Appendix A

Project Area Watershed Descriptions

Appendix A. Project area watershed number, name, acreage, and ownership.

HUC No.	HUC Name	Total (Ac.)	USFS (Ac.)	Non-USFS (Ac.)	USFS (%)	Non-USFS (%)
111401010507	Coffee Mill Creek	25436	4321	21114	17	83
111401010508	Bois d'Arc Creek-Red River	37981	8865	29115	23	77
120100040104	Beauchamp Creek-Tenaha Creek	30409	6675	23734	22	78
120100040205	Caney Branch-Flat Fork Creek	16265	5998	10267	37	63
120100040307	Styles Creek-Toledo Bend Reservoir	24521	1692	22829	7	93
120100040701	Lick Creek-Patroon Bayou	37349	4531	32818	12	88
120100040702	Bull Bay Creek-Patroon Bayou	36306	9031	27276	25	75
120100040703	Reeves Creek-Patroon Bayou	20950	3559	17390	17	83
120100040801	Grannies Creek-Toledo Bend Reservoir	37749	6266	31483	17	83
120100040802	Blue Bayou	13338	5462	7876	41	59
120100040803	Bayou Siep	27919	11607	16312	42	58
120100040805	McGrue Creek-Toledo Bend Reservoir	26844	8526	18318	32	68
120100040806	Martinez Bayou-Toledo Bend Reservoir	24565	7783	16782	32	68
120100040901	Tiger Creek-Palo Gaucho Bayou	26640	1668	24972	6	94
120100040904	Boregas Creek-Palo Gaucho Bayou	18534	932	17602	5	95
120100040905	Hines Creek-Palo Gaucho Bayou	20596	4231	16366	21	79
120100041002	Carrice Creek-Toledo Bend Reservoir	28592	5154	23438	18	82
120100041003	Watts Creek-Housen Bayou	33028	3748	29280	11	89
120100041004	Hurricane Bayou-Housen Bayou	27702	14420	13282	52	48
120100041005	Yocum Creek-Toledo Bend Reservoir	36637	3217	33420	9	91
120100041101	Big Sandy Creek	25980	5942	20038	23	77
120100041102	South Prong Creek-Toledo Bend Reservoir	20020	4385	15635	22	78
120100041103	Sixmile Creek	38669	23840	14830	62	38
120100041104	Mill Creek-Toledo Bend Reservoir	22126	1786	20340	8	92
120100041106	South Prong Indian Creek-Toledo Bend Reservoir	16936	2622	14314	15	85

120200010702	Silver Creek-San Pedro Creek	28972	3226	25746	11	89
120200010703	Butler Branch-San Pedro Creek	18330	3517	14813	19	81
120200020101	Snady Creek-Neches River	40822	8390	32432	21	79
120200020102	Rosy Bayou-Hickory Creek	39389	6990	32399	18	82
120200020103	Whiteley Creek-Hickory Creek	18714	11696	7018	62	38
120200020104	Sikes Creek-Neches River	13949	4764	9185	34	66
120200020106	Conner Creek-Devils Bayou	33787	3352	30435	10	90
120200020202	South Fork Cochino Bayou	31990	13169	18822	41	59
120200020203	Hager Creek-Cochino Bayou	27286	14438	12848	53	47
120200020206	North Fork Cedar Creek	20107	1013	19094	5	95
120200020303	Hackberry Creek	18305	6096	12210	33	67
120200020304	North Creek-Alabama Creek	24186	11094	13092	46	54
120200020305	Lancaster Creek-Alabama Creek	15671	5084	10588	32	68
120200020306	White Oak Creek-Neches River	26437	4873	21564	18	82
120200020401	Lynch Creek-Piney Creek	27845	17791	10054	64	36
120200020402	Mossy Creek-Piney Creek	34491	13079	21412	38	62
120200020403	Kemper Creek-Caney Creek	27155	14377	12778	53	47
120200020505	Dry Creek-Shawnee Creek	25901	1434	24468	6	94
120200030102	Graham Creek	22241	9838	12402	44	56
120200030103	Sugar Creek-Neches River	30473	1696	28777	6	94
120200030104	Big Creek-Neches River	17430	13736	3694	79	21
120200030105	Shearwood Creek-Neches River	26673	8395	18278	31	69
120200040705	Bonaldo Creek-Angelina River	27671	2537	25134	9	91
120200050103	Red Branch-Angelina River	11259	1989	9270	18	82
120200050105	Tom Creek-Angelina River	16526	2766	13760	17	83
120200050107	Anderson Creek-Angelina River	24844	1723	23121	7	93
120200050501	Polysot Creek-Attoyac River	29494	2044	27450	7	93
120200050502	Brushy Creek-Angelina River	38554	9469	29085	25	75
120200050503	Prairie Creek-Angelina River	26055	6581	19474	25	75
120200050603	Stanley Creek-Angelina River	35727	3500	32227	10	90

120200050604	Pophers Creek-Angelina River	25942	10461	15480	40	60
120200050702	Caney Creek-Ayish Bayou	31875	7993	23882	25	75
120200050703	Chinquapin Creek	19657	2389	17268	12	88
120200050704	Sandy Creek-Ayish Bayou	11138	6421	4717	58	42
120200050801	Copelle Creek-Angelina River	11954	1418	10536	12	88
120200050802	Couchatana Creek-Angelina River	13057	1303	11754	10	90
120200050805	Pomponaugh Creek	10290	2246	8043	22	78
120200050806	Devils Ford Creek	11257	6743	4515	60	40
120200050807	Rock Creek-McKim Creek	16745	1886	14859	11	89
120200050808	Johnson Creek-Angelina River	10087	1488	8600	15	85
120200050901	Harvey Creek	24722	11823	12899	48	52
120200050902	Lucas Creek-Angelina River	24375	13606	10769	56	44
120200050903	Parker Creek-Angelina River	30237	18814	11423	62	38
120200050904	Norris Creek-Angelina River	29720	14391	15329	48	52
120200051001	Beef Creek-Angelina River	34817	10843	23974	31	69
120301010507	Lower Brushy Creek	21929	2862	19067	13	87
120301010510	Briar Branch-Big Sandy Creek	28733	4271	24462	15	85
120301040104	Panther Creek-Denton Creek	27774	7778	19996	28	72
120301040201	Black Creek-Denton Creek	20507	2218	18289	11	89
120302020701	Lake Creek-White Rock Creek	35298	10337	24961	29	71
120302020703	Upper Little White Rock Creek	22555	2134	20421	9	91
120302020705	Dickey Creek-White Rock Creek	40592	2167	38425	5	95
120302020805	Harmon Creek	35953	5072	30882	14	86
120302021201	Little Creek-Big Creek	25075	8474	16602	34	66
120401010103	West Sandy Creek	27472	4283	23189	16	84
120401010201	East Sandy Creek	15434	2148	13286	14	86
120401010202	McDonald Creek-West Fork San Jacinto River	36356	18490	17867	51	49
120401010203	Caney Creek	25876	20201	5675	78	22
120401010204	Hostetter Creek-Conroe Lake	39115	17637	21479	45	55
120401010205	Little Lake Creek-Conroe Lake	31538	9437	22101	30	70

120401010303	Kidhaw Branch-Lake Creek	23482	4884	18597	21	79
120401030108	Jayhawker Creek	14800	2746	12053	19	81
120401030201	Upper Tarkington Bayou	35542	11562	23980	33	67
120401030301	Boswell Creek	15116	8540	6576	56	44
120401030302	Gourd Creek-Winters Bayou	39413	6315	33098	16	84
120401030303	Hopkins Branch-Winters Bayou	35639	7175	28464	20	80
120401030304	Nebletts Creek-Winters Bayou	19212	7203	12009	37	63
120401030305	Cobb Creek-East Fork San Jacinto River	30628	6963	23665	23	77
120401030306	McCombs Creek-East Fork San Jacinto River	10997	722	10275	7	93
120401030307	Miller Creek-East Fork San Jacinto River	29910	5319	24591	18	82
120401030308	Oil Creek-East Fork San Jacinto	20807	11390	9416	55	45
120401030401	Whiskey Branch-East Fork San Jancito River	27916	1825	26092	7	93

Appendix B

Project Area Soils Descriptions

Appendix B. Project area soils and acreages.

Soil Name	**Acres**
Alazan fine sandy loam, 0 to 2 % slopes	1,657
Alazan very fine sandy loam, 0 to 2 % slopes	5,715
Alazan very fine sandy loam, 0 to 4 % slopes	13,680
Alazan-Besner complex, 0 to 1 % slopes, mounded	2,571
Alazan-Besner complex, 0 to 2 % slopes	8,287
Alazan-Besner complex, gently undulating	2,461
Alto clay loam, 1 to 3 % slopes	267
Alto fine sandy loam, 1 to 3 % slopes	142
Angelina soils, frequently flooded	158
Angie fine sandy loam	257
Annona association, gently rolling	10,730
Annona association, gently undulating	18,509
Annona loam, 1 to 3 % slopes	76
Anocon loam, 2 to 5 % slopes	272
Arents, loamy	0
Aris loam, heavy substratum	442
Attoyac fine sandy loam	0
Attoyac fine sandy loam, 0 to 3 % slopes	112
Attoyac fine sandy loam, 0 to 4 % slopes	3,819
Attoyac fine sandy loam, 0 to 5 % slopes	201
Attoyac fine sandy loam, 1 to 3 % slopes	1,240
Attoyac fine sandy loam, 8 to 15 % slopes	350
Aubrey fine sandy loam, 8 to 20 % slopes	293
Austin silty clay loam, 1 to 3 % slopes	28
Austonio fine sandy loam, 1 to 3 % slopes	275
Austonio fine sandy loam, 5 to 12 % slopes	2,023
Austonio fine sandy loam, 5 to 15 % slopes	554
Balsora silt loam, frequently flooded	2,226
Balsora silt loam, occasionally flooded	1,090

Balsora silty clay, frequently flooded	203
Bastsil fine sandy loam, 0 to 3 % slopes	2,723
Bastsil loamy fine sand, 0 to 3 % slopes	2,374
Belk clay, rarely flooded	22
Benklin silt loam, 0 to 1 % slopes	538
Bernaldo fine sandy loam, 0 to 3 % slopes	8,222
Bernaldo fine sandy loam, 1 to 3 % slopes	1,665
Bernaldo fine sandy loam, 3 to 8 % slopes	24
Bernaldo-Besner complex	2,353
Bernaldo-Besner complex, 0 to 2 % slopes	755
Bernaldo-Besner complex, gently undulating	3,714
Besner fine sandy loam, 0 to 2 % slopes	1,237
Besner fine sandy loam, 0 to 3 % slopes	936
Besner-Mollville complex, gently undulating	967
Betis fine sand, 0 to 5 % slopes	2,481
Betis fine sand, 5 to 12 % slopes	619
Betis loamy fine sand	494
Betis loamy fine sand, 0 to 8 % slopes	920
Betis loamy fine sand, 1 to 5 % slopes	668
Bibb soils, frequently flooded	4,333
Bienville loamy fine sand, 0 to 3 % slopes	1,787
Bienville loamy fine sand, 0 to 5 % slopes	31
Bienville loamy fine sand, 1 to 5 % slopes	148
Bienville loamy fine sand, nearly level	0
Bienville-Alaga association, gently undulating	1,743
Blanket clay loam, 1 to 3 % slopes	122
Bleiblerville clay	959
Bolar clay loam, 1 to 3 % slopes	17
Bolar clay loam, 3 to 5 % slopes	26
Bolar-Aledo complex, 3 to 20 % slopes	1
Bonti fine sandy loam, 2 to 5 % slopes	144
Bonti-Exray complex, stony, 1 to 8 % slopes	195

Bowie fine sandy loam, 1 to 3 % slopes	2,681
Bowie fine sandy loam, 1 to 5 % slopes	3,114
Bowie fine sandy loam, 1 to 8 % slopes	320
Boy fine sand	1,138
Boykin loamy fine sand, 1 to 5 % slopes	4,076
Brackett-Aledo complex, 5 to 20 % slopes	1,119
Briley loamy fine sand, 1 to 8 % slopes	164
Browndell fine sandy loam, 2 to 5 % slopes	166
Browndell fine sandy loam, 5 to 15 % slopes	120
Browndell-Rock outcrop complex, sloping	1,095
Bub clay loam, 2 to 5 % slopes	1,293
Burkeville clay, 5 to 15 % slopes	527
Burleson clay	412
Burleson clay, 0 to 1 % slopes	18
Chaney loamy fine sand, 1 to 4 % slopes	6,629
Chireno loam, 0 to 1 % slopes	136
Choates loamy fine sand, 1 to 5 % slopes	4,403
Cisco loamy sand, 1 to 3 % slopes	1,359
Cona very stony sandy loam, 3 to 15 % slopes	5,365
Conroe association, gently undulating	1,153
Conroe gravelly loamy fine sand, 0 to 5 % slopes	2,099
Conroe gravelly loamy fine sand, 1 to 5 % slopes	27,885
Conroe gravelly loamy fine sand, 5 to 8 % slopes	577
Conroe loamy fine sand, 0 to 5 % slopes	4,898
Conroe loamy fine sand, 5 to 12 % slopes	327
Conroe soils	30
Corrigan fine sandy loam, 1 to 5 % slopes	2,675
Corrigan-Rayburn association, gently undulating	5,345
Crockett fine sandy loam, 1 to 3 % slopes	216
Crockett loam, 1 to 3 % slopes	2,998
Crockett loam, 2 to 5 % slopes, eroded	1,857
Crowley fine sandy loam	187

Cuthbert fine sandy loam, 15 to 35 % slopes	4,288
Cuthbert fine sandy loam, 5 to 15 % slopes	29,873
Cuthbert fine sandy loam, 8 to 20 % slopes	5,528
Cuthbert gravelly fine sandy loam, 15 to 35 % slopes, stony	337
Cuthbert gravelly fine sandy loam, 5 to 15 % slopes	3,083
Cuthbert gravelly fine sandy loam, 8 to 20 % slopes	5
Cuthbert soils, 5 to 15 % slopes, graded	4
Cuthbert stony fine sandy loam, 5 to 30 % slopes	98
Dallardsville loamy very fine sand, 0 to 2 % slop es	2,700
Dams	45
Darco loamy fine sand, 1 to 8 % slopes	5,440
Darco loamy fine sand, 8 to 15 % slopes	1,931
Darco loamy fine sand, 8 to 20 % slopes	4
Darco loamy fine sandy, 1 to 8 % slopes	215
Dela loam, frequently flooded	2,390
Dela loam, occasionally flooded	681
Deleon silty clay, frequently flooded	30
Depcor-Huntsburg association, gently undulating	50,959
Depcor-Huntsburg-Gunter association, gently rolling	22,064
Derly silt loam, 0 to 1 % slopes	941
Derly-Raino complex, 0 to 1 % slopes	1,902
Diboll very fine sandy loam, 0 to 1 % slopes	858
Diboll very fine sandy loam, 1 to 4 % slopes	6,821
Doucette loamy fine sand, 1 to 5 % slopes	15,337
Doucette-Boykin association, undulating	3,678
Dreka loam, 0 to 1 % slopes, frequently flooded	7,541
Dreka loam, frequently flooded	5,449
Duffau fine sandy loam, 1 to 3 % slopes	4,208
Duffau fine sandy loam, 2 to 5 % slopes	6
Duffau fine sandy loam, 5 to 8 % slopes	9
Duffau loamy fine sand, 1 to 5 % slopes	1,890
Duffau-Gullied land complex, 3 to 8 % slopes	6,246

Eastwood very fine sandy loam, 1 to 5 % slopes	34,998
Eastwood very fine sandy loam, 5 to 15 % slopes	29,448
Eastwood-Latex complex, 1 to 3 % slopes, mounded	2,350
Ellis clay, 5 to 12 % slopes, eroded	48
Elmina association, gently undulating	22
Elrose fine sandy loam, 1 to 3 % slopes	125
Etoile fine sandy loam, 5 to 15 % slopes	431
Etoile loam, 1 to 3 % slopes	527
Etoile loam, 1 to 5 % slopes	4,539
Etoile loam, 5 to 20 % slopes	1,652
Evadale-Gist complex, gently undulating	490
Fairlie and Dalco soils, 1 to 4 % slopes	7
Fairlie-Dalco complex, 1 to 3 % slopes	371
Falba fine sandy loam, 0 to 1 % slopes	18
Ferris clay, 1 to 5 % slopes	2,244
Ferris clay, 5 to 12 % slopes, eroded	4,227
Ferris clay, gullied	59
Fetzer loamy fine sand, 1 to 5 % slopes	21,724
Fetzer loamy fine sand, 5 to 12 % slopes	11,950
Freestone-Hicota complex, 0 to 2 % slopes	11,096
Freestone-Hicota complex, 0 to 3 % slopes	0
Frio silty clay loam, occasionally flooded	428
Frioton silty clay loam, occasionally flooded	281
Fuller fine sandy loam, 0 to 1 % slopes	4,373
Fuller fine sandy loam, 1 to 3 % slopes	62,290
Fuller fine sandy loam, 1 to 4 % slopes	3,054
Gallime very fine sandy loam, 1 to 3 % slopes	1,167
Gallime-Alazan Complex, 0 to 2 % slopes	1,702
Gallime-Guyton complex, 0 to 2 % slopes	3,378
Gallime-Guyton complex, 0 to 2 % slopes, mounded	1,659
Garner clay	686
Gladewater clay, frequently flooded	1,389

Gowen soils, frequently flooded	1
Gowker and Kanebreak soils, frequently flooded	472
Gowker sandy clay loam, overwash	308
Grapeland fine sand, 1 to 4 % slopes	644
Grapeland loamy fine sand, 1 to 5 % slopes	261
Gunter association, undulating	4,464
Gunter fine sand	266
Guyton silt loam, 0 to 1 % slopes	269
Guyton silt loam, ponded	21
Guyton-Sawtown complex, mounded	2,601
Hainesville fine sand, 0 to 2 % slopes	2,103
Hainesville loamy fine sand, 0 to 2 % slopes	780
Hannahatchee fine sandy loam	0
Hannahatchee fine sandy loam, frequently flooded	741
Hannahatchee loam, 0 to 1 % slopes, occasionally flooded	1,385
Hassee fine sandy loam, 0 to 2 % slopes	1,316
Hatliff loam, frequently flooded	5,287
Heiden clay, 1 to 3 % slopes	348
Heiden-Ferris complex, 2 to 6 % slopes, eroded	1,537
Hensley very stony loam, 1 to 3 % slopes	92
Herty loam, 0 to 1 % slopes	890
Herty loam, 0 to 3 % slopes	2,355
Herty loam, 1 to 3 % slopes	10,531
Herty very fine sandy loam, 0 to 1 % slopes	368
Herty very fine sandy loam, 1 to 5 % slopes	4,866
Hopco silt loam, frequently flooded	594
Hopco silt loam, occasionally flooded	66
Houston Black clay, 1 to 3 % slopes	590
Iuka fine sandy loam, occasionally flooded	1,364
Iuka soils, frequently flooded	1,753
Iulus fine sandy loam, 0 to 1 % slopes, frequently flooded	1,139
Iulus fine sandy loam, 0 to 1 % slopes, occasionally flooded	6,439

Iulus fine sandy loam, frequently flooded	3,142
Iulus soils, frequently flooded	95
Ivanhoe silt loam, 0 to 1 % slopes	6,288
Kaman clay, frequently flooded	4,259
Kaman clay, occasionally flooded	10
Kanebreak soils, frequently flooded	8,760
Karma loam, 0 to 2 % slopes	226
Karma loam, 5 to 12 % slopes, eroded	292
Kaufman clay, frequently flooded	101
Kaufman-Gowker complex, frequently flooded	1,001
Kawah fine sand, 0 to 2 % slopes	29
Keeter very fine sandy loam, 1 to 6 % slopes	8,767
Keeter very fine sandy loam, 2 to 6 % slopes, ero ded	6,743
Keithville very fine sandy loam, 0 to 3 % slopes	1,356
Kellison loam, 5 to 15 % slopes	2,452
Keltys fine sandy loam, 1 to 3 % slopes	32,397
Keltys fine sandy loam, 1 to 5 % slopes	11,167
Keltys fine sandy loam, 5 to 15 % slopes	134
Keltys fine sandy loam, 5 to 8 % slopes	2,347
Kian and Mantachie soils, frequently flooded	93
Kiomatia very fine sandy loam, 0 to 1 % slopes, freq. flooded	28
Kirbyville fine sandy loam	27
Kirbyville fine sandy loam, 0 to 2 % slopes	5,724
Kirvin fine sandy loam, 1 to 5 % slopes	11,658
Kirvin fine sandy loam, 1 to 8 % slopes	2,522
Kirvin fine sandy loam, 2 to 5 % slopes	5,846
Kirvin gravelly fine sandy loam, 1 to 5 % slopes	2,479
Kirvin gravelly fine sandy loam, 1 to 8 % slopes	126
Kirvin gravelly fine sandy loam, 2 to 5 % slopes	239
Kirvin soils, 1 to 5 % slopes, graded	70
Kirvin soils, 2 to 8 % slopes, graded	548
Kirvin soils, graded, 2 to 8 % slopes	257

Kisatchie fine sandy loam, 5 to 15 % slopes	1,378
Kisatchie loam, 5 to 15 % slopes	2,016
Kisatchie-Rayburn association, hilly	2,283
Kosse soils, frequently flooded	172
Koury loam, frequently flooded	1,056
Koury loam, occasionally flooded	4,335
Koury silt loam, 0 to 1 % slopes, frequently flooded	14,716
Koury silt loam, frequently flooded	4,908
Kullit fine sandy loam, 1 to 3 % slopes	747
Kurth fine sandy loam, 0 to 4 % slopes	1,772
Kurth fine sandy loam, 1 to 3 % slopes	53,118
Kurth fine sandy loam, 5 to 8 % slopes	8,867
LaCerda clay loam, 0 to 1 % slopes	97
LaCerda clay loam, 0 to 5 % slopes	5,010
LaCerda clay loam, 1 to 3 % slopes	582
LaCerda clay loam, 5 to 15 % slopes	1,401
LaCerda clay loam, 5 to 20 % slopes	12
Lamar clay loam, 5 to 8 % slopes	114
Lamar loam, 5 to 12 % slopes	1
Landman association, gently undulating	1,903
Landman fine sand	290
Laneville loam, 0 to 1 % slopes, frequently flooded	18,460
Laneville loam, 0 to 1 % slopes, occasionally flooded	4,193
Laneville loam, frequently flooded	4,828
Laneville silt loam, occasionally flooded	2,975
Larton loamy fine sand, 0 to 2 % slopes	1,154
Latex fine sandy loam, 1 to 3 % slopes	12,987
Latex loam, 1 to 3 % slopes	2,633
Latium clay, 1 to 5 % slopes, eroded	511
Latium clay, 5 to 8 % slopes, eroded	191
Latium-Gullied land complex, 3 to 8 % slopes	50
Leggett fine sandy loam, 0 to 3 % slopes	5,626

Leson clay, 0 to 3 % slopes	194
Leson clay, 1 to 3 % slopes	1,027
Letney loamy sand, 1 to 5 % slopes	3,770
Letney loamy sand, 1 to 8 % slopes	2,341
Letney loamy sand, 5 to 15 % slopes	470
Letney-Tehran association, undulating	6,222
Lilbert loamy fine sand	998
Lilbert loamy fine sand, 1 to 5 % slopes	4,857
Lilbert loamy fine sand, 1 to 8 % slopes	484
Lilbert loamy fine sand, 2 to 5 % slopes	9,436
Lilbert loamy fine sand, terrace	11
Lilbert-Urban land complex, 1 to 8 % slopes	6
Lindy loam, 1 to 3 % slopes	69
Lovelady loamy fine sand, 1 to 5 % slopes	4,349
Lovelady loamy fine sand, 5 to 8 % slopes	1,909
Lovelady loamy sand, 1 to 5 % slopes	615
Lovelady loamy sand, 5 to 8 % slopes	213
Lufkin fine sandy loam, 0 to 1 % slopes	633
Maben fine sandy loam, 15 to 35 % slopes	2,992
Maben fine sandy loam, 5 to 15 % slopes	24,203
Mantachie and Bleakwood soils, frequently flooded	1,196
Mantachie clay loam	16
Mantachie clay loam, frequently flooded	928
Mantachie soils, frequently flooded	6,351
Marietta fine sandy loam, frequently flooded	0
Marietta soils, frequently flooded	1,837
Mattex clay loam, 0 to 1 % slopes, frequently flooded	1,725
Mattex-Iulus complex, 0 to 1 % slopes, frequently flooded	13,702
May fine sandy loam, 0 to 2 % slopes	258
Melhomes loamy sand, frequently flooded	647
Melhomes soils, frequently flooded	846
Metcalf very fine sandy loam, 0 to 2 % slopes	3,283

Metcalf-Sawtown complex, 0 to 2 % slopes	22,275
Metcalf-Sawtown complex, 0 to 2 % slopes, mounded	13,398
Metcalf-Timpson complex, 0 to 2 % slopes, mounded	9,237
Meth fine sandy loam, 1 to 5 % slopes	10,684
Miller soils, frequently flooded	0
Mine or Quarry	77
Mingo silty clay loam, 1 to 3 % slopes	12
Mollville loam	104
Mollville loam, 0 to 1 % slopes	229
Mollville-Besner complex	2,157
Mollville-Besner complex, 0 to 1 % slopes, mounded	1,648
Mollville-Besner complex, 0 to 2 % slopes	2,688
Mollville-Besner complex, 0 to 3 % slopes, mounded	3,177
Mollville-Besner complex, gently undulating	890
Morse clay, 5 to 12 % slopes, eroded	372
Moswell loam, 1 to 3 % slopes	3,685
Moswell loam, 1 to 5 % slopes	59,492
Moswell loam, 5 to 15 % slopes	35,657
Moten-Multey comlpex, 0 to 2 % slopes	7,788
Moten-Multey complex, 0 to 2 % slopes	19,735
Moten-Multey complex, gently undulating	541
Naclina clay loam, 1 to 5 % slopes	566
Naclina clay loam, 15 to 35 % slopes, eroded	14
Naclina clay, 5 to 15 % slopes	100
Naclina clay, 5 to 20 % slopes	433
Nacogdoches clay loam, 1 to 5 % slopes	1,556
Nacogdoches fine sandy loam, 1 to 5 % slopes	2,077
Naconiche mucky sandy loam, 0 to 2 % slopes	170
Nikful fine sandy loam, 0 to 8 % slopes	1,637
Nimrod fine sand, 1 to 4 % slopes	330
Normangee clay loam, 1 to 3 % slopes	15
Normangee clay loam, 2 to 5 % slopes, eroded	151

Nugent soils, frequently flooded	430
Oklared-Kiomatia complex, occasionally flooded	177
Osier-Alaga complex	834
Otanya fine sandy loam, 0 to 3 % slopes	6,341
Owens very stony clay, 8 to 30 % slopes	25
Owentown fine sandy loam, 0 to 1 % slopes, freq. flooded	341
Owentown fine sandy loam, 0 to 1 % slopes, occas. flooded	2,876
Owentown fine sandy loam, occasionally flooded	779
Ozias silty clay, frequently flooded	711
Ozias-Pophers complex, 0 to 1 % slopes, freq. flooded	7,240
Ozias-Pophers complex, frequently flooded	5,577
Palopinto extremely stony silty clay loam, 1 to 8 % slopes	166
Patilo-Heaton fine sands, 3 to 12 % slopes	1,528
Penning very fine sandy loam, 0 to 2 % slopes	13,522
Penning very fine sandy loam, 0 to 4 % slopes	9,980
Penning-Kurth complex, 0 to 2 % slopes	7,773
Percilla soils	0
Pinetucky and Conroe soils, graded	4,097
Pinetucky fine sandy loam, 1 to 5 % slopes	30,151
Pinetucky loamy fine sand, 1 to 5 % slopes	522
Pits	338
Pits, quarries	800
Pluck and Kian soils, frequently flooded	21,100
Ponder clay loam, 1 to 3 % slopes	240
Pophers silt loam, 0 to 1 % slopes, frequently flooded	1,158
Pophers silt loam, frequently flooded	6,167
Pophers silty clay loam, 0 to 1 % slopes, freq. flooded	8,855
Pophers silty clay loam, frequently flooded	2,913
Porum loam, 2 to 5 % slopes	1,202
Porum loam, 5 to 12 % slopes	1,474
Pulexas fine sandy loam, occasionally flooded	0
Pulexas soils frequently flooded	4

Pulexas soils, frequently flooded	5,623
Pulexas very fine sandy loam, occasionally flooded	7,401
Purves clay, 1 to 3 % slopes	75
Rayburn fine sandy loam, 1 to 5 % slopes	472
Rayburn fine sandy loam, 5 to 15 % slopes	1,717
Rayburn loam, 5 to 15 % slopes	1,474
Rayburn-Corrigan association, undulating	1,605
Rayburn-Kisatchie association, hilly	1,992
Raylake clay loam, 0 to 4 % slopes	3,967
RayLake clay loam, 5 to 15 % slopes	2,009
Raylake clay, 1 to 5 % slopes	12,282
Redco clay, 0 to 2 % slopes	1,712
Rentzel loamy fine sand, 0 to 4 % slopes	3,990
Rentzel loamy fine sand, 0 to 5 % slopes	3,055
Rosenwall fine sandy loam, 1 to 5 % slopes	13,078
Rosenwall fine sandy loam, 5 to 15 % slopes	9,330
Ruston fine sandy loam, 1 to 8 % slopes	4
Sacul fine sandy loam, 1 to 3 % slopes	3,685
Sacul fine sandy loam, 1 to 5 % slopes	7,221
Sacul fine sandy loam, 5 to 15 % slopes	648
Sacul fine sandy loam, 5 to 20 % slopes	5,735
San Saba clay, 1 to 3 % slopes	62
Sanger clay, 1 to 3 % slopes	51
Sanger clay, 3 to 5 % slopes	58
Sawlit fine sandy loam, 0 to 3 % slopes	6,949
Sawlit-Latex complex, 0 to 2 % slopes	2,598
Sawlit-Sawtown complex, 0 to 2 % slopes	683
Sawtown very fine sandy loam, 0 to 2 % slopes	7,879
Segno fine sandy loam	222
Selden loamy fine sand, 1 to 3 % slopes	4,515
Severn silt loam, rarely flooded	199
Shankler-Boykin association, hilly	161

Shankler-Boykin association, undulating	123
Silawa fine sandy loam, 3 to 8 % slopes	3,408
Silawa fine sandy loam, 3 to 8 % slopes, eroded	1,201
Smithdale sandy loam, 1 to 5 % slopes	1,573
Somervell-Aledo complex, 1 to 8 % slopes	1,110
Sorter silt loam	329
Sorter silt loam, 0 to 1 % slopes	11,576
Speck clay loam, 0 to 2 % slopes	28
Splendora fine sandy loam	646
Splendora very fine sandy loam, 0 to 2 % slopes	2,717
Spurger fine sandy loam, 1 to 5 % slopes	28
Spurger-Mollville association, gently undulating	452
Stephen silty clay, 1 to 3 % slopes	32
Stephen silty clay, 2 to 5 % slopes	2
Stephenville fine sandy loam, 1 to 3 % slopes	86
Stringtown fine sandy loam, 15 to 35 % slopes	1,496
Stringtown fine sandy loam, 5 to 15 % slopes	956
Stringtown-Bonwier association, graded	494
Stringtown-Bonwier association, strongly sloping	9,034
Tehran loamy sand 5 to 15 % slopes	4,236
Tehran loamy sand, 8 to 15 % slopes	948
Tehran-Letney association, hilly	5,602
Tenaha loamy fine sand, 1 to 5 % slopes	6,561
Tenaha loamy fine sand, 15 to 35 % slopes	785
Tenaha loamy fine sand, 5 to 15 % slopes	13,226
Tenaha loamy fine sand, 5 to 20 % slopes	455
Tinn clay, frequently flooded	3,736
Tinn clay, occasionally flooded	2,554
Tonkawa fine sand, 0 to 8 % slopes	759
Tonkawa fine sand, 8 to 15 % slopes	86
Trawick clay loam, 15 to 35 % slopes	503
Trawick fine sandy loam, 5 to 15 % slopes	2,023

Trawick gravelly clay loam, 5 to 15 % slopes	5,578
Trawick gravelly fine sandy loam, 2 to 5 % slopes	361
Trawick gravelly fine sandy loam, 5 to 15 % slopes	413
Trawick-Bub complex, 15 to 40 % slopes	460
Trawick-Urban land complex, 8 to 20 % slopes	8
Trinity soils, frequently flooded	70
Truce fine sandy loam, 1 to 3 % slopes	702
Truce fine sandy loam, 2 to 5 % slopes, eroded	229
Truce fine sandy loam, 3 to 5 % slopes	324
Tuscosso clay loam, frequently flooded	0
Tuscosso loam, 0 to 1 % slopes, frequently flooded	940
Urbo and Mantachie soils, frequently flooded	2,193
Urland fine sandy loam, 1 to 5 % slopes	77
Venus loam, 1 to 3 % slopes	106
Venus loam, 3 to 8 % slopes	3,173
Vernon clay, 3 to 8 % slopes	362
Waller loam	56
Waller silt loam, 0 to 1 % slopes	4,326
Waller soils, ponded	28
Waskom silt loam, 0 to 1 % slopes	653
Waurika-Renfrow complex, 0 to 1 % slopes	1
Weatherford-Duffau complex, 3 to 8 % slopes	11,339
Weatherford-Duffau complex, 3 to 8 % slopes, eroded	9,675
Whakana fine sandy loam, 1 to 5 % slopes	6
Whakana very fine sandy loam, 1 to 3 % slopes	2,493
Whakana very fine sandy loam, 3 to 5 % slopes	2,498
Whakana very fine sandy loam, 5 to 12 % slopes	10,748
Whakana-Porum complex, 8 to 20 % slopes	7
Wiergate clay, 1 to 5 % slopes	1,948
Wiergate clay, 5 to 8 % slopes	2,366
Wilson silt loam, 0 to 1 % slopes	1,302
Windthorst and Duffau soils, 2 to 8 % slopes, eroded	15

Windthorst fine sandy loam, 1 to 5 % slopes	5,031
Windthorst fine sandy loam, 2 to 5 % slopes	25
Windthorst fine sandy loam, 2 to 6 % slopes, eroded	3,057
Windthorst fine sandy loam, 5 to 8 % slopes	11
Windthorst loamy fine sand, 1 to 5 % slopes	4
Wise clay loam, 3 to 8 % slopes	474
Woden fine sandy loam, 0 to 3 % slopes	81
Woden fine sandy loam, 0 to 4 % slopes	130
Woden fine sandy loam, 1 to 3 % slopes	537
Woden fine sandy loam, 1 to 4 % slopes	435
Woodtell very fine sandy loam, 1 to 3 % slopes	2,878
Woodtell very fine sandy loam, 1 to 5 % slopes	4,053
Woodtell very fine sandy loam, 5 to 15 % slopes	3,219
Woodtell very fine sandy loam, 5 to 20 % slopes	1,480
Woodville fine sandy loam, 1 to 5 % slopes	19,433
Woodville fine sandy loam, 5 to 12 % slopes	9,730
Woodville soils, 2 to 5 % slopes, eroded	94
Grand Total	**1,659,112**

Appendix C

Fuels and Fire Behavior

Adaptive Management Environmental Effects Analysis for Wind Events - Effects on Fuels and Fire Behavior

.

Appendix C – Fuel Model Photos

Management Area 1 – Upland Forest Ecosystems

Figure 1. Lightly damaged area in Compartment 29. This area is representative of fuel model 10 with substantial downed needles and small diameter woody fuels.

Figure 2. Lightly damaged area in Compartment 56. This area is a fire suppressed pine-hardwood community that is representative of fuel model 7. The scattered tops and greater quantity of fine surface fuels will result in increased fire intensity however the shrub component remains the primary fire carrier.

Figure 3. Lightly damaged plantation in compartment 55. This area is representative of fuel model 7.

Figure 4. Moderately damaged area in shortleaf pine-hardwood community in Compartment 55. This area is representative of fuel model SB3.

Figure 5. Extensively damaged area in Compartment 26. This area is representative of fuel model SB4. The area was prescribed burned in 2004 and the shrub component is light.

Figure 6. Extensively damaged area in Compartment 30. This area has not burned in over 15 years and has a significant shrub component. It is representative of fuel model SB4/sh.

Management Area 2 – Red-cockaded Woodpecker Emphasis

Figure 7. Lightly damaged area in shortleaf pine dominated RCW habitat area in Compartment 13. This area is representative of fuel model 2. The vegetation structure depicted here is approaching the Desired Future Conditions for much of the uplands in MA-2.

Figure 8. Extensive damage in frequently burned RCW habitat in Compartment 13. This area is representative of fuel model SB4.

Management Area 6 – Longleaf Pine Special Area

Figure 9. Lightly damaged area in Compartment 77. This area is representative of fuel model 2. The scattered tops and higher fine fuel loadings will result in increased fire intensity, however the grass component remains the major fire carrier and will have the most influence on fire behavior. The herbaceous understory vegetation in this area is representative of the Desired Future Conditions for the much of the dry uplands in MA-6.

Figure 10. Lightly damaged area in Compartment 78. This area is representative of fuel model 10 with scattered downed trees and a noticeable increase in needle fall and 1- to 10-hour woody fuels. This area was last burned in the spring of 2005 and represented fuel model 9 prior to the hurricane.

Figure 11. Surface fuels in lightly damaged area in Compartment 78. Prior to the hurricane this area was representative of fuel model 9. The area is now a fuel model 10 with 1- and 10-hour fuel loadings estimated to be 50 to 100% higher than in pre-storm conditions.

Figure 12. Moderate storm damage in Compartment 78. This area is representative of fuel model SB3 with numerous downed trees and substantial increase in needle fall and 1- to 100-hour fuels. The area was last burned in the spring of 2005.

Figure 13. Extensively damaged area on a hillside in Compartment 89. This area is representative of fuel model SB4.

Figure 14. Extensively damaged area within Wildland-Urban Interface in Compartment 78. This area is representative of fuel model SB4.

Appendix D

Management Indicator Species Evaluation

Appendix D
Management Indicator Species Evaluation
National Forests and Grasslands in Texas

Management Indicator Species considered and selected for, or eliminated from, further consideration.

Management Indicator	***Management Indicator For:***	***Selected for Project***		***Rationale***
		Yes	***No***	
Red-cockaded Woodpecker	Longleaf pine woodland/savanna Dry-xeric oak pine forest Mesic oak-pine forest	X		Species presence will likely be near the proposed project locations. Effects are addressed in the T&E species section of the EA.
Slender Gayfeather	Longleaf pine woodland/savannah		X	Effects are addressed in the sensitive species section of the EA.
Incised Groovebur	Longleaf pine woodland/savannah		X	Effects are addressed in the sensitive species section of the EA.
Scarlet Catchfly	Longleaf pine woodland/savannah		X	Effects are addressed in the sensitive species section of the EA.
Longleaf – Bluestem series	Longleaf pine woodland/savannah	X		There could be significant longleaf within the treatment areas.
Navasota Ladies Tresses	Longleaf pine barrens	X		Barrens could be found near the treatment areas. But there are no known occurrences of Navasota ladies tresses on the NFGT in recent years.
Little Bluestem –Rayless Goldenrod series	Longleaf pine barrens	X		Barrens could be found in the treatment areas.
Yellow Fringeless Orchid	Herbaceous wetlands	X		Herbaceous wetlands (seepage bogs) may occur in the treatment areas.
Sphagnum – Beakrush series	Herbaceous wetlands		X	Herbaceous wetlands (seepage bogs) may occur in the treatment areas. But they will not be affected by any of the proposed alternatives, because of SMZ exclusions and protections.
Nodding Nixie	Bay – Shrub Wetlands		X	Bay-shrub wetlands may occur in the project areas. But they will not be affected by any of the proposed alternatives, because of SMZ exclusions and protections.
Texas Baronia	Bay – Shrub Wetlands		X	Bay-shrub wetlands may occur in the project areas. But they will not be affected by any of the proposed alternatives, because of SMZ exclusions and protections.
Sweetbay – Magnolia series	Bay – Shrub Wetlands		X	Bay-shrub wetlands may occur in the project area. But they will not be affected by any of the proposed alternatives, because of SMZ exclusions and protections.

Management Indicator	*Management Indicator For:*	*Selected for Project*		*Rationale*
		Yes	*No*	
Louisiana Squarehead	Dry-xeric oak pine forest	X		Restricted to sandy soils in sandhill woods and xeric sandhills in longleaf pine savannas. Known occurrences on Davy Crockett and Angelina NFs.
Shortleaf – Oak forest	Dry-xeric oak pine forest	X		There is potential for of this community type in the treatment areas.
Loblolly - Oak forest	Mesic oak-pine forest	X		There is potential loblolly and some oaks within the treatment area.
Southern Ladyslipper	Mesic hardwood forest	X		Effects are addressed in the sensitive species section of the EA.
Beech-White Oak series	Mesic hardwood forest		X	Acreage of this community type will not be altered by this project.
Northern Bobwhite	Tallgrass prairie		X	Tallgrass prairie will not be present within the treatment area.
Little Bluestem – Indiangrass	Tallgrass prairie		X	Tallgrass prairie will not be present within the treatment area.
Neotropical Migrants	Bottomlands, Streamsides		X	The proposed alternative will not change structure of bottomlands or streamsides.
Neches River Rose Mallow	Bottomlands, Streamsides		X	This species was not detected during surveys of the area.
Bottomland Hardwood	Bottomlands, Streamsides		X	Acreage of this community type will not be altered by this project.
Eastern Wild Turkey	Forest/Grassland: Early succession (0-20 yrs) Mid-succession (20-50 yrs) Late-succession (50-90 yrs) Old growth (90+ years)	X		Species is in demand by hunters; responds to forest management actions. May occur in treatment areas.
Whitetail Deer	Forest/Grassland: Early succession (0-20 yrs) Mid-succession (20-50 yrs) Late-succession (50-90 yrs) Old growth (90+ years)	X		Species is in demand by hunters. May occur in treatment areas.
Yellow-Breasted Chat	Forest/Grassland: Early succession (0-20 yrs) Mid-succession (20-50 yrs) Late-succession (50-90 yrs) Old growth (90+ years)	X		Selected as MIS for early successional habitat only (USFS 2002).

Management Indicator	*Management Indicator For:*	*Selected for Project*		*Rationale*
		Yes	*No*	
Pileated Woodpecker	Forest/Grassland: Mid-succession (20-50 yrs) Late-succession (50-90 yrs) Old growth (90+ years)	X		Species dependent on large diameter trees/snags. May occur in treatment areas.
Gray Squirrel/Fox Squirrel	Forest/Grassland: Mid-succession (20-50 yrs) Late-succession (50-90 yrs) Old growth (90+ years)	X		Squirrel populations fluctuate more in response to annual variations in mast crops rather than forest management; they are poor indicators of changing forest conditions that result from management. But may occur in treatment areas.
Snags	Forest/Grassland: Early succession (0-20 yrs) Mid-succession (20-50 yrs) Late-succession (50-90 yrs) Old growth (90+ years)	X		Snags may occur in treatment areas.
Largemouth Bass	Aquatic – Ponds and Reservoirs		X	Project will not affect ponds and reservoirs.
Sunfish – Redear and Bluegill	Aquatic – Ponds and Reservoirs		X	Project will not affect ponds and reservoirs.
Channel atfish	Aquatic – Ponds and Reservoirs		X	Project will not affect ponds and reservoirs.
Paddlefish	Aquatic – Rivers and Streams		X	Inhabits large rivers, large rivers; will not be in treatment areas.
Sabine Shiner	Aquatic – Rivers and Streams		X	Effects are addressed in the sensitive species section of the EA.
Dusky Darter	Aquatic – Rivers and Streams		X	The sources of siltation that impact mussels are the same that impact this species. See sensitive species section of the EA.
Scaly Sand Darter	Aquatic – Rivers and Streams		X	The sources of siltation that impact mussels are the same that impact this species. See sensitive species section of the EA.
Stonefly Guild	Aquatic – Rivers and Streams		X	The sources of siltation that impact mussels are the same that impact this species. See sensitive species section of the EA.

Appendix E

Design Criteria

Design Criteria

1. Applicable standards and guidelines in the 1996 Revised Land and Resource Management Plan as amended for each Management Area affected would be implemented.
2. On-site damage evaluation would occur prior to treatment.
3. On-site cultural resource survey would occur prior to treatment.
4. The road bed of temporary roads would be pulled up so that the road is no longer useable. Following timber removal, temporary roads would be obliterated, seeded, water barred, and the entrances would be blocked.
5. No removal, mulching, or lop and scatter would occur in active red-cockaded woodpecker (RCW) clusters during nesting season (April 1- July 31) unless concurrence by USFWS is provided.
6. Use of open and closed roads will be evaluated on a case-by-case basis, through consultation with USFWS, to determine if specific open roads can be used during nesting season without causing incidental take.
7. No activities in active clusters or use of roads through clusters prior to one hour after sunrise and ceasing one hour prior to sunset. These restrictions are in place all year long.
8. Treatments in new RCW clusters would follow applicable guidance in the 1996 Forest Plan and the RCW Recovery Plan.
9. If any federally listed species or RCW cavity trees are discovered during implementation, the project activities would be stopped. The district wildlife biologist would determine appropriate management actions consistent with Forest Plan and Recovery Plan guidelines before project activities can resume.
   Section 7 consultation would be reinitiated with the USFWS, if additional project effects could occur that are not already disclosed in the biological evaluation for the NFGT Wind Event EA.
10. If any Regional Forester's Sensitive Species are encountered during project implementation, the district wildlife biologist would be notified immediately so the appropriate management actions can be implemented.
11. A report will be submitted to USFWS with an assessment of damage to any RCW habitat, along with damage to bald eagle nests. The Forest Service will provide maps, treatment activities and treatment acres to USFWS before any treatments begin. A short (< 1 to 2 pages) description of the proposed activities, project effects (direct, indirect, and cumulative) and determination will be included in the report. The Forest Service will request concurrence for each project.
12. A 660 foot buffer would be established around all active bald eagle nests to preclude equipment and timber harvest activities near nests during nesting season (October through May). The distance may be decreased to 330 feet for alternate nests, including nests that were attended during current breeding season but not used to raise young. Nests found to be inactive the proceeding five breeding periods do not have to be buffered from disturbance activities. If an unknown nest is found while treating the project areas, the operation would be temporarily halted, the district wildlife biologist would be notified, the nest tree would be protected and the buffer would be established around its perimeter.
13. If any other federally listed or Forest Service Sensitive species are encountered during project implementation, the district wildlife biologist will be notified immediately so the appropriate management actions can be implemented.
14. Tree removal will be restricted in wet weather. The district timber sale administrator will monitor conditions and promptly shut down timber sales when erosion and soil compaction will be unacceptable.

15. Longleaf pine will only be removed if lying on the ground or if the crown is totally broken off. Relict longleaf pine trees that are leaning 45 degrees or greater but are still viable will be left unless they create a safety hazard.
16. Standing or downed hardwoods that are contributing to a fuel problem or are a safety hazard, could be mulched, lopped and scattered, or sold to the public for personal use firewood. There may be rare occasions when a logging contractor may remove hardwoods in order to assist with general forest clean up where the contractor is already on site. This would only be done on a case-by-case basis and is the exception rather than the rule. Hardwoods that are not contributing to the fuel load and are not a safety hazard would be left on site as coarse woody debris. This distinction will be clarified in the EA.
17. Ephemeral streams in all MAs will be protected according to Plan standard FW-218.
18. Streamside Management Zones (SMZ) associated with Management Area 4 (MA-4). Pine trees falling across the 50-foot edge of the primary zone would be cut off. Only that portion of the tree outside of the primary zone would be removed. Leaners, snaps, root sprung, or dead trees that originate within the primary zone would not be removed. Trees outside the primary zone that are leaning into the primary zone could be removed. The secondary zone will be delineated from the primary zone outward to the extent of the streamside management zone, and will vary depending on biological and physical factors within the landtype association, historical use, and topographical position. Delineation of the secondary zone will use one or more of the seven criteria listed on page 152 of the *Plan*.
19. Developed Recreation Areas (Bouton Lake, Boykin Springs, Caney Creek, Sandy Creek, Townsend, Ratcliff Lake, Cagle, Double Lake, Stubblefield Lake, Big Creek Scenic Area , Boles Field, Indian Mounds, Lakeview, Ragtown, Red Hills, Willow Oak, 566 Piney Creek, Scott's Ridge Swimming Area and Kickapoo Picnic Area), portions of MA-8: Special Area Management, the lakeshore along Sam Rayburn Reservoir, Toledo Bend Reservoir and Lake Conroe) have a Visual Quality Objective (VQO) of Retention.
20. Highways, state and county roads and primary National Forest System Roads (NFSR) and trails, Dispersed Recreation Areas (Bayou, Harvey Creek, Scott's Ridge, and East Hamilton Boat Ramps, Neches Bluff Overlook, White Rock Horse Camp, 208, 233, 234, Kelly's Pond and Northwest Trailheads, Haley's Ferry and areas designated as Hunter Camps), and secondary NFSR in MA-8 have a VQO of Partial Retention.
21. Secondary NFSR and roads open seasonally (except roads covered by higher designation, i.e. seasonally open roads within Red Hills Lake), and remaining areas of MA-8 have a VQO of Modification.
22. For prescribed burning, fire lines will be surveyed as determined by a qualified botanist or someone designated by them before they are created or re-positioned on the landscape (bladed, plowed, hand, or other). While these lines are being installed, in areas where there are plant areas that are to be flagged and avoided, a qualified botanist or someone designated by them will be present at areas to be avoided, and assure that flag and avoid sites are not entered.
23. Sensitive plant habitats such as pine barrens, baygalls, and bogs occur in the project area. These sites will be included in the areas burned when practicable. The exception will be for areas where Navasota Ladies'-Tresses (*Spiranthes parksii*), an endangered plant species, has been reported to occur. Prescribed fire activities will not be conducted as a treatment activity under this proposed action where *Spiranthes parksii* has been reported to occur within Compartment 84 on the Angelina NF.
24. Equipment would be excluded from barrens, baygalls, and bogs. Alternative line placement will be used to protect these habitats, although temporary handlines may be used in baygalls as needed. Within barrens, no oaks would be cut without approval by the Forest botanist. The design and implementation of fuelbreaks and control lines for these special areas will be made in consultation with the Forest Botanist to meet the requirements on a site-specific basis.

25. Contractors shall adhere to the following requirements with regard to cleaning "Off-Road Equipment": Prior to moving Off-Road Equipment onto the Sale Area, Purchaser shall identify the location of the equipment's most recent operation. Purchaser shall not move any Off-Road Equipment that last operated in an area infested with one or more invasive species of concern onto Sale Area without having cleaned such equipment of seeds, soil, vegetative matter, and other debris that could contain or hold seeds. If the location of prior operation cannot be identified, then the Purchaser shall assume that the location is infested with invasive species of concern.
26. Many areas are infested with non-native invasive species of concern to the National Forests and Grasslands in Texas. Prior to moving off-road equipment between payment units all off road equipment must be cleaned to prevent and/or minimize the spread of this species to other locations within the sale area that are currently free of infestations of this species.
27. Every effort must be made to utilize the existing waste areas that are old logging decks as logging decks to be used for the implementation of this project. They are evident throughout the project area.
28. Any trees falling into MA-4 protected wetlands (bogs) should be removed manually by a chainsaw crew. No dragging or cutting by heavy machinery is allowed within these areas. Trees must be lopped and scattered outside the bog boundaries.
29. Any trees falling into Catahoula pine barrens should be removed manually by a chainsaw crew. No dragging or cutting by heavy machinery is allowed within these areas. Trees must be lopped and scattered outside the barren boundaries.
30. Any trees discovered to have fallen onto sensitive plant locations within MA-8d (Kentucky Ladies'-Slipper sites) should be removed manually by a chainsaw crew. No dragging or cutting by heavy machinery is allowed within these areas. Trees must be lopped and scattered outside the site boundaries.
31. Every area designated for treatment will be surveyed for TES plants and, if found, the area delineated. No equipment will be allowed within the boundaries of the delineated area.
32. Prescribed fire activities will be excluded in areas where the endangered plant Navasota Ladies'-Tresses, *Spiranthes parksii*, has been reported to occur.

Protection Measures for Historic Properties – All Action Alternatives

The following measures only apply to cultural resource sites that are unevaluated, eligible for listing, or listed in the National Register of Historic Places.

HP1: Site Avoidance During Project Implementation
Avoidance of historic properties (HP) will require the protection from effects resulting from the undertaking. Effects will be avoided by (1) establishing clearly defined site boundaries and buffers around protected sites where activities that might result in an adverse effect. Buffers will be of sufficient size to ensure that integrity of the characteristics and values which contribute to, or potentially contribute to, the properties' significance will not be affected, and (2) routing proposed new roads, temporary roads, log landings and skid trails away from historic properties; a typical buffer zone would extend 30 meters beyond the defined boundary of a protected site. Certain sites may require a broader zone of protection, and/or may require consideration of factors such as noise and viewshed in determining an appropriate buffer zone.

HP2: Site Protection During Prescribed Burns

(1)Firelines. Historic properties located along existing non-maintained woods roads used as fire lines will be protected by hand-clearing those sections that cross the sites. Although these roads are generally cleared of combustible debris using a small dozer, those sections crossing archeological sites will be cleared using leaf blowers and/or leaf rakes. There will be neither removal of soil, nor disturbance below the ground surface, during fireline preparation. Historic properties and features located along proposed routes of mechanically-constructed firelines, where firelines do not now exist, will be avoided by routing fireline construction around historic properties. Sites that lie along previously constructed dozer lines from past burns where the firelines will be used again as firelines, will be protected during future burns by hand clearing sections of line that cross the site, rather than re-clearing using heavy equipment. Where these activities will take place outside stands not already surveyed, cultural resources surveys and regulatory consultation will be completed prior to project implementation. Protection measures, HP1, HP3, and HP4, will be applied prior to project implementation to protect historic properties.

(2)Burn Unit Interior. Combustible elements at historic properties in burn unit interiors will be protected from damage during burns by removing excessive fuels from the feature vicinity and, as necessary, by burning out around the feature prior to igniting the main burn, creating a fuel-free zone. Burn out is accomplished by constructing a set of two hand lines around the feature, approximately 30 to 50 feet. apart, and then burning the area between the two lines while the burn is carefully monitored. Combustible features located in a burn unit will also be documented with digital photographs and/or field drawings prior to the burn. Historic properties containing above ground, non-combustible cultural features and exposed artifacts will be protected by removing fuel concentrations dense enough to significantly alter the characteristics of those cultural resources. No additional measures are proposed for any sites in the burn interior that have been previously burned or that do not contain combustible elements or other above ground features and exposed artifacts as proposed prescribed burns will not be sufficiently intense to cause adverse effects to these features.

(3)Post-Burn Monitoring. Post-burn monitoring may be conducted at selected sites to assess actual and indirect effects of the burns on the sites against the expected effects. SHPO consultation will be carried out with respect to necessary mitigation for any sites that suffer unexpected damage during the burn or from indirect effects following the burn.

HP3: Other Protection Measures

If it is not feasible or desirable to avoid an historic property that may be harmed by a project activity (HP1), then the following steps will be taken: (1) In consultation with the Texas SHPO and Tribes, the site(s) will be evaluated against NRHP significance criteria (36 CFR 60.4) to determine eligibility for the NRHP. The evaluation may require subsurface site testing; (2) In consultation with the Texas SHPO, Tribes, and other consulting parties, if required, site specific mitigation measures will be developed to minimize the adverse effects on the site, so that a finding of No Adverse Effect results; (3) The agreed-upon mitigation measures will be implemented prior to initiation of activities having the potential to affect the site.

HP4: Discovery of Cultural Resources during Project Implementation

Although cultural resources surveys were designed to locate all NRHP eligible archeological sites and components, these may go undetected for a variety of reasons. Should unrecorded cultural resources be discovered, all activities in the vicinity (minimum of 50 meters from the discovery) shall cease, and reasonable efforts shall be taken to avoid or minimize harm to the cultural resource; the resource will be evaluated by an archaeologist, and consultation will be initiated with the SHPO and Tribes to determine appropriate actions for protecting the resource and mitigating adverse effects. Project activities at that locale will not resume until the resource is adequately protected and until agreed-upon mitigation measures are implemented with SHPO approval. The NFGT will adhere to the specific and comprehensive protocols for Unanticipated Discoveries articulated in Section VI of the Programmatic Agreement among the NFGT, SHPO, ACHP, and affiliated Tribes.