in Alternatives 5, 6 and 7 to address considerations and issues identified during the planning process. All roadless areas reviewed contained a number of attributes that, when evaluated according to the standard criteria (Table D-2), found them to be undesirable wilderness candidates. Most roadless areas evaluated (with the exception of the Stark Tract on the Sabine National Forest, which has historical records only) were found in identified red-cockaded woodpecker (RCW) 1,200-meter zones, or in potential habitat management areas for the RCW (Management Area 2). Management that would provide habitat for the recovery of the endangered RCW and perhaps other threatened or endangered species was considered to be in conflict with wilderness designation. This factor, as well as the other criteria used in the evaluation, led the Forest to conclude that none of the 17 areas evaluated should be recommended to Congress for wilderness designation in their present state. Areas identified in Alternatives 5, 6, and 7 as proposed wilderness, however could be recommended to Congress for wilderness designation if actions were taken to correct those criteria that did not conform to wilderness standards. These corrective measures, in most cases, would not be possible without changes in existing laws and ownership status.

TABLE D-1

EXISTING WILDERNESS IN TEXAS AND ADJOINING STATES

Administrative Unit	Wilderness Area	Acreage
TEXAS		
Angelina NF	Turkey Hill	5,286
	Upland Island	13,390
Davy Crockett NF	Big Slough	3,639
Sabine NF	Indian Mounds	11,037
Sam Houston NF	Little Lake Creek	3,810
Guadalupe Mountains Nat'l Park	Guadalupe Mountain	46,850
State Total		84,012
OKLAHOMA		
Ouachita NF	Black Fork Mountain	8,700
	Upper Kiamichi River	9,371
Wichita Mountain Nat'l Wildlife Refuge	Wichita Mountain	8,570
State Total		17,046
LOUISIANA		
Breton Nat'l Wildlife Refuge	Breton	5,000
Kisatchie NF	Kisatchie Hills	8,700
Lacassine Nat'l Wildlife Refuge	Lacassine	3,346
State Total		17,046
ARKANSAS		
Big Lake Nat'l Wildlife Refuge	Big Lake	2,144
Buffalo Nat'l River	Buffalo Nat'l River	10,529
Ouachita NF	Black Fork Mountain	7,568
	Caney Creek	14,344
	Dry Creek	6,310
	Flat Side	10,105
	Poteau Mountain	10,884
Ozark NF	East Fork	10,777
	Hurrican Creek	15,177
	Leatherwood	16,956
	Richland Creek	11,822
	Upper Buffalo	11,746
State Total		128,362
FOUR STATE REGIONAL TOTAL		251,944

Alabama Creek
Davy Crockett National Forest
Trinity Ranger District

Roadless Area Review and Evaluation

Description of the Analysis Area

Roadless area name and number of acres.

ALABAMA CREEK: Gross area approximately 13,263 acres; net area approximately 12,783 acres.

Location and vicinity.

The analysis area is located in the southeastern portion of the Trinity District of the Davy Crockett National Forest. It is south of the towns of Apple Springs and Nigton, and east of Diboll in Trinity County, Texas.

Describe access to the analysis area, including roads and trails leading to the area.

Access is by Farm-to-Market (FM) 2262 from the southeast and the north, by FM 2174 from the southeast, and by FM 357 and Forest Service Road (FS) 509 from the west.

General description of the analysis area's geology.

The analysis area is in the western Gulf Coastal Plain and is underlain by the Caddell-Manning geologic formation. This formation is 36 to 58 million years old and consists of clays, quartz, sands, lignite, glauconite, and fossil wood. Soils associated with this formation are Moten-Mutley, Alazan-Besner, Koury-Pophers-Rosewall, Fuller-Kurth-Keltys, and Ray-Lake-Moswell-Herty.

General description of the analysis area's topography.

The analysis area is in the western Gulf Coastal Plain, which is made up of ridges and valleys approximately parallel to the Gulf of Mexico coastline. Its topography is generally level to gently rolling, but short slopes are as steep as 40 percent near the Neches River. Elevation varies from 140 to 320 feet above sea level.

General description of the analysis area's vegetation, including the ecosystem type.

The analysis area is covered with forest. The predominant plant community is loblolly pine-oak. Loblolly pine and shortleaf pine are the most common forest cover types and together they occupy more than 75 percent of the analysis area. The water oak-willow oak, and to a lesser extent the swamp chestnut oak-willow oak, plant communities commonly occur on more mesic sites along the Neches River. The tree species most common in the analysis area are loblolly pine, shortleaf pine, sweetgum, post oak, white oak, Southern red oak, water oak, willow oak, and cherrybark oak. Common understory species include flowering dogwood, yaupon, wax myrtle, red maple, and greenbrier.

Key attractions, if any, including sensitive wildlife and scenic landmarks.

Some of the oldest forest stands are impressive, especially near the Neches River. The analysis area contains three active and two inactive clusters of red-cockaded woodpeckers (RCW). The RCW is an endangered species. The Neches River, which adjoins the analysis area on the east, has been nominated as a wild and scenic river and is being managed as such. The National Rivers Inventory (NPS 1982) determined that the Neches River possessed outstandingly remarkable scenic, recreation, fish, and wildlife values.

Wild turkey are being reintroduced into the analysis area. Some people travel to the analysis area to view the turkeys.

The analysis area is also designated as a Wildlife Management Area (WMA). This designation places the analysis area under special rules for deer hunting and results in publicity for the analysis area. Part of the special fee hunters pay to use WMA's is used to manage wildlife on those areas.

Area Inventory

Human influence.

1. To what degree have humans and past and present human activity affected natural ecological processes and conditions?

The National Forest System purchased the land in 1935. Most of the analysis area had been cut over a short time earlier. Since its acquisition in 1935, the analysis area has been managed intensively for multiple use. Recent activities include timber cutting, road construction, creation of wildlife openings, cattle grazing, and prescribed burning.

2. To what degree is the area natural or natural-appearing and free from disturbance?

Old tramways are the only evidence of turn-of-the-century logging and farming activities. These are not obvious to the casual visitor. However, more recent activities are very evident. Only a small portion of the analysis area is free from disturbance. Man's influence is evident in most of the analysis area. The analysis area is dissected by roads. Some of these are major roads.

Timber has been cut on most of the analysis area. Regeneration areas–where all or most of the timber is cut to make room for a new crop of trees–occupy approximately 13 percent of the acreage. Stands occupying about 90 percent of the remaining areas have been thinned.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural untrammeled appearance?

No. Most of the analysis area has been and is being managed intensively as part of the general forest area according to principles of multiple-use management. Recent management activities are evident, and only small portions of the analysis area appears natural.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

Subsurface mineral rights are owned privately or owned federally and leased. Surface occupancy for the purposes of mineral exploration and production, with mitigating measures implemented, must be allowed where mineral rights are privately owned or leased. Therefore, perpetuation of wilderness values can not be ensured.

There are two privately owned inholdings near the Neches River. These would not preclude perpetuation of wilderness values; however, provisions for permanent access would have to be made. The parcel containing the boys camp would probably not be available or suitable for acquisition and management as wilderness.

5. Is more than 15 percent of the analysis area in nonnative vegetation?

No.

Improvements, structures and nonconforming uses.

1. Are any of the following types of areas, features, or nonconforming uses present? If so, where?

a. Air strips or heliports: No.

b. Electric installations: There is an aerial powerline to the boys camp.

c. Areas displaying evidence of historic mining at least 50 years old: No.

d. Areas under current mineral lease that contain a "no surface occupancy" stipulation? No.

e. Areas under current mineral lease where the lessee has not exercised development and occupancy rights: Two parcels, totaling 561.8 acres are under oil and gas lease. There are no active wells on these leases.

f. Recreation improvements such as occupancy spots or minor hunting or outfitter camps: The analysis area contains three designated hunter camps. These camps receive heavy use for three months of hunting seasons, and very light use the remainder of the year. The Holly Bluff site, a popular boat launch site and fish camp, receives moderate use all year.

g. Timber harvest areas where logging and prior road construction are or are not evident: Almost all timber was removed from about 13 percent of the analysis area in the last 10 years. Some timber was removed in ordinary logging operations, some was removed in storm salvage operations, and some was removed to create openings for wildlife. Stands on almost all of the remaining acreage have been thinned commercially. There are no significant areas where no timber has been removed in the last 10 years. Most of the analysis area displays evidence of logging and logging roads.

Two timber sales were contracted in May, 1992. These sales included: 4 thinning units totaling 1,523 acres; 4 seed-tree cuts totaling 158 acres; and 7 clearcuts totaling 204 acres.

h. Cultural treatments involving plantations or plantings: The 1,654 acres harvested in the last 10 years have been planted to southern pines. The trees in these plantations are now from 2 to 20 feet in height.

i. Private inholdings in the area: There are two private inholdings. Each consists of approximately 240 acres.

j. Dwellings on private inholdings: One of the inholdings is a 40 to 60 person boys camp containing several buildings. There is a temporary dwelling on the other inholding.

k. Nonconforming structures and improvements: The boys camp buildings and associated powerline, and two oil and gas pipelines with a total length of 9.3 miles.

l. Ground-return telephone lines: There are such lines along FM 2262 and along the access to the boys camp from the east.

m. Watershed treatment areas: No.

n. Roads: There are 6.4 miles of paved farm-to-market highway and 32 miles of improved gravel and dirt roads. There are 0.3 miles of graveled and graded county road. Approximately 50 percent of the improved gravel and dirt road is all-weather road maintained to levels III and IV. The other 50 percent is maintained to level I and II, and is operable only during dry weather.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or natural deterioration?

The FS roads and hunter camps could be terminated. The farm-to-market highways (which belong to the State of Texas), access to the boys camp and the other private parcel, access for management of RCW, access to privately owned and federally leased minerals, the 9.3 miles of gas and oil pipelines, and 0.4 miles of powerline cannot be mitigated or terminated.

3. Are improvements in the analysis area being affected by the forces of nature rather than by humans and are they disappearing or muted?

The improvements described in g.-j., l., and n., above are being maintained for long-term service.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the last 10 years?

Yes. Approximately 13 percent of the area has been harvested within the last 10 years. Approximately 90 percent of the remaining area has been thinned commercially. Also, 1,523 acres of thinnings, 158 acres of seed-tree harvesting, and 204 acres of clearcutting are being conducted.

5. Does the analysis area contain less than 1/2 mile of improved road for each 1,000 acres?

No. There are approximately 3.1 miles of improved road per 1,000 acres.

6. Are all existing roads under Forest Service jurisdiction?

No. There are 6.4 miles of State FM roads and 0.3 miles of Trinity County road (0.53 miles of road per 1,000 acres).

Evaluation of Potential Wilderness

Capability.

Does the analysis area have the basic characteristics that would make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the area provide the opportunity for solitude and serenity?

The existing road network, pipeline corridors, and past and present activities within the analysis area and on nearby private land limit opportunities to experience solitude and serenity. More than 95 percent of the analysis area has an inventoried Recreation Opportunity Spectrum (ROS) of roaded-natural or influenced by existing roads. The areas not influenced by roads are small chunks that are scattered throughout the analysis area.

Challenge.

Does the analysis area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

The abundance of roads and the gentleness of the topography makes access very easy. The analysis area presents opportunities for recreational activities that imply varying degrees of adventure, excitement, challenge, initiative, and self-reliance. These recreational activities are detailed under a.-m. below.

Outdoor recreation opportunities.

Describe the analysis area's capability for providing primitive and unconfined types of recreation, including:

a. Camping: Numerous locations are suitable for primitive camping. These include three small, unimproved and designated primitive camping areas.

b. Hunting: The analysis area is one of the best deer hunting areas on public land in east Texas, and is very popular. Squirrel hunting is also excellent and turkey numbers are good. Rabbits, wild hogs, quail, and woodcock are present and can be hunted.

c. Fishing: The Neches River provides good fishing for catfish, bass, bream, and crappie. Many small ponds are stocked with catfish, bass, and bream.

d. Canoeing: The adjoining Neches River affords excellent canoeing. The only other canoeing opportunities are a few small ponds.

e. Boating: The Neches River provides good boating for small boats.

f. River rafting: The analysis area contains no streams or rivers large enough to support this activity.

g. Backpacking: There is some opportunity for backpacking on old woods roads and closed roads; there is very little backpacking activity at present.

h. Hiking: There is some opportunity for hiking on old woods roads and closed roads; but there are no established hiking trails, and the underbrush makes hiking difficult elsewhere.

i. Riding: There is some horseback riding in the analysis area. There are no established riding trails, but horse clubs ride on logging roads and pipeline clearings.

j. Photography: There are good opportunities to photograph plants and animals near small ponds and the Neches River. There are few opportunities for panoramic photography.

m. Other: Mayhaw gathering is very popular in the analysis area.

Special features.

1. What is the analysis area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

Because the analysis area is and has been managed intensively, there are now very few opportunities for such education and study. In the long run, however, Alabama Creek would offer opportunities similar to those offered by any other wilderness in the Forest.

2. Is there an abundant and varied wildlife population?

The analysis area is well known for its abundance of game and nongame animals. There are also three active and two inactive clusters of the endangered RCW.

Manageability.

1. What are the characteristics of the surrounding area, including ROS classification, adopted VQO, and present and planned uses?

Most of the surrounding area is tree farms, hunting clubs, ranches and farms. The ROS is roaded natural. Visual Quality Objectives (VQO's) of adjoining National Forest lands are retention and partial retention because a main travel route is present.

2. Do boundary locations conflict with important existing or potential public uses outside the boundary that might result in demands to allow nonconforming structures or activities in the wilderness?

Such demands are not expected to be a serious problem.

3. Is it possible to readily and accurately describe, establish, and recognize boundaries on the ground?

Yes. The current National Forest boundary is marked.

4. Do boundaries conform with terrain or other features that constitute a barrier to prohibited use?

The Neches River provides some protection against prohibited use, but most sections of the boundary provide no such protection.

5. Do boundaries, to the extent practicable, shield the wilderness environment inside the boundary from the sights and sounds of civilization?

The Neches River, on the eastern boundary, provides some shielding; other boundaries do not.

6. Do boundaries provide adequate opportunity for access and traveler transfer facilities?

Yes.

Availability.

1. Describe other (nonwilderness) resource demands and uses. What current uses exist?

a. Recreation: Hunting of deer, waterfowl, squirrels, doves, and other small game is by far the greatest recreational use. Fishing and swimming in the numerous ponds and the adjacent Neches River are the only other significant recreational uses. In the spring, the Neches River bottom is popular with the mayhaw collectors. Some horseback riding occurs on pipelines and old logging roads.

b. Information on wildlife species, population and management needs: The analysis area has been managed very intensively, in cooperation with Texas Parks and Wildlife Department, as a WMA. Hunters must purchase licenses to hunt deer in this area. Some proceeds from these license sales are returned for wildlife habitat improvement. Featured species are deer and turkey. Populations of deer and turkey are high. Wild turkey management has been a success story here. After initial stocking in 1987 and extensive food plot establishment (34 plots of approximately 2 acres each), the turkeys were well established in the analysis area. In 1991, wildlife biologists with the Texas Parks and Wildlife Department started live-trapping turkeys in the analysis area and transplanting them into other areas in east Texas.

c. Water availability and use: There is adequate water for wildlife and livestock, but the available water is not suitable for human consumption unless treated.

d. Livestock operations: There is an active 100-head cattle allotment in the northwest portion of the analysis area.

e. Timber: Most of the analysis area is well stocked with pine timber. All timber except that in RCW clusters, stringers along streams, and the Neches River Protective Corridor is under intensive management for multiple uses including the protection of the RCW. A 1/4-mile

corridor along the Neches River is being managed as a potential wild and scenic river. No timber is harvested in this corridor.

f. Minerals: Mineral rights on six parcels, totaling 268.97 acres are privately owned. Mineral rights on two parcels, totaling 561.8 acres, are Federally owned and are under oil and gas lease.

One oil well was drilled and abandoned prior to 1980. Production data for this well is not available. Seven seismic exploration operations have been conducted in the past 10 years.

The analysis area has been evaluated as having a high potential for oil and gas occurrence. The Austin chalk formation, which underlies part of the analysis area, is being actively explored in the Sabine National Forest and is producing there. It is possible this activity may move to this area in the future.

g. Cultural resources: Much of the analysis area may contain archeological and historical sites or both (historic properties). The Neches River provided and ideal conditions for early settlement. Fertile bottomlands, abundant wildlife, and other resources attracted and supported Native American inhabitants for more that 5,000 years. Numerous prehistorical sites, ranging from Paleo-Indian to Neo-Historic, have been found in the analysis area. Future surveys will likely reveal additional sites, and evaluations of these sites should broaden our knowledge of the prehistoric inhabitants of the region.

There are several historic sites in the analysis area, including historic farmsteads and cemeteries. The remains of old logging trams or railways also occur throughout.

h. Authorized and potential land uses: The currently authorized land uses are 0.2 miles of county road, a 1,100-foot road easement to Champion; 0.4 miles of overhead powerline to the boys camp, a 0.1-mile water line, two 30 foot oil and gas pipelines (9.3 miles in length), and two segments of FM 2262 totaling 16.4 miles in length.

i. Management considerations including fire, insects and diseases, and presence of non-Federal lands: There are two inholdings (See Figure 1 - Alabama Creek). If prescribed fire were excluded for 10 years or more, the accumulation of fuels would increase the complexity of fire control and the probability that wildfires in the analysis area would threaten adjacent private property. The absence of timber management would eventually increase the potential for a southern pine beetle (SPB) epidemic.

2. What outputs are currently produced or could be produced in the future?

Dispersed recreation activities–primarily hunting, camping and fishing occur. The analysis area's high site quality and gentle topography makes timber management very productive.

3. Is the analysis area located in such a way that the need for increased water production or additional onsite storage or both is so vital that installation or maintenance of improvements is an obvious and inevitable public necessity?

No.

4. Would wilderness designation seriously restrict or prevent the application of wildlife management measures of considerable magnitude and importance?

Yes. The area contains three active RCW clusters. Under wilderness management, the habitat would decline in quality and eventually the birds would be forced to relocate. Additional areas of the Forest would have to be managed to provide replacement habitat.

The analysis area is also managed for wild turkey. Wilderness management would provide habitat for turkeys; however, ongoing habitat enhancement efforts, such as the development of food plots, could not be implemented.

5. Is it a highly mineralized area of such strategic or economic importance and extent that restrictions or controls resulting from wilderness designation would not be in the public interest?

The area is relatively small but has been assessed as having a high potential for occurrence of oil, gas, and lignite coal. There are no known reservoirs and no known potential for other mineral resources.

6. Does the analysis area contain natural phenomena of such unique or outstanding nature that general public access and special development to facilitate public enjoyment should be available?

No.

7. Is the land needed to meet clearly documented resource demands such as demands for timber, mineral production, or developed recreation?

Yes. The analysis area is currently included in the Forest's timber base. Any reduction in this base would result in a reduction in the Forest's production of wood.

In addition, the analysis area is currently included in the base of lands open and available for minerals exploration and production. Part of the analysis area is currently leased, and because the analysis area is underlain by the Austin chalk formation, mineral exploration and production are not unlikely. Receipts from timber sales and minerals activities are very important to the county.

Roads crossing the analysis area provide popular and important access to the Neches River. The analysis area also provides important habitat for the RCW.

8. Is the land committed through contractual agreements for use, purposes, or activities not in concert with wilderness requirements?

Yes. There are two timber sale contracts, two special use pipelines, a water line, a power line, a special use road, and leases of mineral rights.

Need.

Other wildernesses.

1. What are the locations, sizes, and types of other wildernesses in the vicinity?

The National Wilderness Preservation System includes 84,012 acres of designated wilderness in the State of Texas, as well as additional land in nearby states. See Table 1 (found in the Introduction to the Evaluation of Roadless Areas) for more information about wilderness areas in Texas.

2. How far is it to the closest existing wilderness?

The Big Slough Wilderness is located 25 miles to the north of the analysis area.

3. What is the level of use in nearby wilderness? What are the trends in the use of these areas?

On the average, the wilderness areas in Texas have been receiving about 0.2 Recreation Visitor Days (RVD's) of use/acre/year, or about 10 percent of capacity. Wilderness use has slowly increased from about 5,800 RVD's in 1987 to about 10,900 RVD's in 1991. Monitoring and research show that most wilderness use is related to hunting and is primarily day use.

The nearby Big Slough Wilderness received an estimated 1,900 RVD's of use in 1991 (0.52 RVD's/acre, or about 25 percent of capacity).

4. Is the population in and around these areas increasing or decreasing? How quickly is it increasing or decreasing?

The population of Texas increased 0.6 percent annually from 1980-1987; and this slow increase is expected to continue. The large metropolitan areas such as Houston and Dallas grew at much faster rates (17 percent and 27 percent, respectively, 1980-87). These population centers are about 100 miles (Houston) to 175 miles (Dallas) from the analysis area.

The population of the Deep East Texas region, which includes Trinity County, increased about 26 percent from 1980 to 1987. The population of Deep East Texas is expected to increase about 50 percent over the next 35 years.

Nonwilderness lands.

1. Are there opportunities for unconfined and primitive recreation on nonwilderness areas in the vicinity? If so, where?

There are such opportunities on the Davy Crockett National Forest. The National Forests in Texas now contains 82,348 acres of land providing opportunities for primitive or semi-primitive recreation.

Habitat needs.

1. Are any biotic species in the analysis area competing directly with increasing public use and development?

Yes. There are several active and inactive RCW clusters in this analysis area. There is a 200-foot boundary and a 1200-meter foraging habitat zone around each RCW cluster. The RCW is protected under the Endangered Species Act, and its habitat is managed under court-ordered direction.

The eastern wild turkey, which has been reintroduced into the analysis area, is somewhat sensitive. Some roads in the area have been closed to protect its habitat.

2. Could their needs be provided for through means other than wilderness designation?

Yes, through seasonal or year-long road closures.

3. Is there a need to provide a sanctuary for biotic species that cannot survive in less than primitive surroundings?

No.

Landform and ecosystem preservation.

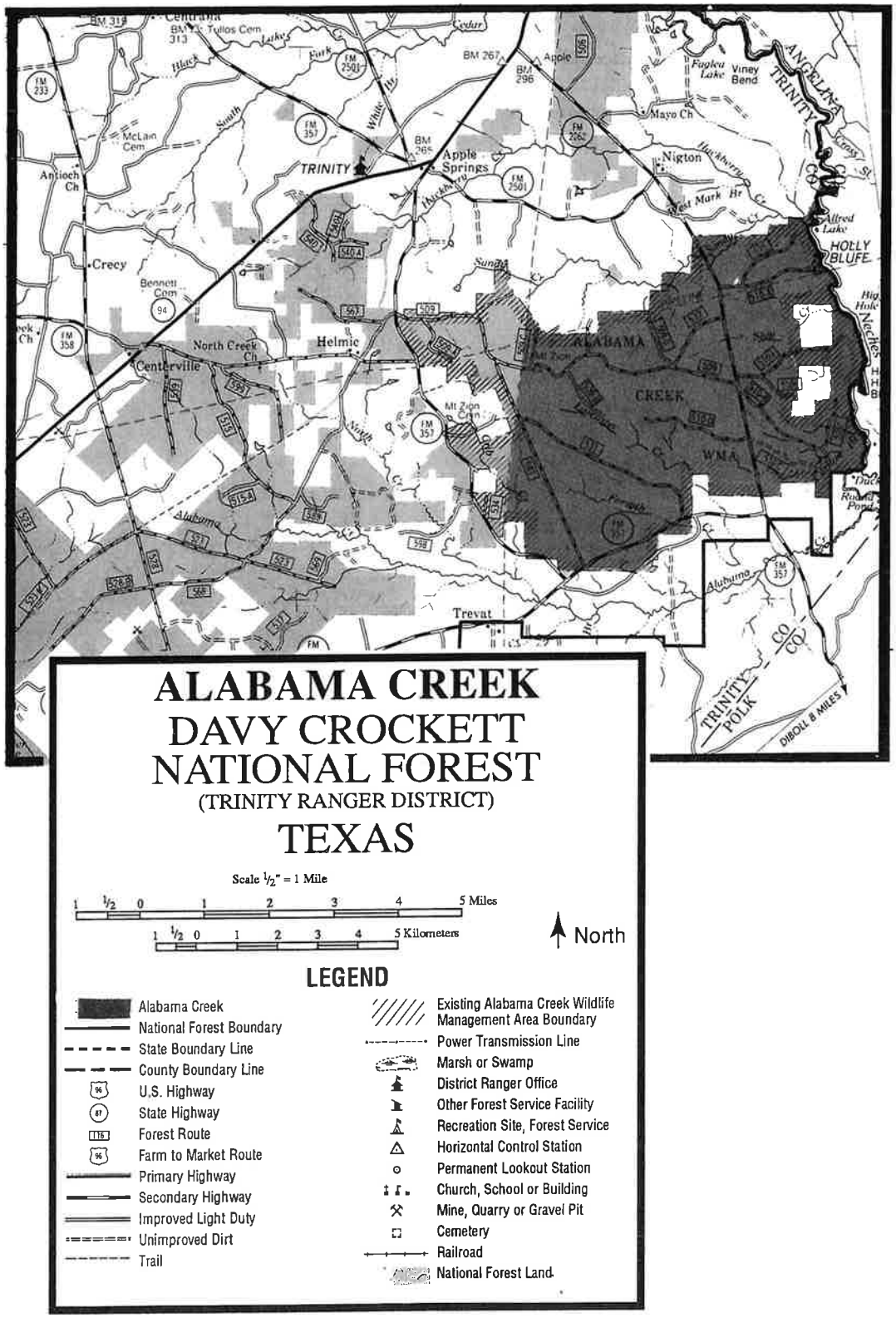
1. What is the analysis area's landform type based on the Region 8 Soil Resource Inventory (R-8 1977)? Does the area represent a unique landform type that is not represented in any wilderness areas in the general vicinity?

This part of the upper Coastal Plain consists of floodplains, stream terraces, concave foot slopes, and gently sloping ridge tops. The side slopes are characterized by inclined surfaces on broad interstream divides with narrow floodplains and branch head inclusions. These landforms are common in the region, and in wilderness areas in Texas.

2. What is the area's ecosystem classification? Does the analysis area represent a unique ecosystem that is not represented in any existing wilderness areas in the general vicinity?

The area has loblolly pine, shortleaf pine, loblolly pine-hardwood, swamp chestnut oak-cherrybark oak, white oak-hickory, white oak-black oak-yellow pine, sweetgum-Nutall oak-willow oak, and sweet bay-Swamp tupelo-redbay forest cover types. This vegetation is typical of the southern Coastal Plains. The plant communities most common in the analysis areas are loblolly pine-oak, shortleaf pine-oak, water oak-willow oak, and swamp chestnut oak-willow oak. This ecosystem is represented in existing wilderness areas in Texas.

Figure 1 - Alabama Creek



Big Creek
Sam Houston National Forest
San Jacinto Ranger District

Roadless Area Review and Evaluation

Description of Analysis Area

Roadless area name and number of acres.

BIG CREEK: Gross area approximately 6,767 acres; net area approximately 6,767 acres.

Location and vicinity.

The analysis area is located in the central portion of the San Jacinto Ranger District of the Sam Houston National Forest. The analysis area is approximately 5 miles south of Coldspring or 15 miles north of Cleveland, Texas, on Farm-to-Market (FM) 2025. It is bounded by Forest Service (FS) Roads 217, 221, 220, and private land on the east.

Describe access to the analysis area including roads and trails leading to the area.

State Highway (SH) 150 and FM 2025 and 2666 provide access to FS 217, 221, and 220.

A 6-mile portion of the Lone Star Hiking Trail bisects the analysis area. It also contains a system of four loop trails that are part of the Big Creek Scenic Area trail system. A parking area and trail head on FS 217 serve the trail network.

General description of the analysis area's geology.

The San Jacinto Ranger District is on the western Gulf Coastal Plain. It is underlain by the Bently formation, which is Pleistocene in age. The principal soils are developed from unconsolidated beds of clay, sand, sandy clay, or clay shale materials comprising old, noncalcareous sediments.

General description of the analysis area's topography.

The analysis area displays gentle but noticeable changes in elevation and is fairly well drained. The main drainages are Double Lake and

Henry Lake branches, which drain into Big Creek. Elevation of the highest point is 315 feet, and elevation of the lowest point is 190 feet.

Big Creek is a tributary of the Trinity River system. Little Creek, an intermittent stream, flows through the easternmost portions of the analysis area.

General description of the analysis area's vegetation, including the ecosystem type.

Big Creek is a biologically diverse area containing examples of four ecological landtypes (associations) and many plant communities described by the Texas Natural Heritage Program (TNHP). The Inland Bays Association consists of poorly drained flats or depressions, with water oak-willow oak and water oak-sweet gum plant communities. The Bottomlands Association is characterized by swamp chestnut oak-willow oak, water oak-willow oak, and water oak-sweetgum communities. The Riparian Association consists of American beech-southern magnolia, American beech-white oak, loblolly pine-oak, sweetbay magnolia, and hardwood forest communities on lower slopes, creek bottoms, and stream terraces. Vegetation of the Medium Texture Association is primarily the loblolly pine-oak plant community.

Key attractions, if any, including sensitive wildlife and scenic landmarks.

The analysis area includes the 1,420-acre Big Creek Scenic Area, which was established in 1962. The Scenic Area and its trail network are very popular attractions. The TNHP inventoried the area and described it as the most ecologically intact and botanically significant area in the Sam Houston National Forest.

The area contains the State champion black tupelo and the third largest Littlehip Hawthorne in the United States. One sensitive plant species, slender wake-robin (trillius gracile), occurs in this area. It is also a popular area for viewing orchids and other flowering plants.

Big Creek Scenic Area contains an inactive red-cockaded woodpecker (RCW) cluster and recruitment stand. The RCW is an endangered species and a popular birding attraction in east Texas.

Area Inventory

Human influence.

1. To what degree have humans and past and present human activity affected natural ecological processes and conditions?

Turn-of-the-century logging, farming, and grazing partly determined the analysis area's present condition and vegetation. More recent land

disturbing activities have reduced the hardwood component and increased the pine component in the various plant communities. This created a diverse and well balanced mixture of plant species. Present-day southern pine beetle (SPB) control efforts are creating openings that will be dominated by early successional plant species. Past and current beetle control efforts have created a mosaic of plant communities, but have not significantly affected natural ecological processes.

2. To what degree is the analysis area natural or natural appearing and free from disturbance?

Clearing and stumps caused by SPB suppression activities are evident throughout the Big Creek Scenic Area. Hiking trails and logging roads also detract from the analysis area's naturalness.

The analysis area contains several pine plantations, permanent roads, and oil or gas production facilities. Some of these features may detract from the naturalness of the analysis area for many years to come.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural, untrammeled appearance?

The analysis area has not yet regained a natural appearance following recent SPB infestations and activities to control SPB. Hiking trails and logging roads will disappear if they are not maintained.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

The ownership pattern ensures the perpetuation of such values in the Big Creek Scenic Area, but not in the remainder of the evaluation area. Rights to minerals in part of the analysis area are reserved. Therefore, the Federal government cannot prevent mineral exploration or development activities inconsistent with wilderness conditions.

5. Is more than 15 percent of the area in non-native vegetation?

No.

Improvements, structures, and nonconforming uses.

1. Are any of the following types of areas, features, or nonconforming uses present? If so, where?

a. Airstrips or heliports: No.

b. Electronic installations: No.

c. Areas displaying evidence of historic mining at least 50 years old (Do not include areas of significant current mineral activity): No.

d. Areas under current mineral lease that contain a "no surface occupancy" stipulation: No.

e. Areas under current mineral lease where the lessee has not exercised development and occupancy rights: No.

f. Recreation improvements, such as occupancy spots or minor hunting or outfitter camps: There is a primitive campsite near Double Lake Creek and the Lone Star Trail at Road 220. This campsite is popular with scout troops.

g. Timber harvest areas where logging and prior road construction are or are not evident: There are no timber harvest areas in Big Creek Scenic Area. However, Big Creek Scenic Area contains area where SPB infestations occurred. Trees were felled for treatment purposes, and in most cases hauled away.

There are plantations and evidence of harvesting in parts of the analysis area that are outside the scenic area. Plantations and evidence of harvesting are visible along FS 218, 279, 220, 220C, and 217C. These roads are surfaced and open to traffic. Plantations and other evidence of harvesting are also visible from many woods roads that are open only to foot traffic.

h. Cultural treatments involving plantations or plantings: Yes.

i. Private inholdings in the analysis area: No.

j. Dwellings on private inholdings: No.

k. Nonconforming structures and improvements: Pacline Inc. gas pipeline, three oil and gas well sites, pump house at FS 220, and Henry Lake Branch.

l. Ground-return telephone lines: No.

m. Watershed treatment areas: No.

n. Roads: Level C (open) roads 218, 279, 220, 220C, and 217C. Level D (closed) roads are numerous.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or rapid natural deterioration?

The oil and gas production facilities cannot be terminated. It is likely, however, that they will be abandoned in the future. If this happens, mitigation measures and natural restoration processes would remove evidence of these uses in a relatively short period of time.

Other nonconforming uses can be terminated, removed, or mitigated.

3. Are improvements in the area being affected by the forces of nature rather than by humans, and are they disappearing or muted?

No.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the past 10 years?

Yes.

5. Does the analysis area contain less than 1/2 mile of improved road for each 1,000 acres?

In Big Creek Scenic Area, yes. In the analysis area as a whole, no.

6. Are all existing roads under Forest Service jurisdiction?

Yes.

Evaluation of Potential Wilderness

Capability

Does the analysis area have the basic characteristics that would make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the analysis area provide the opportunity for solitude and serenity?

Big Creek Scenic Area has a well developed trail system and excellent visual resources; therefore, it is an excellent place in which to enjoy the solitude and serenity of the forest. In the remainder of the analysis area, the presence of roads, oil wells, truck traffic, etc. reduces opportunities for solitude and serenity.

Challenge.

Does the analysis area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

Access is easy and the trail system is already developed. Big Creek Scenic Area and the trail management corridor along Big Creek and the Lone Star Hiking Trail offer many of these opportunities. Except where improvements and nonconforming structures are present, the rest of the analysis area provides similar opportunities.

Outdoor recreation opportunities.

Describe the analysis area's capability for providing primitive and unconfined types of recreation including:

a. Camping: Excellent capability.

b. Hunting: Excellent capability (especially for deer hunting) because of low road densities in Big Creek Scenic Area; however, the current Forest Plan prohibits hunting.

c. Fishing: Limited capability with existing fish populations. Good capability with a fisheries program.

d. Canoeing: None. There are no streams or other bodies of water large enough for canoeing.

e. Boating: No capability.

f. River rafting: No capability.

g. Backpacking: Big Creek Scenic Area is a very popular destination for casual hikers and backpackers.

h. Hiking: The analysis area has a system of excellent hiking trails.

i. Riding: Big Creek Scenic Area and the existing trails are designated for foot traffic only, but there is ample opportunity to create horse and llama trails.

j. Photography: Diversity of flora and fauna is a key attraction in the analysis area. Orchids and other flowering plants and interior bird species offer excellent photo opportunities.

Special features.

1. What is the area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

Because the analysis area supports a diversity of plant and animal communities, there are many opportunities for environmental education and research compatible with natural values.

2. Is there an abundant and varied wildlife population?

Although inventories have not been completed, the analysis area is considered prime habitat for fauna typical of east Texas. Of special interest are the interior bird species that are attracted to the old-growth habitat.

Manageability.

1. What are the characteristics of the surrounding area including its ROS classification, adopted VQO, and present and planned uses?

The 1,420-acre scenic area is managed under Special Management Area Standards and Guidelines. Exceptions are the 1,200-meter influence zones, two inactive clusters, two replacement stands, and four recruitment stands managed as endangered species (RCW) habitat. The remainder of the analysis area, and adjoining National Forest area, is managed as general forest for multiple use.

The surrounding area on the east (along about half of the boundary) is private land and is managed mostly for timber production. The remaining boundary is mostly Forest Service road. National Forest land along these roads is managed with maximum modification Visual Quality Objectives (VQO). Recreation Opportunity Spectrum (ROS) along these roads is rural.

2. Do boundary locations conflict with important existing or potential public uses outside the boundary that might result in demands to allow nonconforming structures or activities or both in the wilderness?

Adjacent private lands are primarily rural and to a lesser extent residential, but activities on these lands would not create demand problems or conflicts with National Forest uses or wilderness conditions in the analysis area.

3. Is it possible to readily and accurately describe, establish, and recognize boundaries on the ground?

Yes.

4. Do boundaries, conform with terrain or other features that constitute a barrier to prohibited use?

No. Access is more restricted in some areas than in others, but in general access by boundary road and hiking trail is relatively easy.

5. Do boundaries, to the extent practicable, shield the wilderness environment inside the boundary from the sights and sounds of civilization?

Yes, except where boundaries are roads that could be sources of intrusive sights or sounds. The vegetation common in the region will buffer most sounds and sights.

6. Do boundaries provide adequate opportunity for access and traveler transfer facilities?

Yes.

Availability.

1. Describe other (nonwilderness) resource demands and uses. What current uses exist?

a. Recreation: The analysis area is popular with hikers and sightseers. It is an excellent place for birding and environmental education. It is also used by numerous scout troops.

b. Information on wildlife species, populations, and management needs: With the exceptions of quail and turkey, wildlife species are adequately represented. A need to stock quail and turkey and manage habitat for these species has been identified.

A monitoring program for interior bird species and other neotropical migrants is needed also.

c. Water availability and use: Surface water eventually becomes a domestic water supply for metropolitan Houston. There are no special uses of water or other water rights in the analysis area.

d. Livestock operations: There are no grazing operations in the analysis area and none are planned.

e. Timber: Site indices are high in most of the analysis area, and large old-growth pines and hardwoods are prevalent. Timber has

been managed by even-aged methods outside the Big Creek Scenic Area and the Lone Star Hiking Trail corridor.

Southern pine beetle is killing many overmature pines, and control methods appear to be adversely affecting the characteristic old-growth hardwood-pine forest of the Big Creek Scenic Area and adjoining areas.

f. Minerals: Oil and gas production on lands with reserved mineral rights along FS 220 will continue until the wells play out.

No Federally owned minerals are leased.

g. Cultural resources: There are no recorded historic properties, but it is likely that intensive surveys would locate such properties. The Double Lake and Henry Lake branches of Big Creek have been designated as a cultural resource probability zone (medium probability), and must be surveyed for historic properties before land-disturbing activities are authorized. There are no known conflicts with current or planned management direction or the Antiquities Act of 1906, the National Historic Preservation Act of 1966, or the Archaeological Resource Protection Act of 1979.

h. Authorized and potential land uses: There are no current or anticipated special uses in Big Creek Scenic Area.

Three oil and gas well sites and a natural gas pipeline are permitted for the area along FS 220 near Double Lake Branch. Since production from these wells is relatively low, the potential for additional exploration is low.

i. Management considerations including fire, insects and diseases, and presence of non-Federal lands: There are no parcels of private land within the analysis area. Exterior boundaries, however, follow several private ownership boundaries. Wildfires have been infrequent and are not a major management concern. Forest diseases are also of relatively minor concern. The incidence of SPB infestation, however, has been high throughout the analysis area and is expected to increase. The high basal area and number of stems per acre in the large, overmature pine trees make the analysis area's forests highly susceptible to SPB. A major management concern is how to deal with the effects of SPB infestations and their control on ecosystems in Big Creek Scenic Area.

2. What outputs are currently produced or could be produced in the future?

Commodity outputs are timber and minerals. Present and possible amenity and noncommodity outputs are wildlife and scenery viewing, birding, hiking, camping, hunting, auto touring, photography, and other forms of recreation.

3. Is the analysis area located in such a way that the need for increased water production or additional onsite storage or both is so vital that installation or maintenance of improvements is an obvious and inevitable public necessity?

The Bureau of Land Management has not studied the possibility of constructing reservoirs or other storage systems in the analysis area. It appears that storage outside the analysis area is adequate for regional needs.

4. Would wilderness designation seriously restrict or prevent the application of wildlife management measures of considerable magnitude and importance?

Yes. Wilderness designation would impact management for Threatened and Endangered (T&E) species.

5. Is it a highly mineralized area of such strategic or economic importance and extent that restrictions or controls resulting from wilderness designation would not be in the public interest?

No.

6. Does the area contain natural phenomena of such unique or outstanding nature that general public access and special development to facilitate public enjoyment should be available?

No.

7. Is the land needed to meet clearly documented resource demands such as demands for timber, mineral production, or developed recreation?

No.

8. Is the land committed through contractual agreements for use, purposes, or activities not in concert with wilderness requirements?

Yes, in existing deeds that reserve mineral rights.

Need.

Other wildernesses.

1. What are the locations, sizes, and types of other wildernesses in the general vicinity?

Little Lake Creek Wilderness, on the Raven Ranger District, is the only wilderness in the Sam Houston National Forest. It contains 3,810 acres. See Table 1 (found in the Introduction to the Evaluation of Roadless Areas) for more information about wilderness areas in Texas.

2. How far is it to the closest existing wilderness?

Approximately 40 miles.

3. What is the level of use in nearby wilderness? What are the trends in the use of these areas?

Little Lake Creek has an average annual use of 500 Recreation Visitor Days (RVD's). There is a general lack of awareness of National Forest activities and offerings in the region. However, the trend is toward much greater demand for and use of public land.

4. Is the population in and around these areas increasing or decreasing? How quickly is it increasing or decreasing?

Population growth is greatest in the "bedroom" communities within commuting distance of metropolitan Houston. Private parcels adjacent to the Forest are being bought and subdivided. The population of Texas increased by 19.4 percent between 1980 and 1990. Harris County, in which Houston is located, has a population of 2.8 million. Texas is now the third most populous State in the United States.

Nonwilderness lands.

Are there opportunities for unconfined and primitive recreation on nonwilderness areas in the vicinity? If so, where?

Big Creek and Winters Bayou Scenic Areas, portions of the Lone Star Hiking Trail, and an area known as the Big Woods offer such opportunities. However, most of the Sam Houston National Forest does not offer opportunities for primitive recreation.

Habitat needs.

1. Are any biotic species in the analysis area competing directly with increasing public use and development?

The analysis area includes no known active primary habitats of threatened, endangered, or sensitive wildlife species. However, two inactive RCW clusters affect management of the Big Creek Scenic Area. One cluster is on the southern edge of the scenic area. A second is located northwest of the scenic area, but much of the 1,200-meter zone associated with the second cluster falls within the scenic area. Increased development could negatively affect active management of RCW.

The slenderwake-robin (trillium gracile), occurs in Big Creek Scenic Area. The TNHP lists this slender species wake-robin as an S 3 species, which means that only 21 to 100 occurrences are known within the State of Texas. Habitat for this species should be maintained in the Big Creek Scenic Area.

2. Could their needs be provided for through means other than wilderness designation?

Classification of the scenic area as a Research Natural Area (RNA), botanical area, or similar special area would provide for management for the trillium. Red-cockaded woodpeckers require open stands of older pines. Such habitat is best maintained by means of active management, and active management is not permitted in designated wilderness.

3. Is there a need to provide a sanctuary for species that cannot survive in less than primitive surroundings?

No such need is known at this time. Studies of declining populations of neotropical migrant birds might show that these birds need habitats of kinds represented in Big Creek Scenic Area.

Landform and ecosystem preservation.

What is the analysis area's landform type based on Edwin Hammond's classification system? Does the area represent a unique landform type that is not represented in any wilderness areas in the general vicinity?

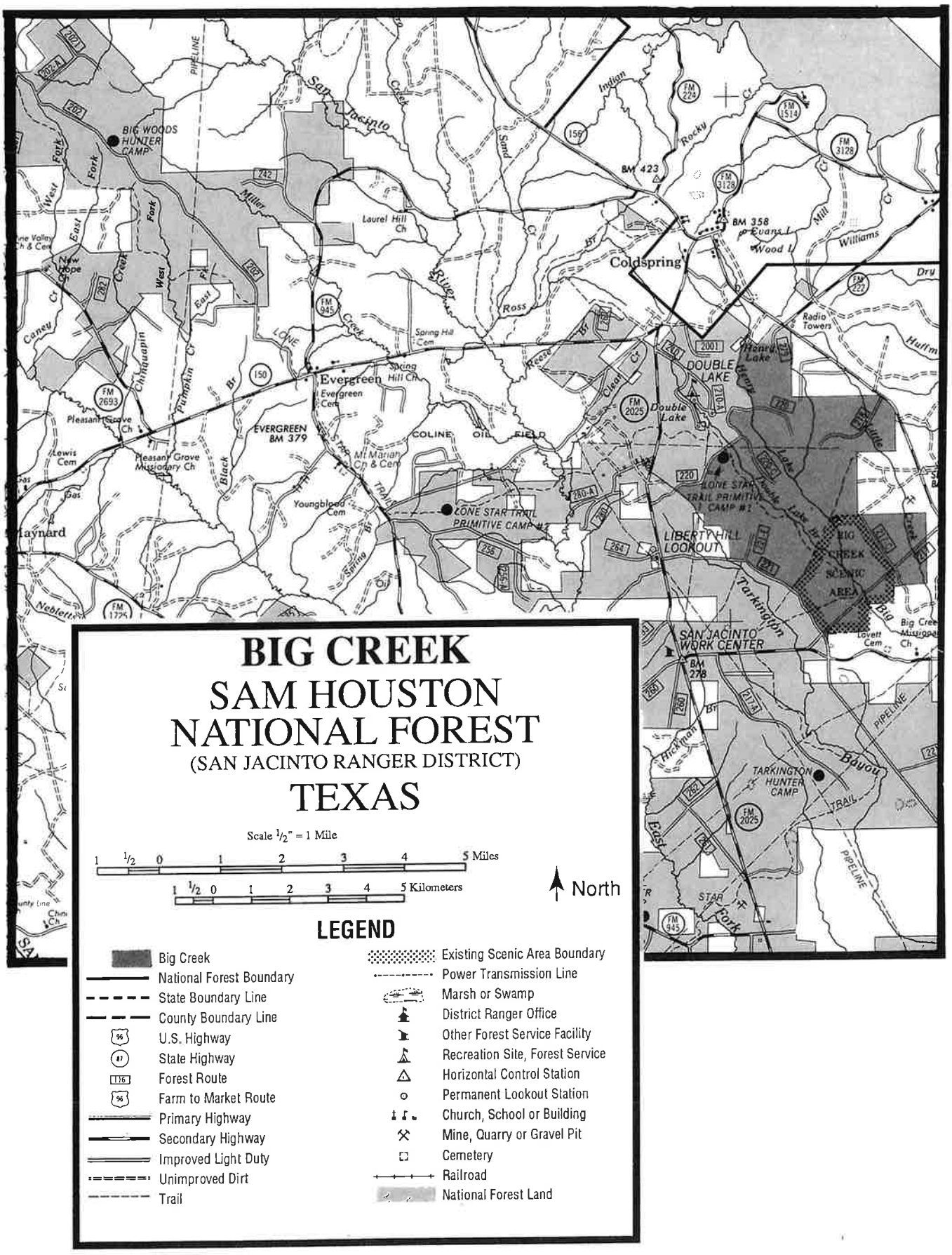
This area of the western Gulf Coastal Plains consist of floodplains, concave foot slopes, side slopes, and gently sloping ridgetops. The side slopes are characterized by inclined surfaces on broad interstream divides with narrow floodplains and branch head inclusions.

Table 1.Big Creek Mineral Interest and Leasing Status of Areas Within Proposed Big Creek as of May 29, 1992

Tract	U.S. Interest	Outstanding/Reserved Acres	Issued Leases
J-2-I	1,088.00	** 30.00	*NM-58178
	4,768.50 (50%)	** 77.50 (50%)	*NM-58179
J-2-XXIV	335.00	**468.00	*NM-58185
Total	6,191.50	575.50	

*Lease applied for; none issued to date.
**Held by production (May revert to U.S. ownership if production ceases on or before 1/1/95).

Figure 1 - Big Creek



Big Slough
Davy Crockett National Forest
Neches Ranger District

Roadless Area Review and Evaluation

Description of Analysis Area

Roadless area name and number of acres.

BIG SLOUGH: Gross area approximately 1138 acres; net approximately 1,138 acres.

Location and vicinity.

The analysis area is located in the northeastern portion of the Neches Ranger District in the Davy Crockett National Forest. It lies just west of the Neches River in Houston County, Texas. It is bounded by private land on the north, Forest Service (FS) 511 on the west, FS 517 on the south, and the National Forest boundary on the east.

Describe access to the analysis area, including roads and trails leading to the area.

Access is by FS 511, FS 517, a few private roads, and the 4-C National Recreation Trail, which passes through the south end of the analysis area.

General description of the analysis area's geology.

This part of the western Gulf Coastal Plain is underlain by recent alluvial deposits and the Sparta Sand geologic formation. The recent alluvial deposits consist of gravels, sands, silts, and clays and are less than 2 million years old. The Sparta Sand formation consists of clays, quartz sands, lignite, glauonitic marl, and marine megafossils and is 36 to 58 million years old. Soils associated with these formations are the Socul, Cuthbert, Kurth, Lilbert, Kerwin, Ozias, and Pophers series.

General description of the analysis area's topography.

The analysis area's elevation ranges from about 210 to about 310 feet above mean sea level. Approximately 50 percent of the area is flat and 50 percent is rolling ridges.

General description of the analysis area's vegetation, including the ecosystem type.

The analysis area contains a variety of vegetation types. Loblolly pine is the dominant forest type (46 percent of total area), followed by shortleaf pine (26 percent of total area), mixed pine and hardwood types (20 percent of total area) and oak types (8 percent of total area).

The western part of the analysis area is dominated by shortleaf pine, with red oak, white oak, and sweetgum the major associated species. The eastern part supports loblolly pine, bottomland red oaks, sweetgum, and sycamore. Other species typical of mesic sites flourish also. The Texas Natural Heritage Program (TNHP) loblolly pine-oak and shortleaf pine-oak series are the dominant plant communities.

Key attractions, if any, including sensitive wildlife and scenic landmarks.

Approximately 1.5 miles of the 4-C National Recreation Trail passes through the analysis area, providing interior access. There are several large pine and hardwood trees to view. Many areas support water-loving plants. A beaver pond is present and the area is a classic example of a water-related ecosystem.

One active and three inactive red-cockaded woodpecker (RCW) clusters are present. Cluster 22-3 is active and includes nine cavity trees. Two of these cavity trees have artificial cavity inserts. The cluster is near the end of FS 517, near the Big Slough Wilderness Area. Cluster 22-1 is inactive and has 4 live cavity trees. Cluster 22-2 consists of 6 cavity trees, all inactive. Two of these trees have artificial cavity inserts. Cluster 15-1 is inactive, extends over into Compartment 22, and consists of four cavity trees. There is only one cluster tree is in Compartment 22.

No sensitive wildlife species are known to be present. A detailed inventory of the analysis area's flora and fauna has not been completed.

Area Inventory

Human influence.

1. To what degree have humans and past and present human activity affected natural ecological processes and conditions?

Logging began in the late 1800's, and the analysis area was cut over heavily. The analysis area was almost completely logged off between 1920 and about 1930. Only a few isolated islands of small pine, stumps, and scrub hardwoods are left. The analysis area's vegetation has since recovered. However, old tramway grades, pieces of narrow gauge steel track, and other artifacts provide evidence of past logging activity. The midstory vegetation in all RCW clusters and replacement stands has

been removed by chainsaw or shear or both. Compartment 22 is being thinned according to guidelines for management within 1,200-meters of RCW clusters.

2. To what degree is the analysis area natural or natural appearing and free from disturbance?

Little evidence of turn-of-the-century logging and farming activities would be evident to the casual visitor. Timber was harvested from most of the area in the 1920's and 1930's. The few old skid trails and haul roads have grown over and are being used as hiking or horse trails. Activities associated with the 4-C Trail are visually evident but have not had any significant or permanent influence on the analysis area's ecological processes. The 4-C Trail and associated side trails are maintained and improved periodically.

Midstory vegetation has been removed from all RCW clusters and replacement stands. The analysis area includes 111 acres of 20-year-old regeneration and 11 acres of 30-year-old regeneration. The analysis area also contains about 4.9 miles of road and 1.2 miles of utility corridor.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural, untrammeled appearance?

Apart from regeneration areas, roads, a utility corridor, and the RCW management sites, the analysis area appears somewhat natural. Under the 1987 Forest Plan, the analysis area will continue to be managed for multiple use and will not regain a natural appearance.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

No. All mineral rights are leased, and surface occupancy with mitigating measures implemented must be allowed in order to accommodate mineral exploration and production.

However, surface ownership patterns do not appear to preclude perpetuation of wilderness values.

5. Is more than 15 percent of the analysis area in nonnative vegetation?

No.

Improvements, structures, and nonconforming uses.

1. Are any of the following types of areas, features, or nonconforming uses present? If so, where?

a. Airstrips or heliports: No.

b. Electronic installations: No.

c. Areas displaying evidence of historic mining at least 50 years old (Do not include areas of significant current mineral activity): No.

d. Areas under current mineral lease that contain a "no surface occupancy" stipulation: No.

e. Areas under current mineral lease where the lessee has not exercised development and occupancy rights: All the mineral rights underlying this area have been leased, but no rights have been exercised.

f. Recreation improvements such as occupancy spots or minor hunting or outfitter camps: The 4-C Trail, a National Recreation Trail, passes through the southern part of the analysis area. Approximately 1.25 miles of this trail is within the analysis area. Primitive dispersed camp spots are scattered throughout the analysis area, but are inconspicuous. Signs are present along the trails.

g. Timber harvest areas where logging and prior road construction are or are not evident: Major logging took place in the analysis area in the 1930's. The only remaining evidence of this active logging is the old logging tram which crosses the area from north to south. Old timber haul roads and skid trails are overgrown and are only evident to the keen observer. Many of these roads are now being used as hiking and horse trails. In 1973, 11 acres were clearcut. An additional 11 acres were regenerated in 1959.

h. Cultural treatments involving plantations or plantings: There are 122 acres of 20-to-30 year old stands. No cultural treatments are being applied in plantations or plantings.

i. Private inholdings in the area: No.

j. Dwellings on private inholdings: Not applicable.

k. Nonconforming structures and improvements: There are three parking areas with bulletin boards along FS 517. There are about 1.2 miles of utility corridor and 4.9 miles of road. The utility corridor contains a 20-foot right-of-way to Houston County Co-op and a 5-foot right-of-way to GTE.

l. Ground-return telephone lines: There is one phone line. This phone line, permitted to GTE, is about 1.2 miles long. The right-of-way for this is five feet wide.

m. Watershed treatment areas: No.

n. Roads: The analysis area contains all or sections of Houston County Road (HST) 27 (0.75 miles); Forest Development Road (FDR) 5122 (0.5 miles); FDR 517B (1.0 miles); FDR 517C (0.4 miles); and FDR 517 (2.25 miles). HST 27 serves the H.R. Conner residence, and FDR 517 is used to access private property.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or rapid natural deterioration?

The 4-C Trail's purpose and character are generally consistent with management of the analysis area as wilderness. The trail and its related structures may support a desirable existing use that provides for visitor health and safety. Traditional trail marking and footpath maintenance should continue. Mechanized or motorized tools would not be used for maintenance except as expressly allowed by the land-managing agency.

All mineral rights have been leased and are not subject to immediate termination. Surface occupancy, with mitigation implemented, must be allowed in order to accommodate exploration and development.

The Forest was restocked with wild turkeys in 1990 and 1991. One release site was in the general vicinity of the analysis area. However, there have been no reported turkey sightings in the analysis area.

RCW occur in the analysis area. They thrive only where midstory vegetation is prevented from encroaching on cavities. If midstory removal activities (hand, mechanical, fire) are discontinued, then RCW would disappear from the analysis area as they disappeared from the Big Slough Wilderness Area.

3. Are improvements in the analysis area being affected by the forces of nature rather than by humans, and are they disappearing or muted?

The roads, trails, and features developed under special use permits are being maintained for long-term services.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the past 10 years?

Yes. None of the analysis area has been harvested within the past 10 years. Compartment 22 is scheduled for a RCW 1,200-meter-zone thinning.

5. Does the analysis area contain less than 1/2 mile of improved road for each 1,000 acres?

No. The area contains 4.9 miles of road or about 4.31 miles per 1,000 acres.

6. Are all existing roads under Forest Service jurisdiction?

No. There are 4.15 miles of Forest Service road (3.65 miles/1,000 acres) and 0.75 miles of county road (0.66 miles/1,000 acres) in the analysis area.

Evaluation of Potential Wilderness

Capability.

Does the analysis area have the basic characteristics that would make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the analysis area provide the opportunity for solitude and serenity?

Hikers frequent the 4-C Trail although developments on private land are visible. A recent Recreation Opportunity Spectrum (ROS) inventory indicates none of the analysis area offers opportunities for primitive or semiprimitive recreation characterized by solitude and serenity.

Challenge.

Does the analysis area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

The 4-C Trail and adjacent roads makes access reasonably easy. The terrain offers some opportunities for adventure and challenge. Cross-country foot travel could be moderately challenging for the novice.

Outdoor recreation opportunities.

Describe the analysis area's capability for providing primitive and unconfined types of recreation including:

a. Camping: Numerous locations are suitable for primitive camping.

b. Hunting: The analysis area offers opportunities to hunt both small and large game species. Deer hunting is more popular than small game hunting because deer have been abundant in the analysis area.

c. Fishing: The Neches River, which is just east of the area, is one of east Texas's major streams and presents good fishing opportunities. Closure of FDR 517 would affect recreational use of the river. People are now walking from the end of FDR 517 to the river or slough. This would be impractical if the area were made wilderness and the road closed.

d. Canoeing: Canoeing on the Neches River is excellent.

e. Boating: The Neches River provides limited opportunities for boating.

f. River rafting: There are no streams or rivers large enough to support this activity.

g. Backpacking: The analysis area is excellent for the resident and through hiker. The 4-C Trail is a popular National Recreation Trail. Backpackers sometimes use this trail.

h. Hiking: Same as for backpacking. The trails are in an acceptable condition.

i. Riding: Horseback riding opportunities are extremely limited. The 4-C Trail is restricted to foot travel only.

j. Photography: Good opportunities exist.

Special Features.

1. What is the analysis area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

The analysis area provides opportunities for education and scientific study in archeology, biology, and dispersed recreation.

2. Is there an abundant and varied wildlife population?

The abundance and variety of game and nongame animals appear to be typical for remote and mature forests of the region. Accurate populations figures, however, are not available.

A complete inventory of the analysis area's flora and fauna has not been completed.

Wild turkey were restocked in the general area in 1990 and 1991. There have been no reported turkey sightings in the analysis area. The analysis area also contains one active and three inactive RCW clusters.

Manageability.

1. What are the characteristics of the surrounding area including ROS classification, adopted VQO, and present and planned uses?

According to a recent inventory, ROS on the entire area is roaded natural. The Visual Quality Objective (VQO) generally varies from partial retention to maximum modification because there are distinctive landscape and aesthetic values along the main travel corridors.

Under 1987 Forest Plan guidance, future land use will continue to stress multiple-use management with sensitivity toward the visual resource. Under the current plan, the 337 acres of the area within 1,200 meters of a RCW cluster will continue to be intensively managed to provide habitat for this species. Neches Bluff, a National Forest Observation Site, is located just to the north of the area. Ratcliff Lake Recreation Area is located south of the area. Adjacent private lands are valued for their timber production and pasture. Private lands are being developed for residential purposes also.

2. Do boundary locations conflict with important existing or potential public uses outside the boundary that might result in demands to allow nonconforming structures or activities or both in the wilderness?

Even though development is likely to continue on private land near the analysis area, encroachments are not expected to be a serious problem. The eastern boundary adjoins existing wilderness and thus is protected.

3. Is it possible to readily and accurately describe, establish, and recognize boundaries on the ground?

Yes. The current National Forest boundary is marked. The other boundaries follow existing wilderness (which is marked) or easily located.

4. Do boundaries conform with terrain or other features that constitute a barrier to prohibited use?

Some portions of the boundary are located in areas that would be difficult to cross or access. However, there would be many areas where the prohibition against the use of motorized vehicles, such as All Terrain Vehicles (ATVs) would be difficult to administer.

5. Do boundaries, to the extent practicable, shield the wilderness environment inside the boundary from the sights and sounds of civilization?

The forested terrain provides some degree of protection along some of the boundary. However, farm scenes, homes, and agricultural lands are evident along the northern boundary in several locations. Some sounds emanating from private developments and public roads near the boundary would reach the analysis area. The Big Slough Wilderness Area would shield the eastern boundary.

6. Do boundaries provide adequate opportunity for access and traveler transfer facilities?

Yes. Existing roads would provide good access along the western boundary.

Availability.

1. Describe other (nonwilderness) resource demands and uses. What current uses exist?

a. Recreation: The analysis area serves users of the 4-C Trail. Hiking use is moderate; hunting use is heavier. There is some ATV trespass in the Big Slough Wilderness, to the south.

b. Information on wildlife species, populations, and management needs: The analysis area supports species associated with late successional habitat. Deer is currently the featured wildlife species. The RCW is the only threatened and endangered species known to occupy the analysis area.

c. Water availability and use: Potable water is available at the trail shelter. Water is readily available for wildlife.

d. Livestock operations: None.

e. Timber: All of the analysis area, except the stringers adjoining perennial and intermittent streams, are classified as suited for timber production. The analysis area's timberland is needed to provide part of the timber for sale program described in the 1987 Plan.

The analysis area is considered a high-quality site for timber production. Site indices are generally from 70 to 100 for pines and in the 80's for oaks in the hardwood stands.

None of the stands in the analysis area are less than 10 years old, but stands occupying about 15 percent of the acreage are about 20

years old. The average age of the analysis area's timber is 80 to 100 years.

District records indicate that the last timber harvest in the analysis area took place in 1973. Thinning in a 1,200-meter RCW zone is planned.

f. Minerals: There are no privately owned mineral rights. The analysis area has been evaluated as having a moderate to high potential for oil and gas occurrence. All minerals rights have been leased.

g. Cultural resources: Much of the analysis area could have provided camping opportunities for prehistoric populations. A number of sites probably offered prehistoric populations the resources necessary for survival. Additional surveys could result in the discovery of more prehistoric sites. The analysis area has not been investigated intensively enough so that significance of the prehistoric sites can be assessed.

Many sites in the analysis area were probably used by Native Americans. These sites, and the objects and other physical evidence left behind by early travelers and settlers, are an important part of our cultural heritage. Artifacts found in the past indicate early Caddoan influences in the Hickory Creek drainage. Designation of the analysis area as wilderness would not be inconsistent with the requirements of the Antiquities Act of 1906, the National Historic Preservation Act of 1966, the Archaeological Resource Protection Act of 1979, and several other laws providing protection for cultural resources on Federally owned lands.

h. Authorized and potential land uses: Two special uses are authorized. One is issued to GTE and the other to the Houston County Rural Electric Co-op.

i. Management considerations including fire, insects and diseases, and presence of non-Federal lands: Fire protection and successful fire suppression efforts have resulted in a moderate buildup of light and heavy fuels. Existing Forest Service roads provide relatively good access for fire suppression.

Potential spread of the southern pine beetle (SPB) is extremely high because pine stands occupy much of the acreage. The large, old trees found in the analysis area are particularly susceptible. SPB numbers are increasing and some mortality can be expected in the near future.

There are no private in-holdings.

Thinnings in 1,200-meter RCW zones help to reduce SPB hazard and open up the area. Prescribed burning is extensively used to control

midstory vegetation. Installation of artificial cavities is proving to be a very important method of replacing cavity trees lost to SPB. These management tools could not be used in wilderness.

If the analysis area becomes wilderness, management for RCW will stop. If this happens, it is probable that RCW will eventually disappear as a result of increases in midstory density and SPB-caused mortality of cavity trees.

2. What outputs are currently produced or could be produced in the future?

Dispersed recreation activities–primarily hunting and hiking (including backpacking)–should continue at about the same low to moderate level. The prominence and visibility of the analysis area make it desirable to manage the area with sensitivity to visual quality. Conventional logging methods are being used now. These same methods are to be used a 1,200-meter RCW zone thinning.

This analysis area is considered suitable timberland and is expected to produce part of the Forest's sustained output of timber.

Federally owned minerals in the analysis area are available for exploration and production. Mineral rights in the analysis area are leased. The analysis area is considered to have a moderate to high potential for oil and gas production and may produce oil and gas in the future.

3. Is the analysis area located in such a way that the need for increased water production or additional onsite storage is so vital that installation or maintenance of improvements is an obvious and inevitable public necessity?

No.

4. Would wilderness designation seriously restrict or prevent the application of wildlife management measures of considerable magnitude and importance?

Yes. Wilderness designation would adversely affect management for the endangered RCW (See i. in previous section for more information).

5. Is it a highly mineralized area of such strategic or economic importance and extent that restrictions or controls resulting from wilderness designation would not be in the public interest?

The analysis area is considered to have a moderate to high potential for oil and gas occurrence. Designation as wilderness would preclude

future leasing of mineral rights and future mineral exploration and development.

6. Does the analysis area contain natural phenomena of such unique or outstanding nature that general public access and special development to facilitate public enjoyment should be available?

No. However, wilderness designation would affect public access of the Neches River.

7. Is the land needed to meet clearly documented resource demands such as demands for timber, mineral production, or developed recreation?

Yes. Wilderness designation would reduce the Forest's base of suitable timberland and would result in a reduction in the volume of wood available to industry. The analysis area has a high potential for oil and gas production, and all mineral rights are currently leased. Wilderness designation would preclude oil and gas production after the expiration of leases in effect at the time of wilderness designation.

8. Is the land committed through contractual agreements for use, purposes, or activities not in concert with wilderness requirements?

Yes. All mineral rights in the analysis area have been leased.

Need.

Other wildernesses.

1. What are the locations, sizes, and types of other wildernesses in the general vicinity?

The National Wilderness Preservation System includes 84,012 acres of designated wilderness in the State of Texas and additional land in nearby States. See Table 1 (found in the Introduction to the Evaluation of Roadless Areas) for more information about wilderness areas in Texas.

2. How far is it to the closest existing wilderness?

The 3,639-acre Big Slough Wilderness is adjacent to the analysis area.

3. What is the level of use in nearby wilderness? What are the trends in the use of these areas?

Big Slough Wilderness received an estimated 1,900 Recreation Visitor Days (RVD's) use in 1990. This level of use (0.52 RVD's/acre) is well below capacity (2.0 RVD's/acre). There has been no significant overuse of the Big Slough Wilderness. Recreational use of Big Slough has increased gradually.

4. Is the population in and around these areas increasing or decreasing? How quickly is it increasing or decreasing?

The population of Texas grew 0.6 percent annually from 1980 to 1987. This slow increase is expected to continue. Metropolitan Dallas and Houston have grown much faster (27 percent and 17 percent respectively, 1980-87). These population centers are about 100 miles (Houston) to 150 miles (Dallas) from the analysis area. Their combined population is more than 5 million persons.

The population of the Deep East Texas Region, which includes Houston County and the analysis area, increased 10 percent between 1980 and 1988. The region's population is expected to increase about 50 percent over the next 35 years.

The analysis area is in Houston County, where the population increased from 22,299 in 1986 to 23,988 in 1988.

Nonwilderness lands.

1. Are there opportunities for unconfined and primitive recreation on nonwilderness areas in the vicinity? If so, where?

Many acres of National Forest land within 1 to 2 hours driving time of the analysis area are suitable and available for primitive recreation use. The National Forests in Texas include 82,348 acres that provide opportunities for semi-primitive or primitive recreation.

Habitat needs.

1. Are any biotic species in the analysis area competing directly with increasing public use and development?

No.

2. Could these needs be provided for through means other than wilderness designation?

Not applicable.

3. Is there a need to provide a sanctuary for biotic species that cannot survive in less than primitive surroundings?

This is unknown at present. Various scientific and interested groups, along with other individuals are conducting studies and collecting data that will answer this question.

Landform and ecosystem preservation.

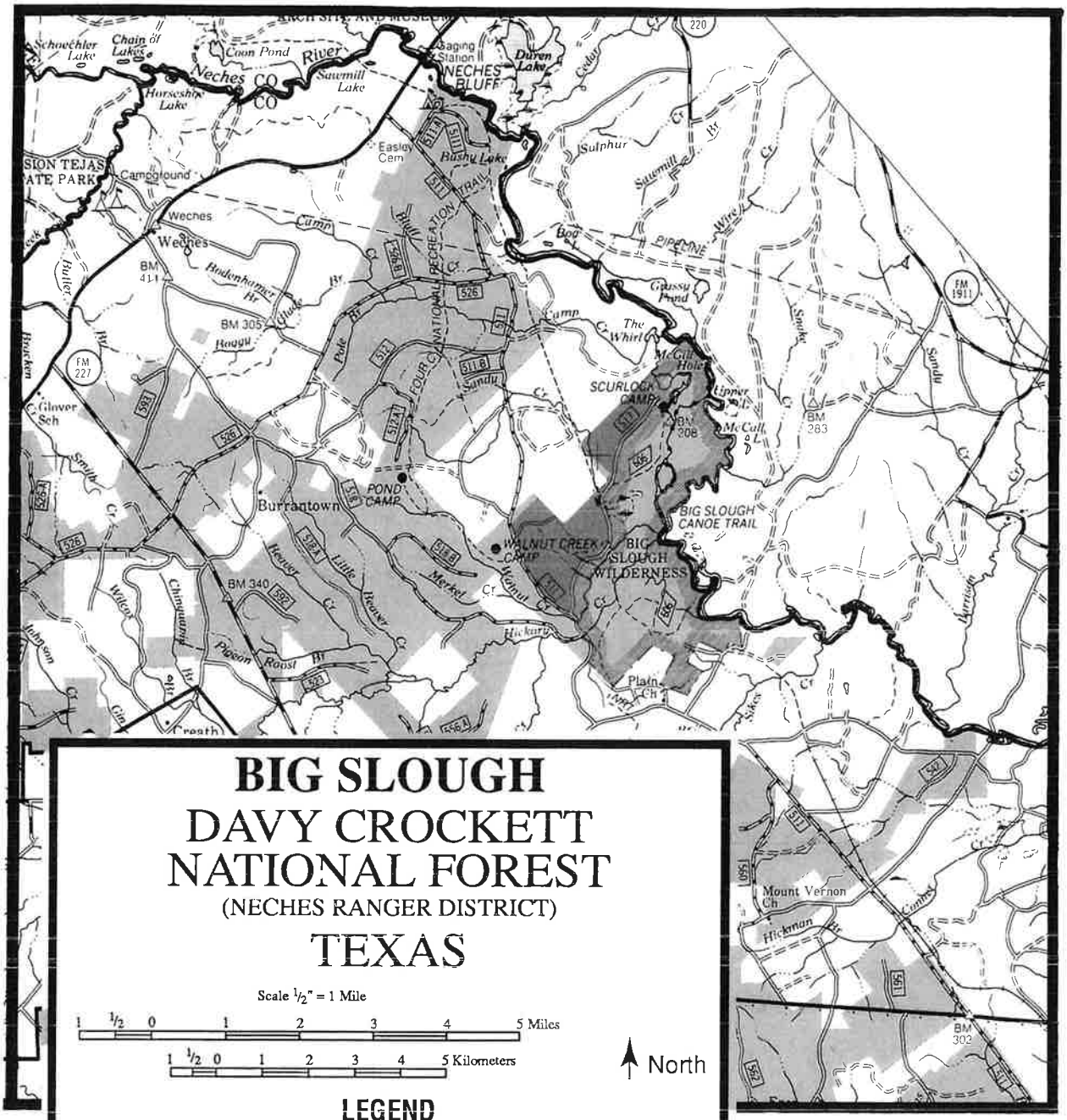
1. What is the analysis area's landform type based on the Region 8 Soil Resource Inventory (R-8 1977)? Does the area represent a unique landform type that is not represented in any wilderness areas in the general vicinity?

The analysis area consist of floodplains, stream terraces, concave foot slopes, side slopes and ridge tops. There are no unique landforms within the analysis area.

2. What is the area's ecosystem classification? Does the analysis area represent a unique ecosystem that is not represented in any existing wilderness areas in the general vicinity?

The analysis area is classified as: loblolly pine (46 percent); shortleaf pine (28 percent); white oak-yellow pine (9 percent); bottomland hardwood-yellowpine (5 percent); white oak-red oak-hickory (6 percent); shortleaf pine-oak (4 percent); and loblolly pine hardwood (2 percent). These types are typical of the southern Coastal Plains and are commonly found in Big Slough and other wildernesses in Texas. The most common plant communities are the TNHP loblolly pine-oak and shortleaf pine-oak series. The analysis area's ecosystem is commonly represented in existing wilderness areas in Texas.

Figure 1 - Big Slough



Big Woods
Sam Houston National Forest
San Jacinto Ranger District

Roadless Area Review and Evaluation

Description of Analysis Area

Roadless area name and number of acres.

BIG WOODS: Approximately 1,335 acres.

Location and vicinity.

This analysis area unit is in the northwest portion of the San Jacinto Ranger District, Sam Houston National Forest. It lies north of Highway 150 in San Jacinto County, Texas; west of the town of Coldspring; east of Old Waverly; and north of Evergreen. It is almost triangular and is bounded by Forest Roads (FR) 202 and 207 and by private land.

Describe access to the analysis area including roads and trails leading to the area.

The analysis area's west side can be reached by going north on Farm-to-Market (FM) 2693 and FR 207. For access to the east side, travel north from Highway 150 on FR 202. The Lone Star Hiking Trail starts at the south boundary and continues to the analysis area's northernmost point at the intersection of FR's 202 and 207.

General description of the analysis area's geology.

The analysis area is on the western Gulf Coastal Plain and is underlain by the Willis Geological Formation. The Willis Formation is less than 2-1/2 million years old and consists of clay, silt, sand, and siliceous gravel of granule to pebble size, including some petrified wood. Soils associated with this formation are the Pinetucky, Conroe, Doucette, Leggett, and Woodville series.

General description of the analysis area's topography.

The analysis area is in the western Gulf Coast Plain and consists of floodplains, concave foot slopes, side slopes, and gently sloping ridgetops. The side slopes are characterized by inclined surfaces on broad interstream divides with narrow floodplains and branchhead inclusions.

General description of the analysis area's vegetation, including the ecosystem type.

The analysis area is within the Southern Mixed Forest Ecosystem. The predominant forest type is loblolly pine. Oaks and other hardwoods make up an average of 15 percent of the crown cover in the loblolly pine forest. Shortleaf pine also occurs in the overstory. Yaupon is the most common understory species. Riparian vegetation on lower slopes, creek bottoms, and stream terraces is mainly loblolly pine-oak and hardwood slope forest. The Texas Natural Heritage Program (TNHP) loblolly pine-oak series is the predominant plant community in the analysis area.

Key attractions, if any, including sensitive wildlife and scenic landmarks.

No special features or biotic communities are known to be present. Because the analysis area has gentle relief and the old-growth forest has a closed canopy, the analysis area is a favorite with local hunters. Wild pigs and white-tailed deer are the favorite game species.

Area Inventory

Human influence.

1. To what degree have humans and past and present human activity affected natural ecological processes and conditions?

Man has altered ecological processes in the analysis area significantly. Much of the analysis area was logged or cleared for agriculture (or both) around the turn of the century. Since then, additional timber management, southern pine beetle treatment, and road construction has occurred. Planned harvests and increased levels of southern pine beetle (SPB) infestation have created many openings in stands. The forest is now a mosaic of clearings and mature stands.

2. To what degree is the analysis area natural or natural appearing and free from disturbance?

Much of the analysis area has been disturbed by harvesting, salvage operations, and SPB suppression activities. Pine plantations from 0 to 25 years old occupy about 27 percent of the analysis area. These plantations do not appear natural.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural, untrammeled appearance?

The analysis area is regaining a natural appearance, but it will take thirty or more than forty years for the plantations to out grow their man-made appearance. Harvesting of mature stands will continue. Under the 1987 Forest Plan, the analysis area will continue to be managed for multiple use and will not regain a natural appearance. As pines stands mature, susceptibility to SPB infestations will increase, and both infestations and their control measures will affect the analysis area's appearance.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

Yes.

5. Is more than 15 percent of the analysis area in nonnative vegetation?

No.

Improvements, structures, and nonconforming uses.

1. Are any of the following types of areas, features, or nonconforming uses present? If so, where?

a. Airstrips or heliports: No.

b. Electronic installations: No.

c. Areas displaying evidence of historic mining at least 50 years old (Do not include areas of significant current mineral activity): No.

d. Areas under current mineral lease that contain a "no surface occupancy' stipulation: No. However, two applications for leases have been received.

e. Areas under current mineral lease where the lessee has not exercised development and occupancy rights: No.

f. Recreation improvements, such as occupancy spots or minor hunting or outfitter camps: Although there are no recreational improvements, an open area known as the Big Woods Hunting Camp receives much use.

g. Timber harvest areas where logging and prior road construction are or are not evident: Plantations, stumps, roads, and other logging evidence are prevalent throughout the analysis area.

h. Cultural treatments involving plantations or plantings: Yes. There are 343 acres of plantations and another 76 acres of SPB cuts in the analysis are. An additional 221 acres of mature pine stands have been thinned in recent years.

i. Private inholdings in the area: No.

j. Dwellings on private inholdings: Not applicable.

k. Nonconforming structures and improvements: No.

l. Ground-return telephone lines: No.

m. Watershed treatment areas: No.

n. Roads: There are four permanent, surfaced, (FR 202, 202A, 207 and 207A) along the analysis area's boundaries. The analysis area also contains numerous unsurfaced "woods" roads (total length 4 miles) and 3.3 miles of trail.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or rapid natural deterioration?

Yes.

3. Are improvements in the area being affected by the forces of nature rather than by humans, and are they disappearing or muted?

Yes.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the past 10 years?

Yes. About 77 acres or 6 percent of the area has been harvested in the past 10 years.

5. Does the analysis area contain less than 1/2 mile of improved road for each 1,000 acres?

Yes.

6. Are all existing roads under Forest Service jurisdiction?

Yes.

Evaluation of Potential Wilderness

Capability.

Does the analysis area have the basic characteristics that would make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the analysis area provide the opportunity for solitude and serenity?

It provides some opportunities for solitude and serenity. Forest Service roads and activities on private land are visible from a number of vantage points. A recent Recreation Opportunity Spectrum (ROS) inventory indicates that about 390 acres or 29 percent of the analysis area provides opportunities for semi-primitive recreation and thus an opportunity to experience serenity.

Challenge.

Does the analysis area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

Access is easy and relatively high wildlife populations offer hunters excellent opportunities for these experiences.

Outdoor recreation opportunities.

Describe the analysis area's capability for providing primitive and unconfined types of recreation including:

a. Camping: Excellent.

b. Hunting: Excellent. The analysis area is popular with deer and wild hog hunters. There are also opportunities for squirrel hunting.

c. Fishing: None.

d. Canoeing: None.

e. Boating: None.

f. River rafting: None.

g. Backpacking: The Lone Star Trail, a National Recreation Trail that passes through the analysis area, provides good backpacking.

Otherwise, backpacking opportunities are limited by the analysis area's small size and dense vegetation.

h. Hiking: The Lone Star Trail, a National Recreation Trail, passes through the analysis area and provides excellent hiking opportunities. Some of the woods roads also provide good hiking opportunities. Off these routes, the opportunity for hiking would be limited by the dense vegetation.

i. Riding: Excellent horseback riding.

j. Photography: Very good opportunities for close-up shots; but very limited opportunities for panoramic views.

Special features.

1. What is the area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

Like most areas within the Sam Houston Forest, the analysis area presents opportunities for outdoor education in a variety of subjects.

2. Is there an abundant and varied wildlife population?

Yes. Wildlife found in this area are typical of the Southern Mixed Ecosystem. Because the analysis area contains varied habitat, a wide variety of early and late successional wildlife species are present.

Manageability.

1. What are the characteristics of the surrounding area, including ROS classification, adopted VQO, and present and planned uses?

The characteristics of the surrounding area and the analysis area are the same. The ROS classification is roaded natural (71 percent of area) and semiprimitive motorized or semiprimitive nonmotorized (29 percent of area). The inventoried Visual Quality Objective (VQO) is 66 percent retention (along the trail, FR 207, and FR 202); 15 percent partial retention; and 19 percent maximum modification. Under the 1987 Forest Plan, future land use will stress multiple-use management.

2. Do boundary locations conflict with important existing or potential public uses outside the boundary that might result in demands to allow nonconforming structures or activities or both in the wilderness?

No.

3. Is it possible to readily and accurately describe, establish, and recognize boundaries on the ground?

Yes. The current National Forest boundary is marked, and the other boundaries follow roads and are easily identified.

4. Do boundaries conform with terrain or other features that constitute a barrier to prohibited use?

No. Little of the analysis area's boundary is located in areas that would be difficult to cross or access.

5. Do boundaries shield the wilderness environment inside the boundary from the sights and sounds of civilization?

No. Many of the analysis area's boundaries are open Forest Service roads where the sounds of civilization are generated. Much of the southern boundary adjoins private land that is a source of sights and sounds that could detract from wilderness experiences.

6. Do boundaries provide adequate opportunity for access and traveler transfer facilities?

Yes. The adjacent roads and Lone Star Trail provide excellent access.

Availability.

1. Describe other (nonwilderness) resource demands and uses. What current uses exist?

a. Recreation: Dispersed recreation only. Hiking and hunting are the primary uses of the analysis area.

b. Information on wildlife species, populations, and management needs: Feral hogs are abundant and may be a problem in the future if not adequately controlled by hunters and predators. There is a fair deer herd and squirrel populations are relatively low. An inventory and monitoring program to provide accurate data on plant, animal, and bird populations is needed. Presently, there are no red-cockaded woodpecker (RCW) clusters in the analysis area. However, a small portion of the area is within 1,200 meters of a cluster.

c. Water availability and use: There are no perennial streams in the analysis area, but water for wildlife is abundant. There are no sources of domestic-use or potable water within the analysis area.

d. Livestock operations: None. There is a long history of trespass problems, however.

e. Timber: Site quality is excellent; site indices range from 70 to 120, and are 90 to 100 in most places. Timber types are loblolly (approximate 80 percent) and shortleaf (approximately 20 percent). Stands on 77 acres (6 percent of the area) are less than 10 years old. Stands on approximately 270 acres (21 percent of the area) are 10 to 25 years of age. All of the analysis area, except the stringers along creeks and the RCW clusters, is classified as general forest and is available for timber production. A small portion of the analysis area is within RCW management areas in which timber harvest operations are constrained.

f. Minerals: There are no reserved or outstanding mineral rights. There are no leases.

g. Cultural resources: There are no known historic properties in the analysis area. However, the area along FR 202 is designated as having a very high probability for the occurrence of significant historic properties. The remainder of the analysis area is considered low probability. There are no known conflicts with management direction or archeological regulations.

h. Authorized and potential land uses: No special uses are authorized or anticipated.

i. Management considerations including fire, insects and diseases, and presence of non-Federal lands: There are no private parcels of land within the boundary. Wildfires have been infrequent and have not caused any significant damage. Southern pine beetle (SPB) infestations are a major concern and will continue to kill many pines. Wilderness designation would limit management tools for suppression and would have a significant effect on species composition and ecological processes in the analysis area.

2. What outputs are currently produced or could be produced in the future?

Dispersed recreation and clean water are produced and will continue to be produced under the current management plan. The analysis area is currently considered suitable timberland and is expected to produce a part of the Forest's sustained output of timber. The analysis area is

being used in ways that may not be possible if it is designated wilderness. The quality of deer habitat and deer hunting could decline, and RCW management would not be possible.

3. Is the analysis area located in such a way that the need for increased water production or additional onsite storage or both is so vital that installation or maintenance of improvements is an obvious and inevitable public necessity?

No.

4. Would wilderness designation seriously restrict or prevent the application of wildlife management measures of considerable magnitude and importance?

Yes. Wilderness designation would negatively affect the management of the analysis area as habitat for RCW. With wilderness management, the absence of measures to control midstory vegetation and SPB would eventually reduce the value of the analysis area as RCW habitat severely.

5. Is it a highly mineralized area of such strategic or economic importance and extent that restrictions or controls resulting from wilderness designation would not be in the public interest?

No. This analysis area is considered to have a high potential for oil and gas occurrence. Despite this, the analysis area is not currently leased and is neither being explored actively nor producing minerals. However, the analysis area is available for mineral leasing, and two applications have been filed.

6. Does the analysis area contain natural phenomena of such unique or outstanding nature that general public access and special development to facilitate public enjoyment should be available?

No.

7. Is the land needed to meet clearly documented resource demands such as demands for timber, mineral production, or developed recreation?

Yes. The analysis area is currently part of the Forest's base of suitable timberland. Any reduction in this base would reduce the amount of wood available for local industry.

8. Is the land committed through contractual agreements for use, purposes, or activities not in concert with wilderness requirements?

No.

Need.

Other wildernesses.

1. What are the locations, sizes, and types of other wildernesses in the general vicinity?

Little Lake Creek Wilderness Area is the only wilderness in the Sam Houston National Forest at the present time. The National Wilderness Preservation System includes 84,012 acres of wilderness in Texas and additional lands in nearby states. See Table 1 (found in the Introduction to the Evaluation of Roadless Areas) for more information about wilderness areas in Texas.

2. How far is it to the closest existing wilderness?

It is approximately 20 miles to the Little Lake Creek Wilderness Area. Wilderness areas on the National Forests and Grasslands in Texas (NFGT) range from 1 to 3 hours driving time from the analysis area.

3. What is the level of use in nearby wilderness? What are the trends in the use of these areas?

The Little Lake Creek Wilderness Area received an estimated 500 Recreation Visitor Days (RVD's) of use in 1991. Low visitor use of Little Lake Creek may result partly from a general lack of awareness of National Forest offerings. However, the trend is toward a much greater demand for and use of public lands.

4. Is the population in and around these areas increasing or decreasing? How quickly is it increasing or decreasing?

The population of Texas grew 0.6 percent annually from 1980 to 1987. This slow increase is expected to continue. The large metropolitan areas grew much faster (17 percent between 1980 and 1987). Nearby Harris County is the third largest county in the United States, and its population grew about 15 percent between 1980 and 1987. Private parcels in the vicinity are frequently purchased by people who commute to Houston.

San Jacinto County and the analysis area are located in the Deep East Texas Region. The population of Deep East Texas increased about 10 percent between 1980 and 1988. In San Jacinto County, the population

grew from 11,434 to 15,169 between 1980 and 1988. The population of San Jacinto County is expected to grow about 119 percent over the next 35 years.

Nonwilderness lands.

Are there opportunities for unconfined and primitive recreation on nonwilderness areas in the vicinity? If so, where?

Several thousand acres of adjoining land in the Big Woods Wilderness Area offer the same recreational opportunities the evaluation area offers. However, most of the Sam Houston National Forest does not provide the opportunity for unconfined and primitive recreation. The 84,012 acres on the NFGT provide semi-primitive or primitive recreation opportunities.

Habitat needs.

1. Are any biotic species in the analysis area competing directly with increasing public use and development?

There are no active clusters of the endangered RCW or other known sensitive, threatened, or endangered species in the analysis area at this time.

2. Could their needs be provided for through means other than wilderness designation?

Not applicable.

3. Is there a need to provide a sanctuary for biotic species that cannot survive in less than primitive surroundings?

No such need has been identified.

Landform and ecosystem preservation.

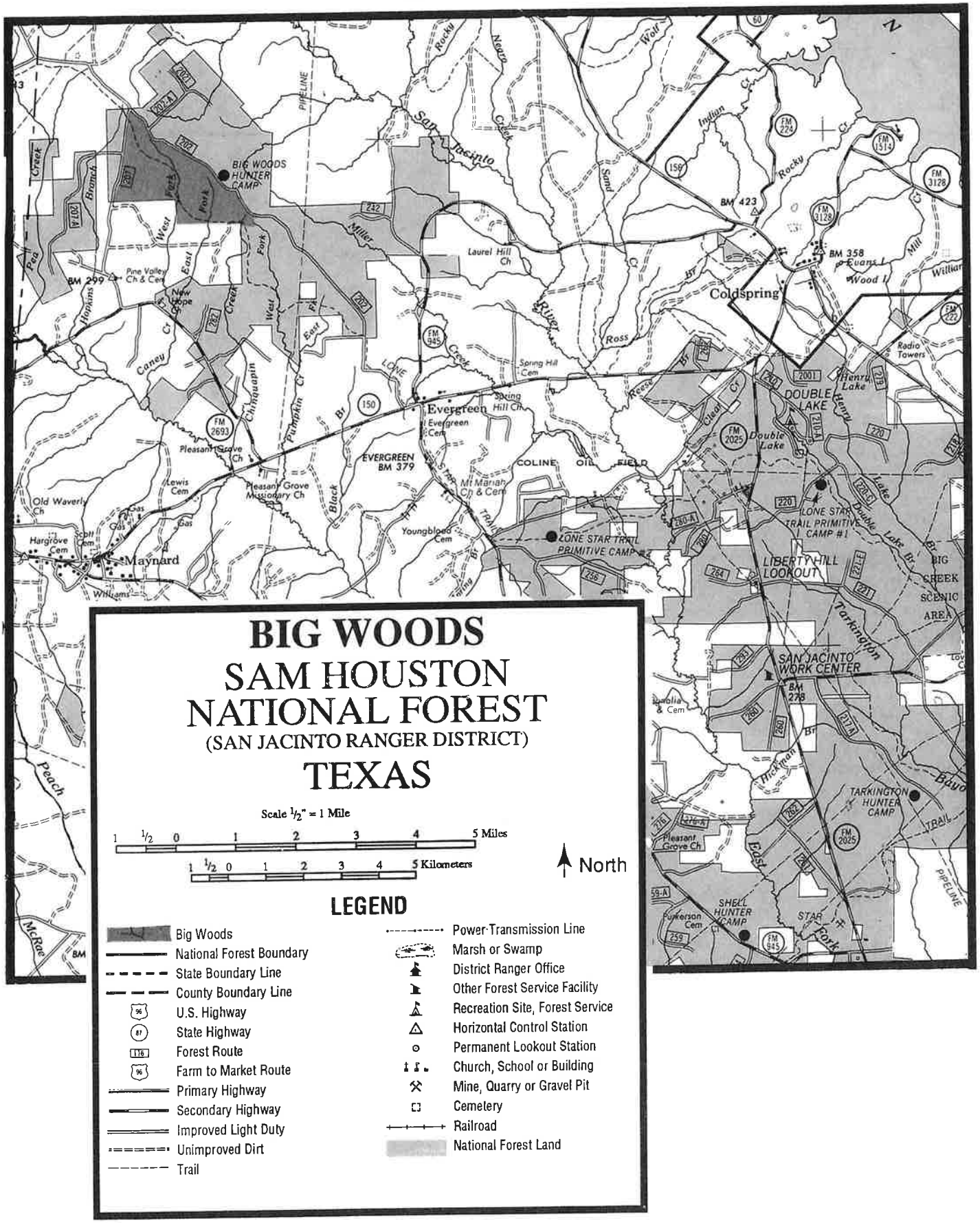
1. What is the analysis area's landform type based on the Region 8 Soil Resource Inventory (R-8, 1977)? Does the area represent a unique landform type that is not represented in any wilderness areas in the general vicinity?

The analysis area consists mostly of gently sloping ridgetops, side slopes, and occasional floodplains similar to those that occupy most of the area in adjacent counties. These landforms are not unique and are common in existing wilderness areas in east Texas.

2. What is the analysis area's ecosystem classification? Does the area represent a unique ecosystem that is not represented in any existing wilderness areas in the vicinity?

The analysis area's forest cover is classified as loblolly pine and shortleaf pine forest cover types (SAF 1980), which are typical of the western Gulf Coastal Plain. The plant communities most common in the analysis are the TNHP loblolly pine-oak and shortleaf pine-oak series. The analysis area forms part of the Southern Mixed Forest Ecosystem. This ecosystem is commonly represented in existing wilderness areas in Texas.

Figure 1 - Big Woods



Boggy Creek
Angelina National Forest
Angelina Ranger District

Roadless Area Review and Evaluation

Description of Analysis Area

Roadless area name and number of acres.

BOGGY CREEK: Gross area approximately 1,897 acres; net area approximately 1,897 acres.

Location and vicinity.

Boggy Creek is located in the central portion of the Angelina National Forest. The area is approximately 2.5 miles west of Farm-to-Market (FM) 705 in San Augustine County, Texas. It is bounded by FS 300 and private land on the east, by Forest Service (FS) 317 and private land on the west, by private land on the north, and by U.S. Forest Service land on the south.

Describe access to the area, including roads and trails leading to the area.

This analysis area is accessible by FS 300 or FS 317, which connect with FM 83 and FM 705.

General description of the area's geology.

This area is in the western Gulf Coastal Plain and is underlaid by the Yegua geologic formation. This formation is 36 to 58 million years old and consists of clay, quartz sands, lignite, glauconitic marl with marine megafossils. Soils associated with the Yeuga formation are the Fuller and Kurth series.

General description of the area's topography.

This area of the western Gulf Coastal Plain is characterized by floodplains, concave foot slopes, side slopes, and gently sloping ridgetops. The side slopes typically occur on broad interstream divides with narrow floodplains and branch head inclusions.

General description of the analysis area's vegetation, including the ecosystem type.

The area is almost entirely forested with the loblolly pine and shortleaf pine forest cover types characteristic of the southern Coastal Plain. Loblolly is dominant except on drier sites and ridges. Hardwood species may be present in the overstory and include sweetgum, southern red oak, post oak, white oak, and hickory. The most common plant communities are the Texas Natural Heritage Program (TNHP) Loblolly Pine-Oak and Shortleaf Pine-Oak Series.

Key attractions, if any, including sensitive wildlife and scenic landmarks.

No key attractions are associated with the analysis area. There are no known red-cockaded woodpecker (RCW) clusters, eagle nests, or sensitive plant species in this or immediately adjacent areas. Sam Rayburn Reservoir, which provides both scenic and recreational opportunities, is located approximately 1 mile to the south of the analysis area. Bald eagles are known to nest along the shore of Sam Rayburn Reservoir and may be seen perching in trees on the shoreline or flying over the lake.

Area Inventory

Human influence.

1. To what degree have humans and past and present human activity affected natural ecological processes and conditions?

Acquisition of the National Forests in Texas was primarily under the authority of the Weeks Act. These lands were acquired from timber companies and other private landowners, during the 1930's and early 1940's. Most of the anaylis area was cutover in the early 1900's. After acquisition by the Forest Service, the analysis area was replanted by the Civilian Conservation Corps (CCC). Natural ecological processes have generally been functioning in the analysis area, but some timber harvesting has taken place recently (see item 2. following).

Southern pine beetle (SPB) has attacked the area's pines in the past, and the area is moderately susceptible to infestation. As of the spring of 1992, there were no known SPB infestations in the analysis area.

There are several abandoned borrow pits in the analysis area. The fertile topsoil was removed when the pits were created, so revegetating the pits has been a slow process.

2. To what degree is the analysis area natural or natural appearing and free from disturbance?

The analysis area generally appears natural. There is little visible evidence of turn-of-the-century logging and farming activities within this

area. Within the last few years, several areas have been regenerated by means of seed-tree or clearcut harvesting. These areas total approximately 294 acres.

There are approximately 6.6 miles of roads (6.3 FS and .3 County) within the analysis area. Skid trails and some haul roads associated with past logging activities have grown over and are not readily apparent.

Most of the analysis area has been prescribed burned over the past 10 years.

The abandoned borrow pits are still evident but are slowly being covered by grasses, pine, and other plants.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural, untrammeled appearance?

With the exceptions of the regeneration areas, borrow pits, and FS roads, the analysis area appears natural. A pond has been constructed within the area, but it is natural in appearance and blends in with the surrounding topographic features. Under current (1987 Forest Plan) management direction, the analysis area will continue to be managed for multiple use and will not regain an untrammeled appearance.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

No. The Federal government owns the mineral rights to a 130-acre block, but mineral rights in the rest of the analysis area are owned privately. A five-year lease of mineral rights to the 130-acre block was issued to Triad in the spring of 1992. Therefore, perpetuation of wilderness values cannot be insured. Surface occupancy, with mitigating measures implemented, must be allowed in order to accommodate mineral exploration and production where mineral rights are owned privately or are leased.

5. Is more than 15 percent of the analysis area in non-native vegetation?

No. No nonnative plant species are known to occur in the analysis area.

Improvements, structures, and nonconforming uses.

1. Are any of the following types of areas, features or nonconforming uses present?

a. Airstrips or heliports: No.

b. Electronic installations: No.

c. Areas displaying evidence of historic mining at least 50 years old (Do not include areas of significant current mineral activity): No.

d. Areas under current mineral lease that contain a "no surface occupancy" stipulation: No.

e. Areas under current mineral lease where the lessee has not exercised development and occupancy rights: Yes. The lessee of mineral rights in a 130-acre block has not exercised such rights. The lease will be valid for five years.

f. Recreation improvements, such as occupancy spots or minor hunting or outfitter camps: There are no developed recreation improvements or camps. However, there are some primitive camps, which are used primarily during the hunting season. They receive minor use in other parts of the year.

g. Timber harvest areas where logging and prior road construction are or are not evident: The analysis area contains approximately 294 acres of regeneration currently less than 10 years old and 6.6 miles of improved graveled road. The regeneration areas and roads are very evident. Old timber haul roads and skid trails are overgrown and are evident only to the keen observer. There were once tramways throughout the forest, and evidence of these still exists.

h. Cultural treatments involving plantations or plantings: The only evidence of timber stand or wildlife habitat improvement in the analysis area were described above.

i. Private inholdings in the area: No.

j. Dwellings on private inholdings: No.

k. Nonconforming structures and improvements: Yes. There are 0.3 miles of graveled county road, which are maintained by San Augustine County. The Deep East Texas Electric Co-op maintains approximately 0.6 miles of aerial powerlines. The right-of-way for the powerline is 20 feet wide.

l. Ground-return telephone lines: Yes. Continental Telephone maintains approximately 0.3 miles of such lines. The right-of-way for the telephone line is 10 feet wide.

m. Watershed treatment areas: No.

n. Roads: There are 6.6 miles of improved graveled roads (including 0.3 miles of San Augustine County road) in use within the area. There are some old unimproved roads; these are becoming overgrown.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or rapid natural deterioration?

Approximately 6.6 miles of roads are in use within the area. All but 0.3 miles under county jurisdiction could be closed if this were necessary for wilderness management.

All of the mineral rights except those to 130 acres are retained by private individuals and are not subject to termination.

Surface occupancy, with some mitigation measures implemented, must be allowed in order to accommodate exploration and production equipment.

3. Are improvements in the area being affected by the forces of nature rather than by humans, and are they disappearing or muted?

The 6.6 miles of road and the powerline and telephone line rights-of-way are the only improvements being maintained for long-term needs. These improvements are not disappearing.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the past 10 years?

Yes. There are approximately 294 acres in regeneration in the 0-to 10-years age class. This acreage accounts for approximately 15 percent of the total area.

5. Does the area contain less than 1/2 mile of improved road for each 1,000 acres?

No. There are approximately 3.47 miles of improved road per 1,000 acres. All but 0.3 miles of road (0.16 miles/1,000 acres) are under Forest Service jurisdiction.

6. Are all existing roads under Forest Service jurisdiction?

No. Approximately 0.3 miles of road are under the jurisdiction of San Augustine County (county road easement).

Evaluation of Potential Wilderness

Capability.

Does the analysis area have the basic characteristics that would make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the analysis area provide the opportunity for solitude and serenity?

There are some opportunities for this area for solitude and serenity. Forest Service roads and activities on private land are visible from some points. The area is bounded on the north and partially bounded on the east and west by private land. Activities and noises on these private lands may reduce the opportunity for solitude and serenity. A recent Recreation Opportunity Spectrum (ROS) inventory indicates that about 350 acres (or 18 percent) of the area provides opportunities for semi-primitive recreation. Visitors might have opportunities to experience solitude and serenity on these 350 acres.

Challenge.

Does the area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

Opportunities for these experiences are similar to those at the nearby Turkey Hill and Upland Island Wilderness Areas and Wilderness Areas.

Existing FS roads make access reasonably easy. The terrain is relatively flat with some low ridges; hiking could be moderately challenging.

Outdoor recreation opportunities.

1. Describe the analysis for providing primitive and unconfined types of recreation including:

a. Camping: There are numerous locations suitable for primitive camping.

b. Hunting: Small and large game species occur in the analysis area and can be hunted.

c. Fishing: The analysis area does not present opportunities for fishing, but Sam Rayburn Reservoir is within 1 mile of the analysis area and offers excellent fishing opportunities.

d. Canoeing: There are no streams or rivers large enough to support canoeing, but it is possible to enjoy this activity on the nearby Sam Rayburn Reservoir.

e. Boating: There is no opportunity for boating within the analysis area, but Sam Rayburn Reservoir is approximately 1 mile south of the area and provides excellent boating opportunities.

f. River rafting: The analysis area has no streams or rivers large enough to support this activity.

g. Backpacking: There are some opportunities for backpacking. The lack of a trail system and the presence of undergrowth detract from the quality of backpacking experiences, however.

h. Hiking: Same as for backpacking.

i. Riding: Riding opportunities do exist; however, there are no developed trails.

j. Photography: Good opportunities exist.

Special Features.

1. What is the area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

The analysis area provides the same types of opportunities that existing wilderness areas in the Forest provide. These include opportunities in archeology, biology, and dispersed recreation.

2. Is there an abundant and varied wildlife population?

Population of game and nongame animals are typical of those in southern pine-hardwood forests in the southern Coastal Plains. Accurate population figures are not available for all species, however.

Manageability.

1. What are the characteristics of the analysis area, including its ROS classification, adopted VQO, and present and planned uses?

The analysis area is classified as either semiprimitive motorized (about 350 acres or 18 percent), or roaded natural (about 1,550 acres or 82 percent). The Visual Quality Objective (VQO) is primarily modification along the FS roads and maximum modification outside the road influence area.

Under the 1987 Forest Plan, future land use will stress multiple-use forest management with sensitivity to the visual resource.

2. Do boundary locations conflict with important existing or potential public uses outside the boundary that might result in demands to allow nonconforming structures or activities or both in the wilderness?

Even though development may occur on National Forest land or private land around and near the boundary, demands for nonconforming structures or activities are not expected to be a serious problem.

3. Is it possible to readily and accurately describe, establish, and recognize boundaries on the ground?

Yes. The current National Forest boundary is marked.

4. Do boundaries, conform with terrain or other features that constitute a barrier to prohibited use?

No. The southern boundary follows an arbitrary line and does not conform with terrain or other features constituting a natural or man-made barrier. Few portions of the boundaries are in areas that would be difficult to cross or access. In most places, the prohibition against the use of motorized vehicles would be difficult to administer.

5. Do boundaries, to the extent practicable, shield the wilderness environment inside the boundary from the sights and sounds of civilization?

The northern boundary is adjacent to private land and the east and west boundaries are adjacent to FS roads and private land. The area inside the boundary would not be shielded from sights and sounds from private developments and these roads.

6. Do boundaries provide adequate opportunity for access and traveler transfer facilities?

Yes. There are points where visitors could transfer from motorized to non-motorized transportation.

Availability.

1. Describe other (nonwilderness) resource demands and uses. What current uses exist?

a. Recreation: Hunting and camping are currently the dominant uses, while horseback riding and hiking appear to be second in importance.

b. Information on wildlife species, populations, and management needs: The analysis area contains both game and nongame animals commonly found in the southeastern Coastal Plains, including gray squirrel and white-tailed deer.

c. Water availability and use: There are no sources of potable water in the analysis area. Creeks flowing through the analysis area and a pond provide water for wildlife.

d. Livestock operations: None.

e. Timber: This area is a high-quality site for timber production. Loblolly pine site indices range from 75 to 95. Timber types are loblolly pine (85 percent), shortleaf pine (5 percent), loblolly-hardwood (9 percent), and hardwood (1 percent). Hardwood types (mostly oak-hickory) are found in the creek bottoms and intermixed with pine types.

Approximately 294 acres, or 15 percent of the area, is in stands less than 10 years old. Approximately half of the timber (47 percent by stand area) is between 40 and 70 years old. An estimated 26 percent of the timber is more than 70 years old.

All of the area except the stringers lying along the intermittent stream courses is classified as suited for timber production. The analysis area is to provide timber for the sale program specified in the 1987 Forest Plan.

f. Minerals: All mineral rights, except those for 130 acres, are owned privately and are not subject to Forest Service jurisdiction. The area is considered to have a moderate potential for oil and gas occurrence.

The 130 acres of government minerals was leased in March, 1992. The lease to Triad is for five years.

2. To what degree is the analysis area natural or natural appearing and free from disturbance?

There is little visible evidence of turn-of-the-century logging and farming activities within the analysis area. Within the last 10 years, several areas have been regenerated by means of seed-tree timber harvesting. These areas total approximately 219 acres. There are approximately 4.6 miles of FS roads within the analysis area. Skid-trails and some haul roads associated with past logging activities have become overgrown and are not readily apparent. The area was last burned in 1988, when prescribed fire was applied.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural, untrammeled appearance.

With the exceptions of the regeneration areas, pipelines, and FS roads, the analysis area appears natural. Under 1987 Forest Plan guidance, the analysis area will continue to be managed for multiple use and will not regain an untrammeled appearance.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

No. Surface management is not a problem within this area; however, subsurface mineral rights are currently retained in private ownership. Surface occupancy, with mitigating measures implemented, must be allowed in order to accommodate mineral exploration and production of privately owned minerals. Therefore, perpetuation of wilderness values cannot be ensured.

5. Is more than 15 percent of the analysis area in nonnative vegetation?

No. No nonnative plant species are known to occur in the analysis area.

Improvements, structures, and nonconforming uses.

1. Are any of the following types of areas, features, or nonconforming uses present?

a. Airstrips or heliports: No.

b. Electronic installations: No.

c. Areas displaying evidence of historic mining at least 50 years old (Do not include areas of significant current mineral activity): None.

d. Areas under current mineral lease that contain a "no surface occupancy" stipulation: No.

e. Areas under current mineral lease where the lessee has not exercised development and occupancy rights: No.

f. Recreation improvements, such as occupancy spots or minor hunting or outfitter camps: There are no developed recreation improvements or camps, but the lakeshore is accessible by motorboat, and there are no restrictions on overnight primitive camping. Such camping is especially common during hunting seasons.

g. Timber harvest areas where logging and prior road construction or are not evident: There are approximately 219 acres of regeneration that is less than 10 years old. The regeneration and improved roads are very evident. However, the old timber haul roads and skid trails are overgrown and are evident only to the keen observer. There were once tramways throughout the forest, but all evidence of these has disappeared.

h. Cultural treatments involving plantations or plantings: The only evidence of timber stand or wildlife habitat improvement in the area was described previously.

i. Private inholdings in the area: No.

j. Dwellings on private inholdings: No.

k. Nonconforming structures and improvements: Yes. United Gas maintains approximately 0.4 miles of buried pipeline in the western part of the analysis area. The right-of-way for the pipeline is 50 feet wide.

l. Ground-return telephone lines: No.

m. Watershed treatment areas: No.

n. Roads: There are 2.46 miles of improved graveled and 2.1 miles of improved unsurfaced FS roads in use within the analysis area. There are some old unimproved roads; these are becoming overgrown.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or rapid natural deterioration?

Approximately 4.6 miles of FS roads are in use within the area. These roads could be closed if this were necessary for wilderness management; however, the mineral rights were retained by private individuals and are

not subject to termination. Surface occupancy, with mitigation measures implemented, must be allowed in order to accommodate mineral exploration and production.

3. Are improvements in the area being affected by the forces of nature rather than by humans, and are they disappearing or muted?

Roads and the pipeline are the only improvements being maintained for long-term service. These improvements are not disappearing.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the past 10 years?

Yes. There are approximately 219 acres in regeneration in the 0-to 10-years age class. This acreage accounts for about 15 percent of the total area.

5. Does the area contain less than 1/2 mile of improved road for each 1,000 acres?

No. There are approximately 3.08 miles of improved road per 1,000 acres. These roads (4.6 miles) are all under Forest Service jurisdiction and could be closed to promote wilderness conditions.

6. Are all existing roads under Forest Service jurisdiction?

Yes.

Evaluation of Potential Wilderness

Capability.

Does the analysis area have the basic characteristics that would make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the analysis area provide the opportunity for solitude and serenity?

There are some opportunities for solitude and serenity. Forest Service roads and activities on private land are visible from some points. The area is bounded by private lands on the north, and activities on the private land may reduce opportunities for solitude and serenity. Motorboat traffic or maintenance work on the pipeline right-of-way (ROW) may detract from the solitude of the area. A recent Recreation Opportunity Spectrum (ROS) inventory indicates that about 176 acres, or 12

percent of the area, provide opportunities for semi-primitive recreation. Visitors might have opportunities to experience solitude and serenity on these 176 acres.

Challenge.

Does the analysis area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

The area offers limited opportunities for these experiences, as do the nearby Upland Island and Turkey Hill Wilderness Areas. The FS road system now in use makes access reasonably easy. The terrain is relatively flat with some low ridges; hiking could be moderately challenging. A significant portion of the area is adjacent to Sam Rayburn Reservoir, which could offer the visitor the opportunity for excitement, initiative, or self-reliance.

Outdoor recreation opportunities. Describe the analysis for providing primitive and unconfined types recreation including:

a. Camping: There are numerous locations suitable for primitive camping.

b. Hunting: Small and large game species occur in the analysis area and can be hunted there.

c. Fishing: Sam Rayburn Reservoir is adjacent to the analysis area and offers excellent fishing opportunities.

d. Canoeing: There are no streams or rivers large enough to support canoeing, but it is possible to enjoy this activity on Sam Rayburn Reservoir.

e. Boating: Sam Rayburn Reservoir is adjacent to the analysis area and provides excellent boating opportunities.

f. River rafting: There are no streams or rivers large enough to support this activity.

g. Backpacking: Backpacking opportunities are limited by the area's small size, the absence of a trail network, and the presence of undergrowth.

h. Hiking: Same as for backpacking.

i. Riding: Horseback riding opportunities do exist; however, there are no developed trails.

j. Photography: Good opportunities exist.

Special Features.

1. What is the area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

The analysis area provides the same types of opportunities that existing wilderness areas in the Forest provide. These include opportunities in geology, archeology, biology, and dispersed recreation.

2. Is there an abundant and varied wildlife population?

Populations of game and nongame animals are typical of those in southern pine-hardwood forests in the southern Coastal Plains. Most wildlife found in the existing habitat are late successional forest dwellers. Limited populations of early successional species are present in the analysis area.

Accurate population figures are not available for all species. Two known bald eagle nests are being monitored. At present, one is active and the other inactive.

Manageability.

1. What are the characteristics of the surrounding area, including its ROS classification, adopted VQO, and present and planned uses?

The area is classified as semiprimitive motorized (about 4 percent), semiprimitive nonmotorized (about 7 percent), and roaded natural (about 89 percent). The Visual Quality Objective (VQO) is primarily partial retention along the lakeshore and modification elsewhere. Aesthetic values along the lakeshore adjacent to Sam Rayburn Reservoir are considered very important.

Under the 1987 Forest Plan, future land use will stress multiple-use management with sensitivity toward aesthetic values. The Forest Plan is being revised, and the new Plan may place additional emphasis on the importance of maintaining the aesthetic values associated with lakeshore views adjacent to Sam Rayburn Reservoir. It is possible that the partial retention zone along the shore will be changed to a retention zone.

2. Do boundary locations conflict with important existing or potential public uses outside the boundary that might result in demands to allow nonconforming structures or activities or both in the wilderness?

Even though development may occur on National Forest land or private land around and near the boundary, demands for nonconforming structures or activities are not expected to be a serious problem.

3. Is it possible to readily and accurately describe, establish, and recognize boundaries on the ground?

Yes. The current National Forest boundary is marked.

4. Do boundaries conform with terrain or other features that constitute a barrier to prohibited use?

Some portions of the boundary are in areas that would be difficult to cross or access; a major portion of the boundary consists of lakeshore that is accessible only by foot or boat. There are other boundaries where the prohibition against the use of motorized vehicles would be difficult to administer. The northern boundary follows the old tract boundary. Both of these boundaries follow arbitrary lines that do not conform with terrain or other features constituting natural or man-made barriers.

5. Do boundaries, to the extent practicable, shield the wilderness environment inside the boundary from the sights and sounds of civilization?

The lakeshore boundary provides some degree of protection; however, sights and sounds of boats on Sam Rayburn Reservoir may detract from solitude. The northern boundary is adjacent to private land. It is possible that private development and road construction could occur near this boundary and that these could produce sounds incompatible with wilderness.

6. Do boundaries provide adequate opportunity for access and traveler transfer facilities?

Yes. There are points where visitors could transfer from motorized to nonmotorized transportation.

Availability.

1. Describe other (nonwilderness) resource demands and uses. What current uses exist?

a. Recreation: Hunting, camping, and boating are currently the dominant uses, while horseback riding and hiking appear to be less popular.

b. Information on wildlife species, populations, and management needs: The analysis area contains two known bald eagle nesting sites. These sites are located adjacent to the lakeshore and are protected under the Endangered Species Act. Management activities within 1,500 feet of the sites are governed by United States Department of the Interior (USDI) guidelines. Under these guidelines, the seed trees that were left to provide seed for regeneration were not removed. The analysis area also supports both game and nongame animals commonly found in the southeastern Coastal Plains, including gray squirrel and white-tailed deer.

c. Water availability and use: There are no sources of potable water in the analysis area. The adjacent Sam Rayburn Reservoir and other water resources, such as creeks and other low areas, provide water for wildlife.

d. Timber: The analysis area is a high-quality site for timber production. Loblolly pine site indices range from 8 to 90. Timber types are: loblolly (92 percent); pine (5 percent); and longleaf pine (3 percent). Some hardwood types (mostly oak-hickory) are found in the creek bottoms and intermixed with pine types. Approximately 219 acres, or 15 percent of the area, is in stands less than 10 years old. Approximately 76 percent of the standing timber is at least 70 years old. There is also a 40-acre stand of shortleaf pine which is approximately 100 years old.

The stringers along perennial and intermittent streams are classified as unsuitable for timber production in the 1987 Forest Plan. The remainder of the analysis area is classified in the 1987 Plan as suited for timber production.

e. Minerals: All mineral rights are owned privately and are not subject to Forest Service jurisdiction. The area is considered to have moderate potential for oil and gas occurrence, and there have been inquiries about drilling in the analysis area. The main access for the proposed drilling activity would be FS 310. Since mineral rights are reserved or outstanding, the Forest Service must allow the construction and maintenance of access routes and drilling sites. The analysis

area is on the Austin Chalk formation, which is being explored actively and is currently producing gas and oil in marketable quantities several miles to the east on the Sabine National Forest.

f. Cultural resources: Much of the analysis area is considered to have high potential for the presence of archeological sites, historical sites, or both (historic properties). The Angelina and Neches Rivers created ideal conditions for early settlement. Numerous Paleo-Indian to Neo-historic prehistoric sites have been recorded within the analysis area. Future surveys will likely reveal additional sites, and evaluation of these sites should broaden our knowledge of the prehistoric inhabitants of the region.

These sites, and the objects and other physical evidence they contain, are an important part of our cultural heritage. The National Forests and Grasslands in Texas (NFGT) is charged with the protection and management of these valuable historic properties by laws and regulations.

g. Authorized and potential land uses: United Gas has approximately 0.4 miles of buried pipeline in the western portion of the analysis area. United Gas has the right to maintain the right-of-way for the line. No other special uses are authorized in the analysis area.

h. Management considerations including fire, insects and diseases, and presence of non-Federal lands: The analysis area has been burned to reduce fuel build-up approximately every five years since the Forest Service acquired the land in the 1930's. No wildfires have been recorded in the analysis area. Should a wildfire occur, the gently rolling terrain would not present suppression difficulties unless there were adverse conditions such as high winds or very dry fuels.

Potential for spread of the SPB is moderate because loblolly and shortleaf pines, the preferred host species, are present throughout the area. Although few infestations have occurred in the analysis area, the majority of the standing timber is at or near maturity and this could increase susceptibility.

Temple-Eastex manages the private land adjacent to the northern boundary for timber production. This land is part of a potential land exchange and may be acquired in the future.

2. What outputs are currently produced or could be produced in the future?

Dispersed recreational activities, such as hunting and fishing, should continue at about the present moderate to high level. The analysis area is adjacent to Sam Rayburn Reservoir, which is now accessible by FS roads. Five Fingers Bay, which receives much fishing use, is

accessible through the analysis area. Because the analysis area is visible from Sam Rayburn Reservoir, it is desirable to manage the lakeshore for aesthetic and recreational purposes.

The analysis area is considered suitable timberland, and is expected to produce a sustainable output of timber volume. The next silvicultural examination and prescription process is scheduled to take place in the late 1990's. There are plans to harvest the seed trees on two areas within the next few years.

3. Is the area located in such a way that the need for increased water production or additional onsite storage or both is so vital that installation or maintenance improvements is an obvious and inevitable public necessity?

No.

4. Would wilderness designation seriously restrict or prevent the application of wildlife management measures of considerable magnitude and importance?

The major concern is the bald eagle. Wilderness designation would prevent the use of vegetation management as a tool for habitat. However, it appears that U.S. Fish and Wildlife guidelines for managing bald eagles are compatible with wilderness designation. The emphasis in protecting bald eagle nesting habitat involves avoiding or minimizing any human-related disturbances.

5. Is it a highly mineralized area of such strategic or economic importance and extent that restrictions or resulting from wilderness designation would not be in the public interest?

This area is not highly mineralized, but considered to have moderate potential for oil and gas occurrences. There have been inquiries about the possibility of drilling within and adjacent to the analysis area. Since the mineral rights are owned privately, it is not necessary to obtain the Forest Service's permission to drill or to construct and maintain drilling sites and road to such sites.

6. Does the area contain natural phenomena of such unique or outstanding nature that general public access and special development to facilitate public enjoyment should be available?

No.

7. Is the land needed to meet clearly documented resource demands such as demands for timber, minerals or developed recreation?

Yes. There are now high demands for dispersed recreation (hunting and fishing), minerals, and timber. Seed trees are to be removed from two areas on Bounds Peninsula. Designation of the analysis area as wilderness would reduce the amount of wood available to industry.

8. Is the land committed through contractual agreements for use, purposes, or activities not in concert with wilderness requirements?

Yes. There are outstanding rights to all minerals within this area, and United Gas has an outstanding right for a pipeline.

Need.

Other wildernesses.

1. What are the locations, sizes, and types of other wildernesses in the general vicinity?

The National Wilderness Preservation System includes 84,012 acres of designated wilderness in Texas as well as additional lands in nearby states. See Table 1 (found in the Introduction to the Evaluation of Roadless Areas) for more information about wilderness areas in Texas.

2. How far is it to the closest existing wilderness?

Turkey Hill Wilderness, consisting of 5,286 acres, is approximately 14 miles to the north.

3. What is the current level of use in nearby wilderness? What are the trends in the use of these areas?

Upland Island Wilderness, about 35 miles to the west, received approximately 3,000 Recreation Visitor Days (RVD's) of use, of which 500 involved overnight camping (3,000 RVD's is about 11 percent of estimated capacity). The average size of visiting groups was 2.6 people. More than 56 percent of visitors to Upland Island visit there more than twice per year. An estimated 27 percent of visitors to Upland Island go into the wilderness alone. Most visitors are there to hunt or to scout places for future hunting trips. A large percentage of visitors are under 16 years of age.

Turkey Hill Wilderness received an estimated 1,500 RVD's (about 14 percent of capacity), of which 500 involved overnight camping. Most of the use was related to hunter use. Users have not had any significant

effects on the area's wilderness qualities or resources. A small increase in use over the next 10 to 20 years is anticipated.

4. Is the population in and around these areas increasing or decreasing? How quickly is it increasing or decreasing?

The population of Texas grew 0.6 percent annually from 1980 to 1987. This slow increase is expected to continue. The large metropolitan areas such as Dallas and Houston grew at much faster rates (27 percent and 17 percent respectively, 1980-87). These population centers are about 100 miles (Houston) to 175 (Dallas) from the analysis area. The combined population of Houston and Dallas is more than 5 million.

The population of Deep East Texas, which includes San Augustine County and the analysis area, increased about 10 percent between 1980 and 1988. The population of Deep East Texas is expected to increase about 50 percent over the next 35 years.

The analysis area is located in San Augustine County, the population of which grew from 8,785 to 9,174 between 1980 and 1990 (a 4.43-percent increase). The populations of adjacent Angelina and Jasper Counties increased by 8.96 percent and 4.01 percent respectively over the same period. The combined populations of Angelina and Jasper Counties was estimated to be 105,965 in 1990.

Nonwilderness lands.

Are there opportunities for unconfined and primitive recreation on nonwilderness areas in the vicinity? If so, where?

Many acres of National Forest land within a reasonable distance of Bounds Peninsula are suitable and available for primitive recreation use. There are 84,012 acres of wilderness in Texas, and another 82,348 acres of National Forest lands in Texas provide opportunities for semi-primitive or primitive recreation.

Habitat needs.

1. Are any biotic species in the analysis area competing directly with increasing public use and development?

Yes. There is one known active bald eagle nesting site on Bounds Peninsula. No management activity is allowed within 750 feet of the site, and only minimal activity is allowed within 1,500 feet of the site.

2. Could their needs be provided for through means other than wilderness designation?

Yes, through seasonal or year-long closures or restrictions.

3. Is there a need to provide a sanctuary for biotic species that cannot survive in less than primitive surroundings?

No. Through conscientious vegetation management practices and mitigation of disturbances, suitable habitat can be maintained for these species.

Landform and ecosystem preservation.

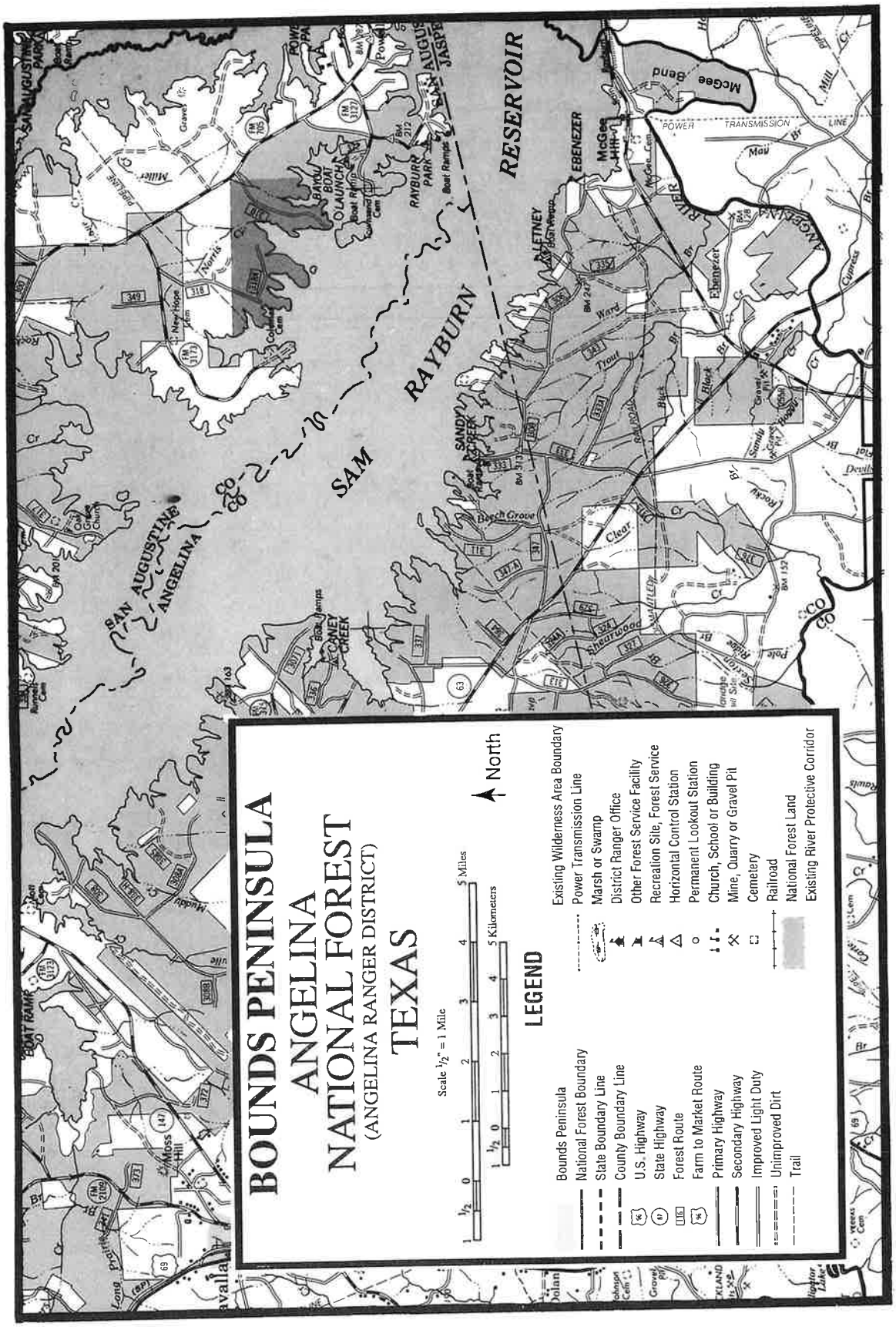
1. What is the analysis area's landform type based on the Region 8 Soil Resource Inventory (R-8, 1977)? Does the area represent a unique landform type that is not represented in any existing wilderness areas in the general vicinity?

The analysis area is on the Coastal Plains of eastern Texas. The dominant landform characteristics are low ridge segments, ridge segments, and side slope segments. These are areas with gently sloping topography or flat or undulating areas that receive moisture from stream terraces. These landforms are not unique and are typical of Turkey Hill Wilderness Area, approximately 14 miles to the north.

2. What is the analysis area's ecosystem classification based on the TNHP report? Does the analysis area represent a unique ecosystem that is not represented in any existing wilderness areas in the general vicinity?

The analysis area's vegetation is classified as loblolly pine and shortleaf pine forest cover types, which are typical of the southern Coastal Plains. The plant communities most common in the analysis area are the TNHP Loblolly Pine-Oak and Shortleaf Pine-Oak Series. The analysis area's ecosystem is commonly represented in existing wilderness areas in Texas.

Figure 1 - Bound's Peninsula



Chambers Ferry
Sabine National Forest
Tenaha Ranger District

Roadless Area Review and Evaluation

Description of Analysis Area

Roadless area name and number of acres.

CHAMBERS FERRY: Gross area approximately 4,695 acres; net area approximately 4,690 acres.

Location and vicinity.

The analysis area is located in the southeastern portion of the Tenaha Ranger District of the Sabine National Forest in Texas. It is on the western shore of Toledo Bend Reservoir, just south of the town of East Hamilton. It is bordered by private land on the south, and by private land and Forest Service land on the north. State Highway 87 forms the analysis area's southwest boundary.

Describe access to the analysis area including roads and trails leading to the area.

Access is by State Highway 87, by Forest Service (FS) 121 and FS 121A, and by boat from Toledo Bend Reservoir.

General description of the analysis area's geology.

The Sabine National Forest is underlain by sedimentary materials laid down from the early Cretaceous to the present. The two most recent sediments are alluvium and fluviatile terrace deposits that date from the present to about 2.5 million years ago. Eleven geologic formations were created in the Miocene, about 25 million years ago. The Nash Creek Formation was created in the Oligocene or Upper Eocene between 25 and 40 million years ago. The Yazoo, Moodys Branch, Yegua, Cook Mountain, Weches, and Reklaw Formations were formed in the Eocene and Paleocene, about 36 to 63 million years ago as were the Wilcox Group undivided and the Sparta and Carrizo sands.

General description of the analysis area's topography.

The Sabine National Forest is on the western Gulf Coastal Plain. Elevations range from 140 to 590 feet above sea level. The steepness of slopes along ravines ranges from 0 to 55 percent. The analysis area is generally drained by the Sabine River; tributaries of the Sabine drain portions of the analysis area along Martinez Bayou and Patroon Bayou.

General description of the analysis area's vegetation, including the ecosystem type.

Two major plant communities are present–the American beech-white oak series and the loblolly pine-oak series as described by the Texas Natural Heritage Program (TNHP). The American beech-white oak series is a mesic, calciphilic forest that occupies ravines and ridges within creek bottoms, mostly in southeastern Texas. Acid-loving species such as southern magnolias are absent, and a rich vernal calciphilic forest forb flora is present. Representative forbs include bigleaf snowbells, blue-stem goldenrod, and chalk maple.

The loblolly pine-oak series is an upland, mainly deciduous forest that occurs primarily on sandy or loamy, low-pH soils in eastern Texas. Old-growth communities are dominated by combinations of post oak, white oak, water oaks, hickories, other hardwoods, loblolly pine, and shortleaf pine. Understory species include flowering dogwood, yaupon holly, wax-myrtle, and beauty-berry. This community type is wide-ranging, often occurring as a second-growth or disturbance type after logging, and thus is highly variable.

Key attractions, if any, including sensitive wildlife and scenic landmarks.

The red-cockaded woodpecker (RCW), a Federally listed endangered species, occurs in the analysis area. There are now three RCW clusters in Compartment 62; two are active and one is inactive. There are only three active clusters in the Tenaha Ranger District. An active bald eagle nest is located in Stand 13 of Compartment 64. The bald eagle is a Federally listed endangered species.

The Beech Ravines Scenic Area (approximately 1,269 acres) is located within the analysis area and is relatively undisturbed. It was inventoried and recommended for designation as a Botanical Area by TNHP. The Beech Ravine primary area identified by the TNHP is approximately 827 acres of botanically significant ravine forest and is considered an area of outstanding regional significance. The topography of Beech Ravines Scenic Area consists of exceptionally deeply cut, north and east facing, steep-sided ravines draining into Toledo Bend Reservoir. These mesic ravines support mixed hardwoood forest dominated

by sweetgum, blackgum, water oak, and large beech dominants in the canopy of these mesic ravines.

Area Inventory

Human influence.

1. To what degree have humans and past and present human activity affected natural ecological processes and conditions?

The analysis area was farmed in the 1930's before it was acquired by the U.S. Forest Service. Currently, stands on 364 acres (or about 8 percent of the U.S. Forest Service ownership) is in the 0- to 10-years age class.

During 1991, 746 thousand board feet (MBF) were salvaged from southern pine beetle (SPB) mortality and hail damage.

Eight stands located in Compartment 62 (totaling 100 acres) have been treated as RCW habitat. The treatment consists of basal area reduction, midstory vegetation removal and prescribed burning. The remainder of the analysis area has been burned with prescribed fire at 3- to 5-year intervals. Stands on 85 percent of the analysis area have been thinned in salvage operations. There are logging skid trails and woods roads throughout the analysis area.

2. To what degree is the analysis area natural or natural appearing and free from disturbance?

Only the Beech Ravines Scenic Area appears natural and largely undisturbed. Boating activities on Toledo Bend Reservoir, which is adjacent to Beech Ravines, are the only activities that might disturb visitors to Beech Ravines.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural, untrammeled appearance?

No. Maintenance of RCW habitat involves prescribed burning and removal of midstory hardwoods. These activities are ongoing. Some evidence of salvage harvesting is visible.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

No. The analysis area is surrounded by several hundred acres of privately owned cut-over timberland in the early stages of regeneration. Also, there is a subdivision adjacent to the analysis area boundary at

the confluence of Martinez Bayou and Toledo Bend Reservoir. Mineral rights on 2,356 acres are reserved or outstanding.

5. Is more than 15 percent of the analysis area in non-native vegetation?

No.

Improvements, structures, and nonconforming uses.

1. Are any of the following types of areas, features, or nonconforming uses present? If so where?

a. Airstrips or heliports: No.

b. Electronic installations: No.

c. Areas displaying evidence of historic mining at least 50 years old (Do not include areas of significant current mineral activity): No.

d. Areas under current mineral lease that contain a "no surface occupancy" stipulation: No.

e. Areas under current mineral lease where the leasee has not exercised development and occupancy rights: See Table 1 near the end of this evaluation.

f. Recreation improvements, such as occupancy spots or minor hunting or outfitter camps: The analysis area is popular with local hunters and campers. The bluffs overlooking the Toledo Bend Reservoir receive most of this use. Primitive, dispersed camp spots are evident at the end of 121A and on the numerous bluffs overlooking Toledo Bend Reservoir. Most of the adjacent private timber company land has been leased by hunting clubs. These leased areas have gated roads and large hunter camps.

g. Timber harvest areas where logging and prior road construction are or are not evident: Two pipe gates were installed to block access into two RCW clusters. The blocked roads were temporary haul roads for previous timber sales. Also, several hundred acres of private timberland adjacent to the analysis area is in young regeneration.

h. Cultural treatments involving plantations or plantings: There are 205 acres of Forest Service land with vegetation in the seedling or sapling stage. An additional 159 acres, which were harvested as a result of SPB damage, are revegetating naturally with a variety of tree species. Several hundred acres of adjacent private timberland is in seedlings or saplings.

i. Private inholdings in the analysis area: Bennet's Cemetery and another small parcel of private land are the only inholdings. Total area in inholdings is about five acres.

j. Dwellings on private inholdings: No.

k. Nonconforming structures and improvements: Two gates block access on both Forest Service land and private timber company land. Steel restrictor plates have been installed on eight cavity trees within two active RCW clusters.

l. Ground-return telephone lines: No.

m. Watershed treatment areas: No.

n. Roads: The analysis area has 12.99 miles of improved roads.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or rapid natural deterioration?

Yes. The gates could be removed. Restrictor plates could be removed if analysis showed that this would not be harmful to RCW.

3. Are improvements in the area being affected by the forces of nature rather than by humans, and are they disappearing or muted?

No.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the past 10 years?

Yes. Ninety-five percent of the analysis area has been harvested within the last 10 years.

5. Does the analysis area contain less than 1/2 mile of improved road for each 1,000 acres?

No. The analysis area contains 12.99 miles of improved road, or 2.8 miles of road per 1,000 acres. Roads and their lengths are:

FS Road	Miles	FS Road	Miles
121	3.26	1211	0.76
121A	2.12	SAB38	1.00
1612 and 1612A	1.33	1625	0.75
1212	0.76	1624	0.50
121M	0.38	1623	0.61
131	1.14	1627	0.38

6. Are all existing roads under Forest Service jurisdiction?

Yes.

Evaluation of Potential Wilderness

Capability.

Does the analysis area have the basic characteristics that would make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the analysis area provide the opportunity for solitude and serenity?

Yes.

Challenge.

Does the analysis area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

Numerous roads to and within the analysis area make access easy. The analysis area presents opportunities for forms of recreations that involve excitement, challenge, initiative, and self-reliance.

Outdoor recreation opportunities.

Describe the analysis area's capability for providing primitive and unconfined types of recreation including:

a. Camping: Numerous locations are suitable for primitive camping.

b. Hunting: There are opportunities for both small and big game hunting.

c. Fishing: Toledo Bend Reservoir offers outstanding bass fishing.

d. Canoeing: It is possible to canoe in coves and close to the shoreline of Toledo Bend Reservoir. Martinez Bayou also offers some canoeing opportunities.

e. Boating: The adjacent Toledo Bend Reservoir can support this activity.

f. River rafting: There are no opportunities for river rafting.

g. Backpacking: The analysis area offers some backpacking opportunities, but the lack of a trail system and presence of undergrowth detracts from the experience.

h. Hiking: Same as backpacking.

i. Riding: The analysis area offers only limited opportunities for horseback riding.

j. Photography: Good opportunities exist, especially in the Beech Ravines site when sensitive plants are flowering.

Special features.

1. What is the area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

There are opportunities in areas such as biology, botany, and dispersed recreation.

2. Is there an abundant and varied wildlife population?

The game and nongame species present are typical of those occurring in Coastal Plain forests. Two active RCW clusters are present.

Manageability.

1. What are the characteristics of the surrounding area,including its ROS classification, adopted VQO, and present and planned uses?

Recreation Opportunity Spectrum (ROS) on a majority of the analysis area is Roaded Natural (RN). The Beech Ravines site is mostly Semi-Primitive Non-Motorized (SPNM). Visual Quality Objective (VQO) ranges from Maximum Modification (MM) to Modification (M), Partial Retention (PR), Retention (R), and Preservation (P). Only the Beech Ravines site has a VQO of P.

Future land use will continue to stress habitat enhancement for the endangered RCW. Pest management activities such as treatment of SPB infestations will continue also.

2. Do boundary locations conflict with important existing or potential public uses outside the boundary that might result in demands to allow nonconforming structures or activities or both in the wilderness?

No.

3. Is it possible to readily and accurately describe, establish, and recognize boundaries on the ground?

Yes. The current National Forest boundary is marked.

4. Do boundaries conform with terrain or other features that constitute a barrier to prohibited use?

Some portions of the boundary are located in areas that would be difficult to cross or access. However, there would be many areas where the use of motorized vehicles, such as All Terrain Vehicles (ATV's), would be difficult to administer.

5. Do boundaries, to the extent practicable, shield the wilderness environment inside the boundary from the sights and sounds of civilization?

No. Private developments and public roads near the boundary can be expected to create some sounds. Boating activities on Toledo Bend Reservoir will also contribute sounds.

6. Do boundaries provide adequate opportunity for access and traveler transfer facilities?

Yes. Existing roads within the analysis area provide adequate opportunity for access and traveler transfer. If the analysis area were designated wilderness and these roads were closed, it would still be possible to reach the analysis area by way of State Highway 87, or by boat on Toledo Bend Reservoir. There are points where visitors could transfer from motorized to nonmotorized modes of transportation.

Availability.

1. Describe other (nonwilderness) resource demands and uses. What current uses exist?

a. Recreation: The analysis area serves dispersed recreation users. Primitive camping and hunting are popular.

b. Information on wildlife species, populations, and management needs: The analysis area provides habitat for game and nongame species common in Coastal Plain forests. The endangered RCW is present in two active clusters in Compartment 62. Population figures for game and nongame species are not available.

c. Water availability and use: Water for human consumption is not available. Water is readily available for wildlife.

d. Livestock operations: None.

e. Timber: The analysis area has high-quality timber sites. Site indices range from the 70's to the 90's. Most of the timber is mature or immature sawtimber. Thinning operations have been conducted throughout the analysis area to improve RCW habitat or reduce the risk of infestation by SPB.

f. Minerals: Mineral rights are outstanding on more than half the analysis area. (See Table 1 near the end of this evaluation.)

g. Cultural resources: The analysis area has a high potential for archeological prehistoric and historic sites, but none have been inventoried.

h. Authorized and potential land uses: No special uses are authorized and none are anticipated.

i. Management considerations including fire, insects and diseases, and presence of non-Federal lands: The analysis area has been included in the district's control burning program in recent years. Fuel loading is light to moderate.

Bennet's Cemetery, a private inholding, is located within the analysis area.

The analysis area has a high hazard rating for potential SPB infestation. High basal area densities and overmature stands account for the high hazard rating. During recent years, salvage operations have been conducted to treat SPB in the analysis area. The treatments have created numerous scattered openings throughout the analysis area.

2. What outputs are currently produced or could be produced in the future?

Dispersed recreation activities, primarily primitive camping and hunting, should continue at about the present low to moderate level.

3. Is the area located in such a way that the need for increased water production or additional onsite storage or both is so vital that installation or maintenance of improvements is an obvious and inevitable public necessity?

No.

4. Would wilderness designation seriously restrict or prevent the application of wildlife management measure of considerable magnitude and importance?

Yes. The future of the active RCW clusters will be compromised if the habitat is not maintained with fire and midstory vegetation control. Currently, the District has only three active clusters, and two of these are in Compartment 62 in the analysis area. Red-cockaded woodpecker habitat has been improved not only in the colony sites, but also in the replacement and recruitment stands. The investment of manpower and dollars will be lost if the analysis area is designated as wilderness.

There is an active eagle nest in Stand 13 of Compartment 64. Although the endangered bald eagle is not dependent on midstory control or a prescribed fire regime, it is associated with sparse basal area conditions. Seed-tree harvesting, shelterwood harvesting, and thinning operations can make habitat more suitable for bald eagles.

5. Is it a highly mineralized area of such strategic or economic importance and extent that restrictions or controls resulting from wilderness designation would not be in the public interest?

No.

6. Does the area contain natural phenomena of such unique or outstanding nature that general public access and special development to facilitate public enjoyment should be available?

No.

7. Is the land needed to meet clearly documented resource demands such as demands for timber, mineral production, or developed recreation?

The land is needed to perpetuate a Federally listed endangered species, the RCW. There are currently demands for dispersed recreation (hunting and fishing), minerals, and timber. Designation of the analysis area as wilderness would reduce the amount of wood available for industry.

8. Is the land committed through contractual agreements for use, purposes, or activities not in concert with wilderness requirements?

Yes. Rights to minerals on 652 acres are leased, and rights to minerals on 1,496 acres are shared by the United States and a second party.

Need.

Other wildernesses.

1. What is the locations, sizes, and types of other wildernesses in the general vicinity?

There are no other wildernesses in the general vicinity. See Table 1 (found in the Introduction to the Evaluation of Roadless Areas) for more information about wilderness areas in Texas.

2. How far is it to the closest existing wilderness?

The Indian Mounds Wilderness is 14 air miles south of the analysis area.

3. What is the level of use in nearby wilderness? What are the trends in the use of these areas?

Use of the Indian Mounds area is low. Use of that area is increasing slightly.

4. Is the population in and around these areas increasing or decreasing? How quickly is it increasing or decreasing?

The population around the Indian Mounds Wilderness Area is stable but substantial.

Nonwilderness lands.

Are there opportunities for unconfined and primitive recreation on nonwilderness areas in the vicinity? If so, where?

Yes, anywhere on the District.

Habitat needs.

1. Are any biotic species in the analysis area competing directly with increasing public use and development?

No.

2. Could their needs be provided for through means other than wilderness designation?

Not applicable.

3. Is there a need to provide a sanctuary for species that cannot survive in less that primitive surroundings?

No.

Landform and ecosystem preservation.

1. What is the analysis area's landform type? Does the area represent a unique landform type that is not represented in any wilderness areas in the general vicinity?

The analysis area is located within the Gulf Coastal Plain physiographic province. The Indian Mounds Wilderness Area is also located within the same physiographic province, and contains the same general landforms.

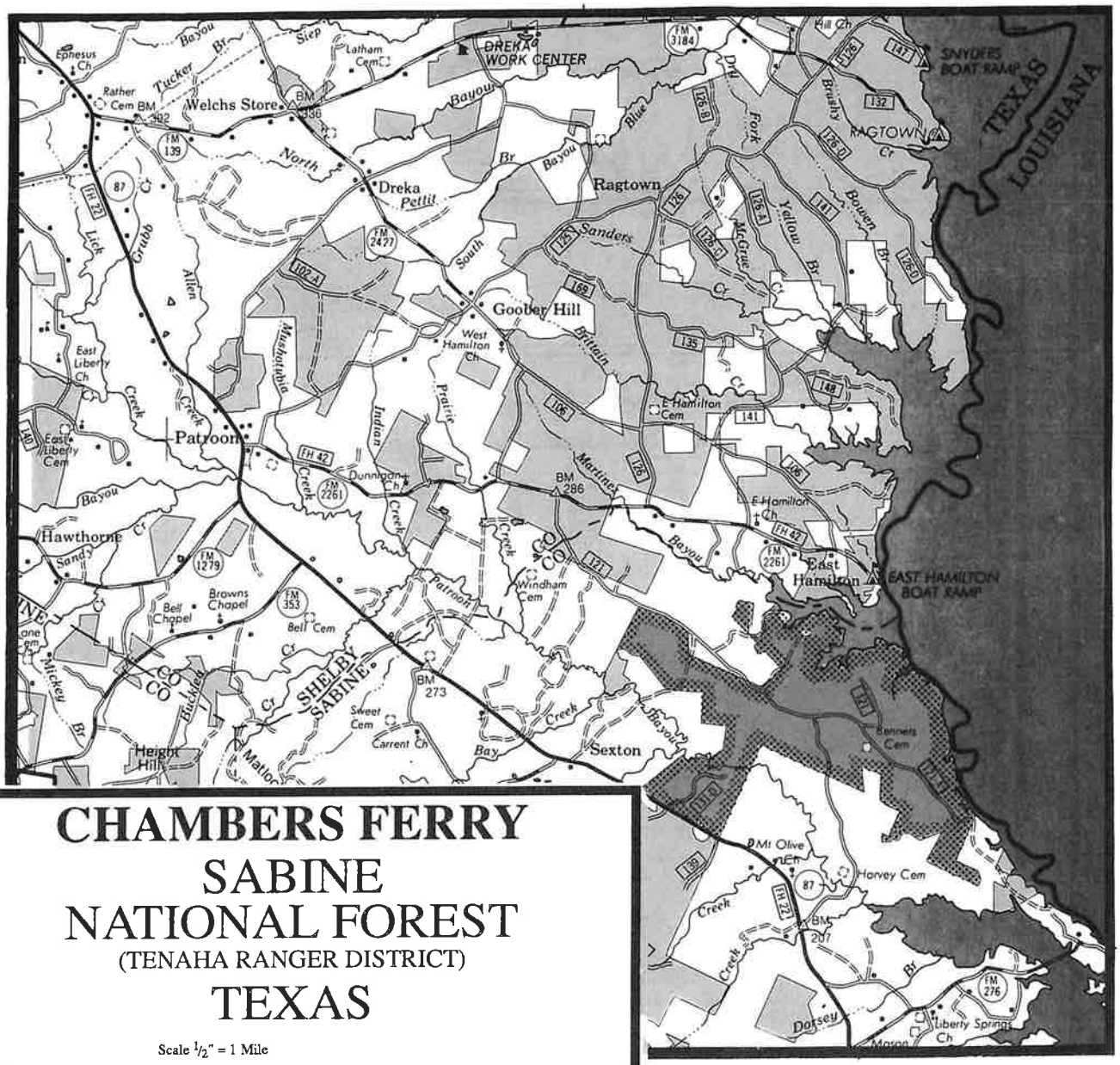
2. What is the area's ecosystem classification? Does the area represent a unique ecosystem that is not represented in any existing wilderness areas in the general vicinity?

The analysis area is included in the mixed pine-hardwood forest of the Piney Woods. The Indian Mounds Wilderness Area is located within the same ecosystem.

Table 1. Mineral Interest and Leasing Status of Areas Within Proposed Chamber's Ferry as of April 8, 1992

Tract	U.S. Interest	Outstanding Acres	Reserved In Perpetuity	Issued Leases
S-26	--	--	55.00	NM-60892, effective 12/1/89 for 10 years
S-65	28.00 (15/16)	--	22.43	None
S-1Ap-I	1,468.00 50 percent	850.00	2,149.00	Parcel 1 sold 1/92 Other parts of tract still available
S-5d	--	--	42.84	None
S-5e	--	--	0.15	None
S-5f	--	--	45.07	None
S-5g	--	--	3.50	None
S-5h	--	--	0.63	None
S-29r	--	5.03	--	Not leasable
S-29r-I	--	6.46	--	Not leasable
S-29r-II	--	0.37	--	Not leaseable
S-29r-III	--	0.35	--	Not leasable
S-29r-IV	--	0.18	--	Not leasable
S-29r-V	--	12.87	--	Not leasable
Total	1,496.00	875.26	2,318.74	

Figure 1 - Chambers Ferry



CHAMBERS FERRY
SABINE NATIONAL FOREST
(TENAHA RANGER DISTRICT)
TEXAS

Scale 1/2" = 1 Mile

1 1/2 0 1 2 3 4 5 Miles

1 1/2 0 1 2 3 4 5 Kilometers

North

LEGEND

- Chambers Ferry
- National Forest Boundary
- State Boundary Line
- County Boundary Line
- U.S. Highway
- State Highway
- Forest Route
- Farm to Market Route
- Primary Highway
- Secondary Highway
- Improved Light Duty
- Unimproved Dirt
- Trail
- Power Transmission Line
- Marsh or Swamp
- District Ranger Office
- Other Forest Service Facility
- Recreation Site, Forest Service
- Horizontal Control Station
- Permanent Lookout Station
- Church, School or Building
- Mine, Quarry or Gravel Pit
- Cemetery
- Railroad
- National Forest Land

Four Notch
Sam Houston National Forest
Raven Ranger District

Roadless Area Review and Evaluation

Description of Analysis Area

Roadless area name and number of acres.

FOUR NOTCH: Gross area approximately 7,135 acres; net area approximately 6,640 acres.

Location and vicinity.

The analysis area is located seven miles southeast of Huntsville, Texas, and is in the north central portion of the Sam Houston National Forest.

Describe access to the analysis area, including roads and trails leading to the area.

U.S. Highway 190 and Farm-to-Market (FM) 2929 and FM 2296 provide access to the analysis area.

General description of the analysis area's geology.

The analysis area is in the southern Gulf Coastal Plains and the Texas Blackland Prairies. The soils have developed from sedimentary material and are classified as recent, pleistocene, and tertiary. The Willis formation consists largely of clayey sand and gravel and some local clay beds. The Fleming formation underlies and is the parent material for the blacklands, which consists of calcareous clay and sandstone.

General description of the analysis area's topography.

This part of the southern Gulf Coastal Plains and the Texas Blackland Prairies consists of floodplains, streams, and gently sloping ridgetops. The elevation between the stream bottoms and ridge tops is approximately 80 feet, and slopes are between 3 and 7 percent.

General description of the analysis area's vegetation, including the ecosystem type.

The analysis area is almost entirely forested. A pine-hardwood mix occupies the ridges and gives way to a hardwood forest along some of

the streams. Species such as loblolly pine, red oaks, white oaks, and hickories may be found on the upper slopes. Species such as sweetgum, various oaks, beech, and hickory may be found along the streams.

Key attractions, if any, including sensitive wildlife and scenic landmarks.

The analysis area is essentially an upland site. Its wildlife include deer and red-cockaded woodpecker (RCW), an endangered species. No sensitive plant or species are known to occur in the analysis area.

Area Inventory

Human influence.

1. To what degree have humans and past and present human activity affected natural ecological processes and conditions?

The National Forests in Texas were acquired primarily under the authority of the Weeks Act. These lands were acquired from private landowners during the 1930's and early 1940's. A significant proportion of the land was acquired from timber companies. Most of the analysis area was cut-over severely during the early 1900's.

2. To what degree is the analysis area natural or natural appearing and free from disturbance?

Little evidence of turn-of-the-century logging and farming is present today. However, traces of more recent activities are evident. A southern pine beetle epidemic killed many of the analysis area's pines in the mid-1980's. About 3,435 acres, or 52 percent of the analysis area, is now in regeneration less than 10 years old. During the mid-1980's, salvage operations were conducted in much of the analysis area. These operations salvaged much of the timber affected by the beetles and prepared the way for stand regeneration, which was completed subsequently.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural, untrammeled appearance?

Most of the analysis area reflects the southern pine beetle (SPB) activity of the mid-1980's and the regeneration work completed soon thereafter. The analysis area is now a mosaic of young and old timber stands dominated by the regeneration in the late 1980's. The 1987 Forest Plan specifies that the analysis area will continue to be managed for multiple use and will not regain natural appearance unless management direction changes toward less intensive management.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

The existing pattern of surface ownership would make it possible to manage the analysis area's surface features so that wilderness conditions would be perpetuated. However, the mineral rights within the analysis area are nearly 100 percent outstanding or reserved, and are not Federally owned. Surface occupancy, with mitigating measures implemented, must be allowed in order to accommodate minerals exploration and production. Therefore, perpetuation of wilderness conditions cannot be ensured.

5. Is more than 15 percent of the analysis area in nonnative vegetation?

No exotic species are known to be present.

Improvements, structures, and nonconforming uses.

1. Are any of the following types of areas, features, or nonconforming uses present? If so, where?

a. Airstrips or heliports: None.

b. Electronic installations: None.

c. Areas displaying evidence of historic mining at least 50 years old (Do not include areas of significant current mineral activity): None.

d. Areas under current mineral lease that contain a "no surface occupancy" stipulation: None.

e. Areas under current mineral lease where the lessee has not exercised development and occupancy rights: Mineral rights on all but 42 acres are owned privately. The 42 acres are leased but no development has occurred.

f. Recreation improvements, such as occupancy spots or minor hunting or outfitter camps: The analysis area receives moderate use from hunters and contains some undeveloped, dispersed campsites. The Lone Star Hiking Trail also traverses the analysis area.

g. Timber harvest areas where logging and prior road construction are or are not evident: Yes. The analysis area was managed for timber before acquisition by the U.S. and has been managed for timber by the Forest Service since the 1930's.

h. Cultural treatments involving plantations or plantings: Extensive pine plantations are present. There is no additional evidence of past timber stand or wildlife habitat improvement.

i. Private inholdings in the area: Several inholdings are scattered throughout this area.

j. Dwellings on private inholdings: Yes. There are farmhouses and other farm buildings on the inholdings.

k. Nonconforming structures and improvements: Three improved roads with a total length of approximately 7.2 miles are present.

l. Ground-return telephone lines: Yes. The lines provide service to local residents.

m. Watershed treatment areas: No.

n. Roads: Three improved roads (total length 7.2 miles) are present. Approximately 6 miles of road is surfaced and maintained on a regular basis. Some of the improved roads provide access for local residents.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or rapid natural deterioration?

Some of the roads crossing Four Notch provide access to private property and must be maintained for continuing service. Surface occupancy, with mitigating measures implemented, must be allowed in order to accommodate mineral exploration and production equipment. Existing powerline and telephone cable must be maintained as specified in special use permits.

3. Are improvements in the area being affected by the forces of nature rather than by humans, and are they disappearing or muted?

The county road, 4.9 miles of aerial transmission lines, and 4.4 miles of oil and gas transmission lines are being maintained for long-term service.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the past 10 years?

No. Approximately 3,435 acres, or 52 percent of the analysis area, is in stands less than 10 years old.

5. Does the analysis area contain less than 1/2 mile of improved road for each 1,000 acres?

No.

6. Are all existing roads under Forest Service jurisdiction?

Yes. Approximately 11 miles of Forest Service (FS) roads are maintained cooperatively with the county. An additional 4.2 miles of roads are on easements and is maintained privately or by the county.

Evaluation of Potential Wilderness

Capability.

Does the analysis area have the basic characteristics that would make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the analysis area provide the opportunity for solitude and serenity?

The analysis area provides limited opportunities for solitude and serenity. Activities on private land and associated roads are visible from several locations. Vehicle noise may be heard from any of the roads that traverse the analysis area and from the perimeter roads. Recreation Opportunity Spectrum (ROS) for the entire analysis area is roaded-natural.

Challenge.

Does the analysis area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

The analysis area offers few opportunities for these experiences, and the experiences offered are similar to those available in the Little Lake Creek Wilderness. The existing road system makes access reasonably easy. The analysis area has some rolling terrain variation. The largest stream in the analysis area, Boswell Creek, could offer the visitor limited opportunity for excitement, initiative, or self-reliance.

Outdoor recreation opportunities.

Describe the analysis area's capability for providing primitive and unconfined types of recreation including:

a. Camping: Several locations are suitable for primitive camping.

b. Hunting: Hunting for some small and large game species is readily available.

c. Fishing: None. The limited stream flow is inadequate to support consistent fishing opportunities.

d. Canoeing: None. The streams are too small for canoeing.

e. Boating: None.

f. River rafting: None.

g. Backpacking: The Lone Star Hiking Trail traverses the analysis area and provides several miles of hiking opportunities.

h. Hiking: Same as for backpacking.

i. Riding: Horseback riding opportunities do exist, but there are no developed equestrian trails.

j. Photography: Good opportunities exist for close-up photography. There are no opportunities for panoramic or scenic shots.

Special Features.

1. What is the area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

The analysis area provides opportunities for education and study in subjects such as biology and dispersed recreation. Forestry teachers have conducted class exercises in the analysis area.

2. Is there an abundant and varied wildlife population?

A variety of game and nongame species occur in the analysis area. Species are typical of those occurring in forests of the southern Coastal Plain.

Manageability.

1. What are the characteristics of the surrounding area including ROS classification, adopted VQO, and present and planned uses?

The ROS is roaded natural. The Visual Quality Objective (VQO) is modification. Under the 1987 Forest Plan, future land use is to be multiple use.

2. Do boundary locations conflict with important existing or potential public uses outside the boundary that might result in demands to allow nonconforming structures or activities or both in the wilderness?

Even though development may occur on private land around and near the boundary, encroachments are not expected to be a serious problem. The biggest concern is the possibility that inholdings might be subdivided. Subdivision of inholdings would reduce wilderness values.

3. Is it possible to readily and accurately describe, establish, and recognize boundaries on the ground?

Yes. The current National Forest boundary is marked.

4. Do boundaries, conform with terrain or other features that constitute a barrier to prohibited use?

Generally, no. Forest Service Road 206 runs along the east boundary for about five miles and constitutes a barrier to some prohibited uses.

5. Do boundaries, to the extent practicable, shield to protect the wilderness environment inside the boundary from the sights and sounds of civilization?

No. Inholdings in the center of the analysis area are sources of sights and sounds of civilization detectable throughout much of the analysis area.

6. Do boundaries provide adequate opportunity for access and traveler transfer facilities?

Yes.

Availability.

1. Describe other (nonwilderness) resource demands and uses. What current uses exist?

a. Recreation: Hunting is currently the dominant use, while horseback riding and hiking are less popular. These activities would be compatible with wilderness.

b. Information on wildlife species, populations, and management needs: The analysis area supports various game and nongame species commonly in forests of the southern Coastal Plain.

c. Water availability and use: There is no source of potable water. Water is readily available for wildlife.

d. Livestock operations: None.

e. Timber: The analysis area is presently included in the Forest's base of land suited for timber management. Loblolly pine forest predominates, and pine-hardwood forest occurs along streams. Approximately 72 percent of the analysis area is in loblolly pine, 90 percent is in shortleaf pine, and 19 percent is in white oak, red oak, or hickory types. Site indices generally run from 80 to 100 for the pines and hardwoods.

f. Minerals: Rights to minerals on all but 42 acres are owned privately. There has been no exploration or development for surface or subsurface minerals.

g. Cultural resources: Some of the analysis area has potential for the presence of archeological or historical or both (historic properties).

The National Forests and Grasslands in Texas are charged with the protection and management of these valuable historic properties by law and regulation.

h. Authorized and potential land uses: Sam Houston Electric Company and Southwestern Bell Telephone Company have permits to provide services to residents along FS 223.

i. Management considerations including fire, insects and diseases, and presence of non-Federal lands: Because the analysis area has been protected from wildfire and because fire suppression efforts have been successful, there is a possibility of a fuel build-up. However, a schedule of prescribed burning has helped to control the fuel loading and reduce the fire danger.

Southern pine beetle (SPB) may infest pines in the analysis area if the trees are stressed or damaged.

There are private inholdings within this area.

2. What outputs are currently produced or could be produced in the future?

Dispersed recreational use, primarily hunting, hiking, and fishing, should continue at the present low to moderate level.

The analysis area is expected to produce timber. Any decline in the acreage available for timber harvesting will result in a decline in timber production on the Forest.

Mineral rights are mostly outstanding and reserved, and potential future exploration is controlled by the company owning the rights.

3. Is the analysis area located in such a way that the need for increased water production or additional onsite storage or both is so vital that installation or maintenance of improvements is an obvious and inevitable public necessity?

No.

4. Would wilderness designation seriously restrict or prevent the application of wildlife management measures of considerable magnitude and importance?

No. Management activities to increase populations of game species such as wild turkey would not be possible, but failure to implement such projects would not significantly impair existing populations or habitat viability.

5. Is it a highly mineralized area of such strategic or economic importance and extent that restrictions or controls due to wilderness designation would not be in the public interest?

No. The potential for oil and gas exploration and development is high. Owners of private mineral rights would likely want compensation if exploration could not occur.

6. Does the area contain natural phenomena of such unique or outstanding nature that general public access and special development to facilitate public enjoyment should be available?

No.

7. Is the land needed to meet clearly documented resource demands such as demands for timber, mineral production, or developed recreation?

Yes. The current Forest Plan designates the analysis area as part of the timber management land base.

8. Is the land committed through contractual agreements for use, purposes, or activities not in concert with wilderness requirements?

Yes. Rights to minerals on all but 42 acres are owned privately.

Need.

Other wildernesses.

1. What are the locations, sizes, and types of other wildernesses in the general vicinity?

The National Wilderness Preservation System includes 84,012 acres of designated wilderness in the State of Texas, and additional wilderness in nearby States. See Table 1 (found in the Introduction to the Evaluation of Roadless Areas) for more information about wilderness areas in Texas.

2. How far is it to the closest existing wilderness?

The Little Lake Creek Wilderness (3,810 acres) is approximately 20 miles southwest from the analysis area. It is north of Montgomery, Texas, and west of FM 149.

3. What level of use currently exists in near-by existing wilderness? What trends exist in the use of these areas?

Little Lake Creek wilderness had an estimated 500 recreation visitor days in 1991. A small increase in wilderness use is expected over the next 10 to 20 years.

4. Is the population in and around these areas increasing or decreasing? How quickly is it increasing or decreasing?

The populations of Dallas and Houston grew 27 percent and 17 percent respectively, from 1980 to 1987. The analysis area is about 60 miles from Houston and 225 miles from Dallas.

The combined population of Montgomery and Walker Counties increased from about 135,000 in 1980 to about 180,000 in 1988.

Nonwilderness lands.

Are there opportunities for unconfined and primitive recreation on nonwilderness areas in the vicinity? If so, where?

Many areas in the Sam Houston National Forest and the Little Lake Creek Wilderness are available to the public for primitive recreation. The Raven Ranger District of Sam Houston National Forest has 102,000 acres of land that provides opportunities for primitive recreation.

Habitat needs.

1. Are there any biotic species in the area that are directly competing with increasing public use and development?

No. No sensitive plant species are known to occur in the analysis area.

2. Could their needs be provided for through means other than wilderness designation?

Not applicable.

3. Is there a need to provide a sanctuary for biotic species that cannot survive in less than primitive surroundings?

No. Through conscientious vegetation management and mitigation of disturbances to protected sites, suitable habitat can be maintained for all species.

Landform and ecosystem preservation.

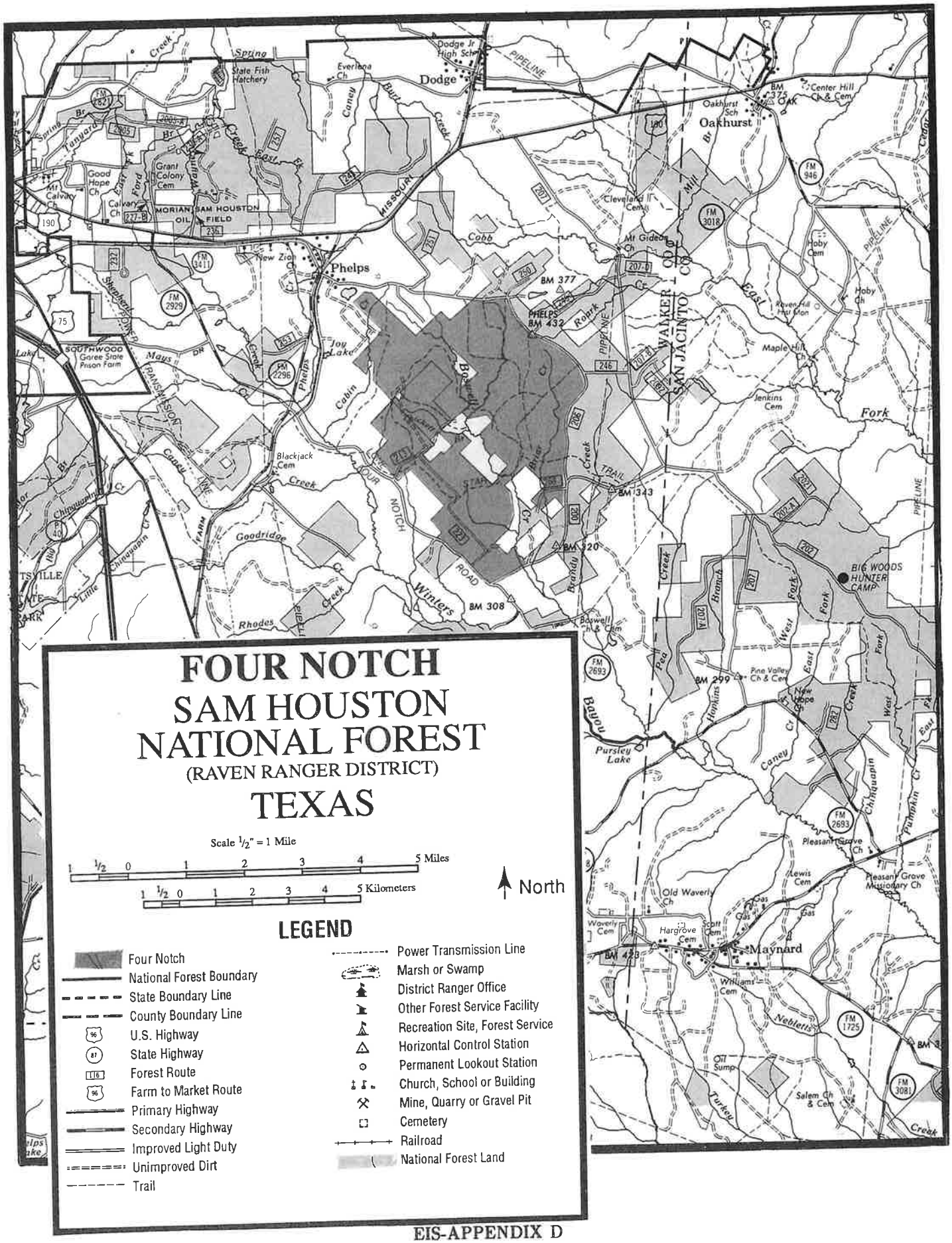
1. What is the analysis area's landform type based on the Region 8 Soil Resource Inventory (R-8 1972)? Does the area represent a unique landform type that is not represented in any wilderness areas in the general vicinity?

Most of the analysis area is on the southern Gulf Coastal Plain, and a very small acreage is in the Texas Blackland Prairies.

2. What is the analysis area's ecosystem classification? Does the area represent a unique ecosystem that is not represented in any existing wilderness areas in the general vicinity?

The analysis area is classified as a Southern Gulf Coastal Plain Forest. This same ecosystem occurs in existing wilderness areas in Texas.

Figure 1 - Four Notch



Graham Creek
Angelina National Forest
Angelina Ranger District

Roadless Area Review and Evaluation

Description of Analysis Area

Roadless area name and number of acres.

GRAHAM CREEK: Approximately 1,280 acres.

Location and vicinity.

The analysis area is located in the southern portion of the Angelina National Forest. The analysis area consists of eight separate parcels of land adjacent to Upland Island Wilderness. These parcels are discussed separately as necessary. The parcels are:

Area 1	Cypress Creek Unit 1	8 acres
Area 2	Rueda Unit	41 acres
Area 3	Graham Creek Unit	2 acres
Area 4	Cypress Creek Unit 2	5 acres
Area 5	Martin Unit	127 acres
Area 6	Marshall Unit	106 acres
Area 7	Bouton Unit	51 acres
Area 8	Green Creek Unit	940 acres

Area 1 is located along the western boundary of Upland Island Wilderness, on Forest Service (FS) 302. Area 2 is just south of Area 1, also along the western boundary of Upland Island Wilderness. Area 3 lies just south of County Road 4-5, along the western boundary of Upland Island Wilderness. Area 4 also lies along the wilderness boundary, and is south of County Road 4-5 and southeast of Area 3. Area 5 lies along the western boundary of Upland Island Wilderness, south of Areas 1 through 4. Area 6 lies along the southern boundary of Upland Island Wilderness, east of Area 5. Area 7 lies south of FS 314, along the southeastern boundary of Upland Island Wilderness. Area 8 lies along the eastern boundary of Upland Island Wilderness, just east of FS 303. Refer to the attached map for locations of these areas.

Describe access to the analysis area, including roads and trails leading to the area.

Primary access to Areas 1 through 5 is from U.S. Highway 69, south of Zavalla, Texas. Area 1 can be accessed by FS 302. Areas 2, 3, and 4 can be accessed from Angelina County Road 4-5, south of FS 302. Area 5 lies just east of U.S. 69 and north of FS 314 and can be accessed by FS 314. Areas 6 and 7 lie south along FS 314 and can be accessed from FS 314 or from FS 303 along the eastern boundary of Upland Island Wilderness. Area 8 lies along FS 303, east of Upland Island Wilderness. Access to areas 6, 7, and 8 is possible by State Highway (SH) 63, north of Upland Island Wilderness and east of Zavalla, Texas.

General description of the analysis area's geology.

The analysis area is in the western Gulf Coastal Plain and is underlain by the Whitsett and Manning geologic formations and recent fluviatile terrace deposits. The Manning and Whitsett formations are 36 to 58 million years old and consist of clays, quartz sands, lignite, glauconite, and an abundance of fossil wood. Soil series associated with these formations are Koury, Kisatchie, Diboll-Fuller, and Rayburn-Corrigan.

General description of the analysis area's topography.

This part of the western Gulf Coastal Plain consists primarily of road floodplains and stream terraces. The stream terraces are characterized by hummocky surfaces on which the mounds are 2 to 3 feet higher than the depressions. There are minor areas of gently sloping ridgetops, side slopes, and concave foot slopes.

General description of the analysis area's vegetation, including the ecosystem type.

The eight areas are almost entirely covered with vegetation of the loblolly pine forest type, which occurs intermittently along the Atlantic Coastal Plains. Loblolly pine is dominant. Other pine species and some hardwoods have intruded as a result of changing fire patterns and extensive logging. Principal hardwood species include water oak, willow oak, swamp chestnut oak, southern red oak, water tupelo, sweetbay magnolia, blackgum, dogwood, and sweetgum. Associated plant communities include the Texas Natural Heritage Program (TNHP) Loblolly Pine-Oak, Sphagnum-Beakrush, Sweetbay Magnolia, Baldcypress-Water Tupelo, Swamp Chestnut Oak-Willow Oak, Water Oak-Willow Oak, and Longleaf pine-Little Bluestem Series. In general, pine is dominant on the uplands, while bottomland hardwoods are intermixed with pine along river bottoms and streams.

Key attractions, if any, including sensitive wildlife and scenic landmarks.

The eight areas are adjacent to the Upland Island Wilderness and portions of the Neches River bottom. They present recreational and history study opportunities. Bouton Lake campground lies southeast of Area 7 and is the trailhead for the Sawmill Hiking Trail. The Sawmill Hiking Trail is 5-1/2 miles long and leads to the Old Aldridge Sawmill ruins, the Neches River bottom, and Boykin Springs Recreation Area. The eight areas are near the Caney Creek, Boykin Springs, and Sandy Creek National Forest Campgrounds. Visitors use each of there campgrounds year-round. Portions of Area 8 have been identified by the THNP as supporting a unique plant community. The Big and Green Creek Bottoms of Area 8 represent an intact example of southern scenic bottomland and support diversity of trees and herbaceous plants.

Area Inventory

Human influence.

1. To what degree have humans and past and present human activity affected natural ecological processes and conditions?

Acquisition of the National Forests in Texas was primarily under the authority of the Weeks Act. These lands were acquired from private landowners during the 1930's and early 1940's. Significant portions of these lands were acquired from timber companies. Most of the analysis area had been cut-over heavily. Some of the analysis area was replanted by the Civilian Conservation Corps (CCC) in the late 1930's.

Sam Rayburn Reservoir was completed in 1966. This 114,500-acre lake is under the jurisdiction of the U.S. Army Corps of Engineers and is located to the northeast of the analysis area.

Natural ecological processes and conditions have been disturbed by human activity. Major disturbances occurred during the early 1900's, when the analysis area was logged heavily. Other disturbances include numerous more recent timber harvests, road construction, special uses (grazing, powerlines, pipelines, etc.), borrow pits, and small parking lots for Upland Island Wilderness.

2. To what degree is the analysis area natural or natural appearing and free from disturbance?

Several locations exhibit evidence of activities that took place during the early 1900's. Portions of an extensive tram system that supported early logging activities still remain. Evidence of the tramways is visible, but the tramways are gradually becoming more natural in appearance.

Area 6 contains one red-cockaded woodpecker (RCW) colony, which is currently inactive. Under current court orders, a 1,200-meter habitat zone and a 200-foot colony boundary are managed for RCW habitat. This management includes thinning, frequent burning, and control within the RCW colony and recruitment stands. Areas 6 and 7, containing approximately 157 acres, are within 1,200-meter RCW habitat zone.

The CCC's replanted several locations with slash pine during the early 1930's. Slash pine is not native to the region, and the areas planted will eventually be converted to longleaf pine. Areas 2, 5, 6, and 7 have been burned by prescribed fire within the last five years and some wildfires do occur. Most wildfires are man-caused and are extinguished quickly. Several special uses have been permitted. Some of these (such as roads, overhead powerlines and pipelines) are unnatural in appearance. (See Table 1).

Areas 1, 4, 6, and 8 have graveled parking lots ranging from 1/10 acre to 1/2 acre in size. These parking lots serve the needs of visitors who utilize Upland Island Wilderness for recreational activities such as hunting, camping, horseback riding, and hiking. There is also a borrow pit along the southern boundary of Area 7.

Area 5 is bordered on the east by an active railroad owned and operated by the Texas and New Orleans Railroad. However, this railroad is not used on a daily basis. Area 5 also contains an outstanding right-of-way owned by Lion Oil Company for the transport of oil from Beaumont, Texas to Longview, Texas.

3. If the analysis area's ecological processes or natural appearance or both have been altered by past or present human activity, is the land regaining a natural, untrammeled appearance?

Some of the analysis area has regained a natural appearance, but the presence of roads and active timber management make human activity evident. There is an extensively used road system, and there are several regeneration areas. There are some old roads and haul roads, but these are becoming overgrown and are visible only to the keen observer. The old tram system for transporting timber is also becoming overgrown. Several locations that support unique plant communities display a natural appearance.

4. Does the existing or attainable National Forest System ownership pattern, both surface and subsurface, ensure perpetuation of identified wilderness values?

No. Mineral rights to 685 acres (see Table 1) within the analysis area are owned privately. The Forest Service retains mineral rights on

approximately 595 acres of land in Area 8. The U.S. Forest Service is obligated to allow surface occupancy for exploration and production activities, with mitigation, on areas where minerals are owned privately and where government-owned minerals are leased. Therefore, perpetuation of wilderness values cannot be ensured.

5. Is more than 15 percent of the analysis area in nonnative vegetation?

No. Approximately 53 acres, or 4 percent of the analysis area is planted to slash pine, a nonnative species. Current plans call for conversion of the slash pine acreage to longleaf pine, which is native to the area.

Improvements, structures, and nonconforming uses.

1. Are any of the following types of areas, features, or nonconforming uses present?

a. Airstrips or heliports: No.

b. Electronic installations: Areas 3, 4, 6, 7, and 8 contain powerlines that are permitted as special uses and listed in Table 2.

c. Areas displaying evidence of historic mining at least 50 years old. (Do not include areas of significant current mineral activity): Yes. There are several gravel pits or borrow pits (or both) in the analysis area. These are becoming overgrown with timber.

d. Areas under current mineral leases that contain "no surface occupancy" stipulations: No.

e. Areas under current mineral lease where the lessee has not exercised development and occupancy rights: Yes. Area 8 contains one such area. The lease (number 86835) belongs to Caddis Resources, Inc. and will expire in 1996.

f. Recreation improvements, such as occupancy spots or minor hunting or outfitter camps: The analysis area receives some dispersed recreational use by horseback riders and hunters who camp in the area. There are no developed campsites, but there are wilderness parking lots in Areas 1, 4, 6, and 8.

g. Timber harvest areas where logging and prior road construction are or are not evident: There are approximately 33 acres of regeneration currently less than 10 years old. There are old timber haul roads and skid trails throughout the analysis area. These are overgrown but are somewhat evident on a few sites. There were once tramways throughout the analysis area; these were used to transport timber to various sawmills during the early 1900's.

h. Cultural treatments involving plantations or plantings: Approximately 157 acres of the analysis area are within 1,200-meter RCW habitat zones. These areas are being thinned according to a cour decision regarding the management of the RCW habitat in the National Forests in Texas. All mid-story hardwoods and midstory nonmerchantable pines are also being removed within the 200-foot colony boundaries.

i. Private inholdings in the area: No.

j. Dwellings on private inholdings: No.

k. Nonconforming structures and improvements: Yes. These include a variety of special uses which are detailed in Table 2. There are also approximately 5.43 miles of inventoried roads, which include Forest Service, State, and county roads.

Lion Oil Company owns a right-of-way through Area 5 and maintains an oil pipeline on that right-of-way. This pipeline was in place before the Forest Service acquired the land and is not subject to mitigation. There is also an active railroad along the analysis area's eastern boundary. This railroad is on a privately owned right-of-way between Area 5 and the boundary with Upland Island Wilderness.

There are also parking lots in Areas 1, 4, 6, and 8. These parking lots are utilized by visitors to Upland Island Wilderness and other places in the National Forest.

l. Ground-return telephone lines: There is an estimated 3.39 miles of buried telephone lines in the analysis area. There are no pay phone lines in the analysis area. The telephone permittees are listed in Table 2.

m. Watershed treatment areas: No.

n. Roads: There are 2.87 miles of improved graveled Forest Service roads in use within this analysis area. Of this, 0.5 miles of road are under special use permit for access to a private dwelling. There are 2.56 miles of road under county jurisdiction. There are also some old woods roads and haul roads; these are overgrown and are visible only to the keen observer.

2. Can existing nonconforming uses be mitigated effectively or terminated through removal or rapid natural deterioration?

Approximately 2.87 miles of Forest Service roads are in use within the analysis area. Overgrown woods roads and old haul roads that are no longer in use or maintained could be closed if this were necessary to promote wilderness management. However, there are several county roads

that could not be closed or mitigated, and FS 314 and FS 303 are access roads for several adjacent private landholders. Lion Oil Company has a right-of-way, and there are privately owned and leased minenal rights that cannot be controlled unless purchased by the United States. Special uses that are permitted must be maintained if they are to continue their service.

3. Are improvements in the analysis area being affected by the forces of nature rather than by humans, and are they disappearing or muted?

All inventoried roads are being maintained for long-term service. Other permanent improvements, including special uses, are also maintained for long-term use.

4. If there are timber harvest areas, has less than 20 percent of the analysis area been harvested within the past 10 years?

Yes. There are approximately 33 acres in regeneration in the 0-to 10-years age class. This acreage accounts for about three percent of the total area.

5. Does the analysis area contain less than 1/2 mile of improved road for each 1,000 acres?

No. There are approximately 5.38 miles of improved roads and 0.5 miles of access road to a private dwelling in the analysis area (4.20 miles/1,000 acres). Both Forest Service and county roads are present.

Only 2.56 miles of the 5.38 miles of road are under county jurisdiction (2 miles/1,000 acres). Forest Service (FS) 302, FS 314, and FS 303 provide access to several parcels of private land adjacent to the analysis area.

Roads that must be kept open if the analysis area is designated as wilderness are 2.56 miles of county roads, FS 302, FS 314, FS 303, and 0.5 miles of unimproved access road to a private dwelling.

6. Are all existing roads under Forest Service jurisdiction?

No. Approximately 2.56 miles of road are under the jurisdiction of Jasper County or Angelina County.

Evaluation of Potential Wilderness

Capability.

Does the analysis area have the basic characteristics that make it suitable for wilderness designation without regard to its availability for or need as wilderness? Consider the following characteristics in analyzing the quality of the wilderness resource. If these characteristics are determined to be important, describe and refer to them.

Experimental benefits.

Does the analysis area provide the opportunity for solitude and serenity?

The analysis area presents few opportunities for solitude and serenity. Forest Service roads and activities on private land are visible from many areas. Some recreational activities, such as camping and All Terrain Vehicles (ATV) use, can cause noise that could disturb solitude and serenity.

Challenge.

Does the analysis area offer visitors the opportunity to experience adventure, excitement, challenge, initiative, or self-reliance? Is access easy or difficult?

Existing Forest Service, State, and county roads make access to all of the analysis area reasonably easy. The analysis area's terrain is relatively flat with some low elevation ridges. The analysis area is adjacent to Upland Island Wilderness, which could offer casual and novice opportunities to experience challenge, excitement, and self-reliance. Sam Rayburn Reservoir and the Neches River are close to the analysis area, and may also offer opportunities for excitement, initiative, or self-reliance. Campgrounds and hiking trails near the analysis area offer various opportunities for adventure and challenge.

Outdoor recreation opportunities.

Describe the analysis area's capability for providing primitive and unconfined types of recreation including:

a. Camping: Numerous locations are suitable for primitive camping. Three developed recreation areas (Caney Creek, Sandy Creek, and Boykin Springs) are within 10 miles of the analysis area. Bouton Lake is a primitive campground and is located approximately two miles southeast of Area 7.

b. Hunting: Small and large game species occur in the analysis area and can be hunted there.

c. Fishing: Sam Rayburn Reservoir is within 10 miles of the analysis area and offers excellent fishing opportunities. The nearby Angelina and Neches Rivers also offer fishing opportunities.

d. Canoeing: Although the Neches and Angelina Rivers are not adjacent to any of the eight areas within the Graham Creek analysis area, both are within a reasonable distance and provide adequate

flows for enjoyable float trips. It is also possible to canoe on Sam Rayburn Reservoir, which is close to the analysis area.

e. Boating: No opportunities exist on the analysis areas, but Sam Rayburn Reservoir is near and provides excellent boating opportunities.

f. River rafting: There are no river rafting opportunities in the analysis area.

g. Backpacking: Some opportunities for backpacking are available, but there are no developed trails within the analysis area.

h. Hiking: Same as for backpacking.

i. Riding: Horseback riding opportunities do exist. Riders use parking lots in Areas 1, 4, 6, and 8 in Upland Island Wilderness and on adjacent Forest Service land.

j. Photography: Good opportunities exist.

Special Features.

1. What is the analysis area's capability to provide outdoor education and scientific study, both formal and informal, in a manner compatible with wilderness?

The analysis area offers opportunities for education and study in geology, archeology, biology, and dispersed recreation.

2. Is there an abundant and varied wildlife population?

Game and nongame animals that are typical of pine-hardwood forests in the eastern Coastal Plains are relatively abundant in the analysis area. Accurate population figures are not available for many species, although squirrel and deer populations are good. The analysis area does contain one inactive red-cockaded woodpecker (RCW) cluster site (in Area 6). The RCW listed on the Federal list of endangered species and is protected under the Endangered Species Act.

Manageability.

1. What are the characteristics of the surrounding area, including its ROS classification, adopted VQO, and present and planned uses?

The Recreation Opportunity Spectrum (ROS) on the majority of the analysis area is Roaded Natural (RN). For the most part, the Visual