APPLEWHITE RESERVOIR

Location: Medina River in Bexar County; dam site approximately 11 miles south of San Antonio.

Normal Pool Elevation: 535 feet msl.
Type of Field Evaluation: HEP (U.S. Army Corps of Engineers [CE] 1987)
Date of Field Evaluation: 1984

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)	
Riparian Forest (2)	908	.65	590	Minimum 25%	688	6,705	
				Moderate 50%	175		3,371
				Maximum 100%	350		1,686
Mesquite Brush (3)	940	.54	508	Minimum 25%	115	4,417	
				Moderate 50%	230		2,209
				Maximum 100%	460		1,104
Grasses/Shrub (4)	62	.55	35	Minimum 25%	118	280	
				Moderate 50%	235		140
				Maximum 100%	470		70
Crops (4)	584	.53	310	Minimum 25%	118	2,627	
				Moderate 50%	235		1,319
				Maximum 100%	470		660
Other	6						
Total	2,500			Minimum 25%		14,029	
				Moderate 50%			7,039
				Maximum 100%			3,520

TPWD Listed Species

Endangered Species

- ***Tern, Least, Interior*
- ***Vireo, Black capped*
- **Eagle, Bald*
- *Crane, Whooping*
- *Curlew, Eskimo (*Numenius borealis*)*
- *Salamander, Blind, Blanco (*Typhlomolge robusta*)

Threatened Species

- ***Egret, Reddish (*Egretta rufescens*)
- ***Hawk, Zone tailed
- ***Ibis, White faced
- ***Kite, Swallow tailed, American
- ***Stork, Wood
- ***Warbler, Golden cheeked
- ***Falcon, Peregrine, Arctic*
- ***Tortoise, Texas (*Gopherus berlandieri*)
- ***Lizard, Horned, Texas
- ***Snake, Indigo, Texas (*Drymarchon corais erebennus*)
- ***Rattlesnake, Timber
- ***Salamander, Blind, Comal (*Eurycea tridentifera*)
- *Salamander, Cascade Caverns (*Eurycea latitans*)
- ***Toothless Blindcat (*Trogloglanis pattersoni*)
- ***Widemouth Blindcat (*Satan eurystomus*)

Plate 5 The Texas tortoise ***(Gopherus berlandieri)****, listed by TPWD as a threatened species, occupies habitat typically represented by this reservoir site.*

BEDIAS RESERVOIR

Location: Bedias Creek in Walker, Grimes and Madison Counties; dam site 3.5 miles west of HWY 75 crossing.[1]

Normal Pool Elevation: 243 feet msl.
Type of Field Evaluation: HEP
Date of Field Evaluation: 1985

Cover Type/ Resource Category[1]	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	7,328	.75	5,496	Minimum 25% Moderate 50% Maximum 100%	.063 .125 .250	87,238	43,968	21,984
Grasses/Parks (4)	7,036	.70	4,925	Minimum 25% Moderate 50% Maximum 100%	.075 .150 .300	65,667	32,833	16,417
Post Oak-Elm-Hackberry Forest (3)	6,851	.72	4,933	Minimum 25% Moderate 50% Maximum 100%	.070 .140 .280	70,471	35,236	16,718
Other	3,460							
Total	24,675			Minimum 25% Moderate 50% Maximum 100%		223,376	112,037	55,119

[1]Reservoir site identified by Texas Water Development Board (1966). Current study by Bureau of Reclamation had not identified preferred dam site in time to include same in this evaluation.

TPWD Listed Species:

Endangered Species

- *Crane, Whooping[E]
- ***Eagle, Bald[E]
- ***Woodpecker, Red-cockaded[E]
- ***Tern, Least, Interior[E]
- ***Snake, Pine, Louisiana
- **Paddlefish
- ***Navasota ladies'-tresses[E]

Threatened Species

- ***Egret, Reddish
- ***Ibis, White-faced
- ***Stork, Wood
- ***Falcon, Peregrine, Arctic[T]
- **Sparrow, Bachman's
- *Kite, Swallow-tailed, American
- ***Lizard, Horned, Texas
- ***Turtle, Snapping, Alligator
- ***Rattlesnake, Timber
- ***Creek Chubsucker
- ***Blue Sucker

*Plate 36. The bobcat (**Lynx rufus**) inhabits secluded areas within the Bedias Reservoir site.*

BIG PINE RESERVOIR

Location: Pine Creek in Lamar and Red River Counties, dam site 13.2 miles above confluence with Red River.

Normal Pool Elevation: 420 feet msl.
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1984

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Grasses (4)	594	.39	232	Minimum 25%	.153	1,516		
				Moderate 50%	.305		761	
				Maximum 100%	.610			380
Post Oak Forest (3)	657	.57	374	Minimum 25%	.108	3,463		
				Moderate 50%	.215		1,740	
				Maximum 100%	.430			870
Mixed Bottomland Hardwood Forest (2)	2,387	.79	1,886	Minimum 25%	.053	35,585		
				Moderate 50%	.105		17,962	
				Maximum 100%	.210			8,981
Other	415							
Total	4,053			Minimum 25%		40,564		
				Moderate 50%			20,463	
				Maximum 100%				10,231

TPWD Listed Species:

Endangered Species

- ***Eagle, Bald[E]
- *Crane, Whooping[E]
- *Tern, Least, Interior[E]
- *Curlew, Eskimo[E]
- ***Woodpecker, Red-cockaded[E]
- ***Paddlefish

Threatened Species

- **Kite, Swallow-tailed, American
- *Ibis, White faced
- **Stork, Wood
- *Falcon, Peregrine, Arctic[T]
- ***Lizard, Horned, Texas
- *Snake, Scarlet, Northern
- ***Rattlesnake, Timber
- *Turtle, Snapping, Alligator
- ***Blue Sucker *(Cycleptus elongatus)*

Plate 19. Vegetation cover map of the Big Pine Reservoir site.

Special Note: Proposed reservoir will impact a mixed bottomland hardwood tract known as "Big Pine Creek," identified as a Priority 1 preservation site by FWS (1984a).

Plate 20. Upland post oak forest at the Big Pine Reservoir site.

BIG SANDY RESERVOIR

Location: Big Sandy Creek in Upshur County; dam site at RM 10.6

Normal Pool Elevation: 335 feet msl
Type of Field Evaluation: HEP (FWS 1980)
Date of Field Evaluation: 1980

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)
Bottomland Hardwood Forest (2)	1,894	.61	1,155	Minimum 25%	.098	11,786
				Moderate 50%	.195	5,925
				Maximum 100%	.390	2,962
Hardwood-Pine Forest (3)	1,498	.53	794	Minimum 25%	.118	6,729
				Moderate 50%	.235	3,378
				Maximum 100%	.470	1,689
Grassland/Savannah (3)	617	.27	167	Minimum 25%	.183	913
				Moderate 50%	.365	457
				Maximum 100%	.730	229
Pine-Hardwood Forest (3)	352	.50	176	Minimum 25%	.125	1,408
				Moderate 50%	.250	704
				Maximum 100%	.500	352
Cropland (4)	44	.74	33	Minimum 25%	.065	508
				Moderate 50%	.130	254
				Maximum 100%	.260	127
Total	4,405			Minimum 25%		21,344
				Moderate 50%		10,716
				Maximum 100%		5,359

TPWD Listed Species:

Endangered Species

- *Bear, Black
- **Eagle, Bald[E]
- *Woodpecker, Red-cockaded[E]
- ***Snake, Pine, Louisiana
- **Paddlefish

Threatened Species

- *Bat, Big-eared, Rafinesque's
- **Ibis, White-faced
- **Kite, Swallow-tailed, American
- **Stork, Wood

Threatened Species, cont.

- **Falcon, Peregrine, Arctic[T]
- **Sparrow, Bachman's
- ***Turtle, Snapping, Alligator
- **Lizard, Horned, Texas
- **Snake, Scarlet, Northern
- *Rattlesnake, Timber
- ***Creek Chubsucker
- *Bluehead Shiner *(Notropis hubbsi)*
- *Blackside Darter *(Percina maculata)*

Plate 37. Herbaceous wetland at the Big Sandy Reservoir site.

TNHP Data Base Listings:

Louisiana Pine Snake *(Pituophis melanoleucus ruthveni)*
Located within vicinity of proposed reservoir; rare in Texas; 21-100 estimated occurrences; no confirmation of any protected species.

Shortleaf Pine *(Pinus echinata)* - Bluejack Oak *(Quercus incana)* Series
Two occurrences located within vicinity of proposed reservoir site; imperiled in Texas, very rare and vulnerable to extirpation; 6-20 estimated occurrences.

Bald Cypress *(Taxodium distichum)* - Tupelo *(Nyssa aquatica)* Series
Located along Big Sandy Creek, above and below SH 154; known as "Upper Big Sandy Creek and Glades" and identified as Priority 2 preservation site by FWS (1984a); imperiled in Texas, very rare and vulnerable to extirpation.

Water Oak *(Quercus nigra)* - Sweetgum *(Liquidambar styraciflua)* Series
Located within floodplain of Big Sandy Creek above SH 155 bridge crossing to below its confluence with Boggy Creek; known as "Lower Big Sandy Creek" and identified as Priority 2 preservation site by FWS (1984a).

Plate 38. Emergent wetlands along Big Sandy Creek in proposed reservoir area.

BON WIER RESERVOIR

Location: Sabine River in Newton County, Texas and Beauregard Parish, Louisiana; dam site at RM 102.

Normal Pool Elevation: 90 feet msl.
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)	
Mixed Bottomland Hardwood Forest (2)	14,645	.79	11,570	Minimum 25% Moderate 50% Maximum 100%	.055 .105 .210	218,302	110,190 55,095
Mixed Hardwood-Pine Forest (5)	10,365	.63	6,529	Minimum 25% Moderate 50% Maximum 100%	.095 .165 .370	70,294	35,292 17,646
Swamp/Flooded Hardwood Forest (2)	2,525	.81	1,882	Minimum 25% Moderate 50% Maximum 100%	.048 .095 .190	39,208	19,811 9,905
Other	7,766						
Total	35,097			Minimum 25% Moderate 50% Maximum 100%		327,714	165,293 82,646

TPWD Listed Species:

Endangered Species

- *Bear, Black
- ***Eagle, Bald[5]
- ***Woodpecker, Red-cockaded[5]
- ***Snake, Pine, Louisiana
- ***Paddlefish

Threatened Species

- ***Bat, Big-eared, Rafinesque's
- ***Stork, Wood
- ***Sparrow, Bachman's
- **Ibis, White-faced
- **Kite, Swallow-tailed, American
- *Egret, Reddish
- *Falcon, Peregrine, Arctic[5]
- ***Rattlesnake, Timber
- ***Turtle, Snapping, Alligator
- ***Snake, Scarlet, Northern
- **Lizard, Horned, Texas
- ***Blue Sucker
- ***Creek Chubsucker

Plate 64. Vegetation cover map of the Bon Wier Reservoir site.

Plate 65. Cypress-tupelo swamp in the Bon Wier Reservoir site.

BOSQUE RESERVOIR

Location: North Bosque River in Bosque County; dam site 6.2 RM above Meridian.

Normal Pool Elevation: 850 feet msl.
Type of Field Evaluation: HEP
Date of Field Evaluation: 1985

Cover Type/ Resource Category ()	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Riparian Forest (2)	793	.72	571	Minimum 25% Moderate 50% Maximum 100%	.079 .140 .280	8,167	4,078	2,039
Deciduous Forest (3)	119	.58	69	Minimum 25% Moderate 50% Maximum 100%	.105 .210 .420	610	305	152
Cropland (4)	1,069	.43	451	Minimum 25% Moderate 50% Maximum 100%	.143 .285 .570	5,154	1,582	791
Tame Grasses/ Herbland Savannah (4)	1,007	.65	453	Minimum 25% Moderate 50% Maximum 100%	.138 .275 .550	3,283	1,647	824
Native Grasses/ Herbland Savannah (3)	1,511	.59	891	Minimum 25% Moderate 50% Maximum 100%	.303 .205 .410	8,690	4,346	2,173
Total	4,479			Minimum 25% Moderate 50% Maximum 100%		23,854	11,959	5,979[1]

[1]Revised from detailed studies to 5,500 acres including 1,000 acres of upland woods and 250 acres of riparian forest as recommended by TPWD to TWC on March 28, 1989 in reference to Water Use Permit Application No. 5093.

TPWD Listed Species:

Endangered Species

- **Eagle, Bald[1]
- **Crane, Whooping[1]
- **Vireo, Black-capped[1]
- *Tern, Least, Interior[1]

Threatened Species

- ***Ibis, White-faced
- ***Warbler, Golden-cheeked
- **Stork, Wood
- **Falcon, Peregrine, Arctic[1]
- *Kite, Swallow-tailed, American
- ***Lizard, Horned, Texas
- ***Rattlesnake, Timber
- ***Snake, Water, Brazos

Plate 23. Riparian vegetation along tributary of the Bosque River.

TNHP Data Base Listing:

Golden-cheeked Warbler

Approximately 25-30 breeding pairs observed during a 4-year study at Meridian State Park located 6 miles from proposed reservoir; species is considered rare in Texas with over 100 estimated occurrences; no confirmation of any protected species.

BRECKENRIDGE RESERVOIR

Location: Clear Fork, Brazos River in Haskell and Throckmorton Counties; dam site approximately 6 miles below confluence of Paint Creek.

Normal Pool Elevation: 1354.5 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Riparian Forest (2)	2,248	.68	1,529	Minimum 25% Moderate 50% Maximum 100%	.080 .160 .320	19,115	9,550	4,778
Grasses (3)	5,303	.33	1,685	Minimum 25% Moderate 50% Maximum 100%	.168 .335 .670	10,018	5,024	2,512
Mesquite-Lotebush Shrub/Brush (5)	4,369	.44	1,922	Minimum 25% Moderate 50% Maximum 100%	.140 .280 .560	13,729	6,864	3,432
Other	2,877							
Total	14,595			Minimum 25% Moderate 50% Maximum 100%		42,860	21,444	10,722

TPWD Listed Species:

Endangered Species

*Eagle, Bald[F]
*Crane, Whooping[F]

Threatened Species

*Rat, Kangaroo, Texas
*Ibis, White-faced
*Kite, Swallow-tailed, American
*Warbler, Golden-cheeked
*Falcon, Peregrine, Arctic[1]
***Lizard, Horned, Texas
***Snake, Water, Brazos

TNHP Data Base Listing:

Brazos Water Snake

Confirmed occurrence within reservoir site along Clear Fork, Brazos River; occurs only in Texas; locally common but critically imperiled and vulnerable to extirpation.

Plate 58 Vegetation cover maps of the Breckenridge Reservoir site.

Plate 59 Stream and riparian forest at the Breckenridge Reservoir site.

CALDWELL RESERVOIR

Location: Cedar Creek in Burleson and Milam Counties; dam site approximately 6 miles northeast of Caldwell.

Normal Pool Elevation: 340 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Riparian Forest (2)	1,189	.75	891	Minimum 25% Moderate 50% Maximum 100%	165 125 250	14,163	7,128	3,564
Post Oak Woods (3)	2,689	.58	1,444	Minimum 25% Moderate 50% Maximum 100%	105 210 420	13,752	6,876	3,438
Grasses (3)	3,545	.39	1,382	Minimum 25% Moderate 50% Maximum 100%	153 305 610	9,055	4,531	2,266
Other	1,209							
Total	8,429			Minimum 25% Moderate 50% Maximum 100%		36,928	18,535	9,268

TPWD Listed Species:

Endangered Species

- **Eagle, Bald[P]
- **Crane, Whooping[1]
- *Vireo, Black-capped[1]
- ***Toad, Houston[1]
- ***Navasota ladies' tresses (*Spiranthes parksii*)[2]

Threatened Species

- **Kite, Swallow-tailed, American
- **Stork, Wood
- *Warbler, Golden-cheeked
- **Falcon, Peregrine, Arctic[2]
- *Ibis, White-faced
- ***Lizard, Horned, Texas
- ***Rattlesnake, Timber
- ***Blue Sucker

TNHP Data Base Listings:

Houston Toad
Located within areas adjacent to Lake Woodrow; area within immediate vicinity of proposed reservoir is designated as critical habitat; occurs only in Texas; extremely rare; critically imperiled; 21-100 estimated occurrences; specific protection of species occurring in at least one location.

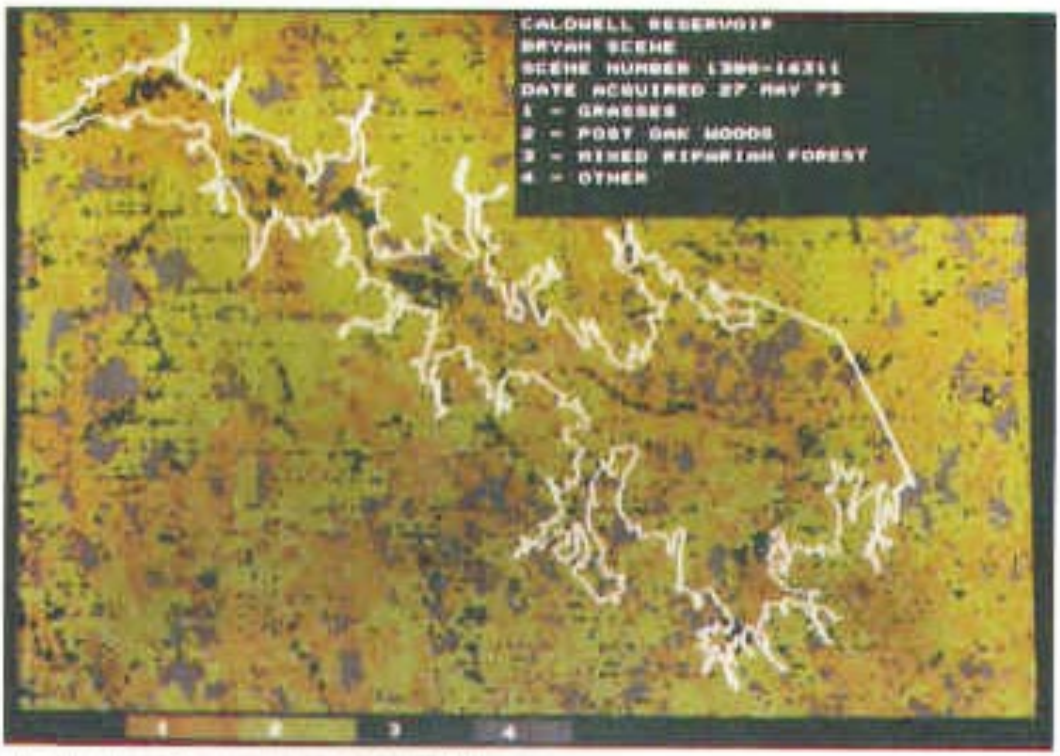

Plate 30. Vegetation cover map of the Caldwell Reservoir site.

CARL ESTES RESERVOIR

Location: Sabine River in Smith, Van Zandt, Rains and Wood Counties; dam site approximately 8 miles west of Mineola

Normal Pool Elevation: 372.5 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	15,628	.72	9,812	Minimum 25% Moderate 50% Maximum 100%	970 1,140 1,280	140,171	70,086	35,043
Grasses (5)	3,044	.35	1,065	Minimum 25% Moderate 50% Maximum 100%	165 325 650	6,554	5,277	1,638
Other	4,586							
Total	21,258			Minimum 25% Moderate 50% Maximum 100%		146,705	75,363	36,681

TPWD Listed Species:

Endangered Species

*Bear, Black
*Crane, Whooping[2]
*Tern, Least, Interior[3]
***Eagle, Bald[4]
***Woodpecker, Red-cockaded[5]
***Snake, Pine, Louisiana
***Paddlefish

Threatened Species

***Ibis, White-faced
***Falcon, Peregrine, Arctic[7]
***Sparrow, Bachman's
**Kite, Swallow-tailed, American
*Stork, Wood
***Turtle, Snapping, Alligator
***Snake, Scarlet, Northern
***Lizard, Horned, Texas
**Rattlesnake, Timber
***Creek Chubsucker

Plate 66. Vegetation cover map of the Carl Estes Reservoir site.

Plate 67. Bottomland hardwoods on the Sabine River at the Carl Estes Reservoir site.

Special Note: Proposed reservoir impacts hardwood bottomlands known as "Upper Sabine Bottom", identified as Priority 2 preservation site by FWS (1984a).

CIBOLO RESERVOIR

Location: Cibolo Creek in Wilson County; dam site approximately 6 miles south of Stockdale.

Normal Pool Elevation: 400.1 feet msl.
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Grasses (4)	1,510	.52	485	Minimum 25%	.170	2,843		
				Moderate 50%	.340		1,421	
				Maximum 100%	.680			710
Mesquite-Granjeno Brush/Woods (3)	4,572	.53	2,317	Minimum 25%	.118	19,636		
				Moderate 50%	.235		9,860	
				Maximum 100%	.470			4,930
Mixed Riparian Forest (2)	625	.69	431	Minimum 25%	.078	5,526		
				Moderate 50%	.155		2,783	
				Maximum 100%	.310			1,390
Crops (4)	954	.20	191	Minimum 25%	.200	955		
				Moderate 50%	.400		478	
				Maximum 100%	.800			239
Other	2,032							
Total	9,693			Minimum 25%		28,958		
				Moderate 50%			14,540	
				Maximum 100%				7,269

TPWD Listed Species:

Endangered Species

- **Crane, Whooping[1]
- *Eagle, Bald[2]
- *Tern, Least, Interior[2]
- *Vireo, Black capped[2]

Threatened Species

- **Kite, swallow tailed, American
- ***Warbler, Golden cheeked
- **Ibis, White faced
- **Stork, Wood
- **Falcon, Peregrine, Arctic[1]
- *Hawk, Zone tailed
- ***Tortoise, Texas
- ***Lizard, Horned, Texas
- **Rattlesnake, Timber
- *Snake, Indigo, Texas

Plate 56. Vegetation cover map of the Cibolo Reservoir site.

*Plate 57. The javelina (**Pecari tajacu**) or peccary prefers dense cover associated with the mesquite granjeno brush/woods and riparian forest vegetation of the Cibolo Reservoir site.*

CLEVELAND RESERVOIR

Location: East Fork of San Jacinto River in San Jacinto County; dam site approximately 8 miles northwest of Cleveland.

Normal Pool Elevation: 243 feet msl.
Type of Field Evaluation: HEP (FWS 1980b).
Date of Field Evaluation: 1985.

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Bottomland Hardwood Forest (2)	2,530	55	1,281	Minimum 25% Moderate 50% Maximum 100%	113 225 450	11,356	5,693	2,847
Oak-Hickory-Pine Forest (3)	1,069	58	620	Minimum 25% Moderate 50% Maximum 100%	105 210 420	5,905	2,952	1,476
Pine Forest (3)	6,033	54	1,759	Minimum 25% Moderate 50% Maximum 100%	115 230 460	15,296	7,647	3,824
Shrubland (5)	124	55	66	Minimum 25% Moderate 50% Maximum 100%	113 225 450	584	293	147
Grasses (3)	1,929	58	1,119	Minimum 25% Moderate 50% Maximum 100%	105 210 420	10,657	5,329	2,664
Total	11,485			Minimum 25% Moderate 50% Maximum 100%		43,778	21,914	10,958

TPWD Listed Species:

Endangered Species

***Eagle, Bald[F]
*Tern, Least, Interior[F]
***Woodpecker, Red-cockaded[F]
**Snake, Pine, Louisiana
**Paddlefish

Threatened Species

*Bat, Big-eared, Rafinesque's
***Stork, Wood
***Sparrow, Bachman's
**Kite, Swallow-tailed, American
**Falcon, Peregrine, Arctic[T]
***Egret, Reddish
*Ibis, White-faced
***Rattlesnake, Timber
**Lizard, Horned, Texas
**Turtle, Snapping, Alligator
***Creek Chubsucker

*Plate 17. The wood duck (**Aix sponsa**) is a resident of bottomland hardwood forests typified by the Cleveland Reservoir site.*

TNHP Data Base Listings:

Texas Screwstem: *(Bartonia texana)*

Located within vicinity of proposed reservoir approximately 2 miles south of Evergreen near FM 945, Little Thicket Preserve; occurs only in Texas, imperiled, very rare and vulnerable to extirpation; 6-20 estimated occurrences; specific protection of species occurring in at least one location.

Red-cockaded Woodpecker

Thirty-nine nesting colonies located within vicinity of proposed reservoir; imperiled globally and in Texas; very rare; vulnerable to extirpation; greater than 100 estimated occurrences; protected in at least one area.

CLOPTON CROSSING RESERVOIR

Location: Blanco River in Comal and Hays Counties; dam site at RM 52.5.

Normal Pool Elevation: 980.5 feet msl
Type of Field Evaluation: HEP (FWS 1978)
Date of Field Evaluation: 1976

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)	
Grasses (3)	1,041	.55	573	Minimum 25%	.113	5,071	
				Moderate 50%	.225		2,547
				Maximum 100%	.450		1,273
Oak-Juniper Parks (3)	1,452	.62	900	Minimum 25%	.095	9,474	
				Moderate 50%	.190		4,737
				Maximum 100%	.380		2,368
Oak-Juniper Woods (3)	3,035	.66	1,990	Minimum 25%	.085	23,412	
				Moderate 50%	.170		11,706
				Maximum 100%	.340		5,853
Pecan-Cypress Riparian Forest (2)	419	.81	339	Minimum 25%	.038	7,063	
				Moderate 50%	.095		3,568
				Maximum 100%	.190		1,784
Other	135						
Total	6,060			Minimum 25%		45,020	
				Moderate 50%			22,558
				Maximum 100%			11,278

TPWD Listed Species:

Endangered Species

- ***Eagle, Bald[3]
- ***Crane, Whooping[3]
- ***Vireo, Black-capped[3]
- *Tern, Least, Interior[3]
- ***Salamander, Blind, Texas (*Typhlomolge rathbuni*)[3]
- ***Salamander, Blind, Blanco
- ***San Marcos Gambusia (*Gambusia georgei*)[3]
- ***Fountain Darter (*Etheostoma fonticola*)[3]
- ***Texas Wild rice (*Zizania texana*)[3]

Threatened Species

- ***Hawk, White-tailed
- ***Hawk, Zone-tailed
- ***Warbler, Golden cheeked
- **Ibis, White faced
- **Kite, Swallow tailed, American
- **Stork, Wood
- ***Falcon, Peregrine, Arctic[3]
- ***Lizard, Horned, Texas
- *Rattlesnake, Timber
- ***Salamander, San Marcos (*Eurycea nana*)[3]
- ***Blue Sucker
- ***Salamander, Blind, Comal
- *Salamander, Cascade Caverns

*Plate 11. The ringtail (**Bassariscus astutus**) is a common resident of the oak-juniper parks and woods in addition to the pecan-cypress forest in the Clopton Crossing Reservoir site.*

TNHP Data Base Listing:

Texas Amorpha (*Amorpha roemeriana*)
located approximately 0.8 mile south of proposed conservation pool along SH 32; occurs only in Texas; imperiled, very rare and vulnerable to extirpation; 6-20 estimated occurrences; no confirmation of any protected plants. (See Addendum p. 59.)

COOPER RESERVOIR

(Under Construction)

Location: South Sulphur River in Delta and Hopkins Counties; dam site approximately 4 miles southeast of Cooper.

Normal Pool Elevation: 440 feet msl.
Type of Field Evaluation: HEP (FWS 1981b)
Date of Field Evaluation: 1980

Note: Due to currently active project construction, a summary of the mitigation settlement is provided in lieu of projected compensation requirements.

Cover Type/ Resource Category( )	Acres Lost
Mixed Bottomland Hardwood Forest(2)	5,905
Mixed Post Oak Woods/Parks(3)	5,800
Grasses (5)	7,600
Total	19,305

Cooper Reservoir is currently under construction after having been enjoined from such activity in 1971 by the U.S. District Court for the Eastern District of Texas. While a Final Environmental Statement (FES) was filed by the U.S. Army Corps of Engineers in 1978, the Court continued the injunction, issuing a memorandum detailing deficiencies of the FES. Among these the court cited a failure to incorporate and address State agency comments, a failure to provide a mitigation plan concurrent with the filing of the FES, and bias in presentation of cost-benefit ratios. As a part of correcting these deficiencies the Corps submitted to Congress a wildlife mitigation plan which included specific acquisition and management of 25,500 acres of mostly hardwood bottomlands and additional development and management of approximately 7,700 acres of project perimeter lands. In addition, annual funding of approximately $145,000 was allocated from Federal and non-Federal cost-sharing participants for annual operation and maintenance costs. The mitigation plan was authorized by Congress with passage of the Water Resources Development Act of 1986. Submission of a mitigation plan and subsequent authorization by Congress, with correction of the other deficiencies has freed the project from court litigation allowing continuation of construction work.

TPWD Listed Species:

Endangered Species

- ***Eagle, Bald *(Haliaeetus leucocephalus)*
- *Crane, Whooping *(Grus americana)*
- *Tern, Least, Interior *(Sterna antillarum athalassos)*
- *Snake, Pine, Louisiana *(Pituophis melanoleucus ruthveni)*
- *Paddlefish *(Polyodon spathula)*

Threatened Species

- **Falcon, Peregrine, Arctic *(Falco peregrinus tundrius)*
- **Sparrow, Bachman's *(Aimophila aestivalis)*
- *Ibis, White-faced *(Plegadis chihi)*
- **Kite, Swallow-tailed, American *(Elanoides forficatus)*
- *Stork, Wood *(Mycteria americana)*
- ***Turtle, Snapping, Alligator *(Macroclemys temminckii)*
- **Lizard, Horned, Texas *(Phrynosoma cornutum)*
- **Rattlesnake, Timber *(Crotalus horridus)*
- *Snake, Scarlet, Northern *(Cemophora coccinea copei)*
- ***Creek Chubsucker *(Erimyzon oblongus)*

Plate 2. Riparian zone along the South Sulphur River.

TNHP Data Base Listing:

Reservoir contains mixed bottomland hardwood forest stand locally known as "Horton Bottom" which was identified by FWS (1984a) as a priority 4 preservation site.

CUERO RESERVOIR

Location: Guadalupe River in DeWitt and Gonzales Counties; dam site approximately 4 miles north of Cuero.

Normal Pool Elevation: 212.5 feet msl.
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Grasses (4)	14,271	30	4,281	Minimum 25%	175	24,463		
				Moderate 50%	350		12,231	
				Maximum 100%	700			6,116
Mesquite Brush (3)	5,135	49	2,515	Minimum 25%	128	19,648		
				Moderate 50%	255		9,865	
				Maximum 100%	510			4,931
Mixed Riparian Forest (2)	7,209	83	5,983	Minimum 25%	043	139,160		
				Moderate 50%	085		70,388	
				Maximum 100%	170			35,194
Post Oak-Mesquite Woods (3)	5,938	57	3,385	Minimum 25%	108	31,343		
				Moderate 50%	215		15,744	
				Maximum 100%	430			7,872
Mesquite-Granjeno Parks (5)	3,632	54	1,961	Minimum 25%	115	17,052		
				Moderate 50%	230		8,526	
				Maximum 100%	460			4,263
Other	4,831							
Total	41,014			Minimum 25%		231,646		
				Moderate 50%			116,752	
				Maximum 100%				58,576

TPWD Listed Species:

Endangered Species

- *Tern, Least, Interior[1]
- ***Prairie-chicken, Greater, Attwater's[2]
- **Eagle, Bald[3]
- **Crane, Whooping[4]
- *Newt, Black-spotted
- *Siren, Lesser, Rio Grande

Threatened Species

- **Ibis, White-faced
- **Kite, Swallow-tailed, American
- ***Egret, Reddish
- *Hawk, White-tailed
- *Stork, Wood
- *Warbler, Golden-cheeked
- **Falcon, Peregrine, Arctic[1]
- **Tortoise, Texas
- ***Lizard, Horned, Texas
- ***Rattlesnake, Timber
- **Frog, Sheep
- *Blue Sucker

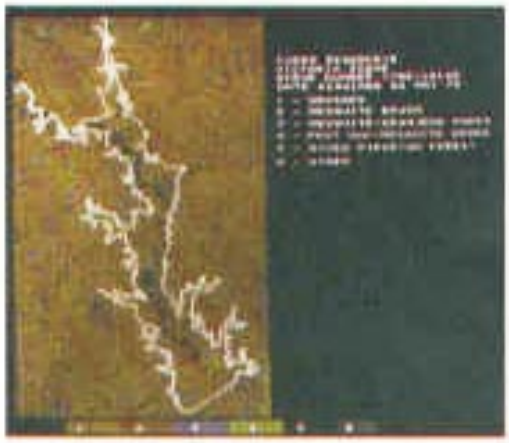

Plate 54 Vegetation cover map of the Cuero Reservoir site.

Plate 55 Large pecan tree in mixed riparian forest at the Cuero Reservoir site.

EASTEX RESERVOIR

Location: Mud Creek in Cherokee County; dam site approximately 5 miles downstream from US 79 crossing

Normal Pool Elevation: 315 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1984

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Grasses (4)	2,706	.32	866	Minimum 25%	170	5,094		
				Moderate 50%	340		2,547	
				Maximum 100%	680			1,274
Pine-Hardwood Forest (3)	2,599	.62	1,859	Minimum 25%	095	19,568		
				Moderate 50%	190		9,784	
				Maximum 100%	380			4,892
Mixed Bottomland Hardwood Forest (2)	3,517	.70	2,462	Minimum 25%	075	32,827		
				Moderate 50%	150		16,413	
				Maximum 100%	300			8,207
Other	867							
Total	10,089			Minimum 25%		57,489		
				Moderate 50%			28,744	
				Maximum 100%				14,375

TPWD Listed Species:

Endangered Species

*Bear, Black
***Woodpecker, Red-cockaded[F]
**Eagle, Bald[F]
***Snake, Pine, Louisiana
**Paddlefish

Threatened Species

*Bat, Big-eared, Rafinesque's
**Ibis, White-faced
**Falcon, Peregrine, Arctic[F]
**Sparrow, Bachman's
*Kite, Swallow-tailed, American
*Stork, Wood
***Lizard, Horned, Texas
**Turtle, Snapping, Alligator
**Rattlesnake, Timber
**Snake, Scarlet, Northern
***Creek Chubsucker

Plate 14. Vegetation cover map of the Eastex Reservoir site.

Plate 15. Backwater slough in bottomland hardwood site within the proposed Eastex Reservoir.

GEORGE PARKHOUSE I RESERVOIR

Location: South Sulphur River in Delta and Hopkins Counties; dam site at RM 3.6.

Normal Pool Elevation: 401 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	10,690	.73	7,804	Minimum 25% Moderate 50% Maximum 100%	.068 .135 .270	114,705	57,807	28,904
Grasses (3)	8,204	.49	4,020	Minimum 25% Moderate 50% Maximum 100%	.128 .255 .510	31,406	15,765	7,882
Crops (4)	4,553	.28	1,275	Minimum 25% Moderate 50% Maximum 100%	.180 .360 .720	7,085	3,542	1,771
Other	4,525							
Total	27,970			Minimum 25% Moderate 50% Maximum 100%		153,254	77,114	38,557

TPWD Listed Species:

Endangered Species

- ***Eagle, Bald[5]
- *Crane, Whooping[5]
- *Tern, Least, Interior[5]
- *Snake, Pine, Louisiana
- *Paddlefish

Threatened Species

- **Falcon, Peregrine, Arctic[5]
- **Sparrow, Bachman's
- *Ibis, White-faced
- **Kite, Swallow-tailed, American
- *Stork, Wood
- ***Turtle, Snapping, Alligator
- **Lizard, Horned, Texas
- **Rattlesnake, Timber
- *Snake, Scarlet, Northern
- ***Creek Chubsucker

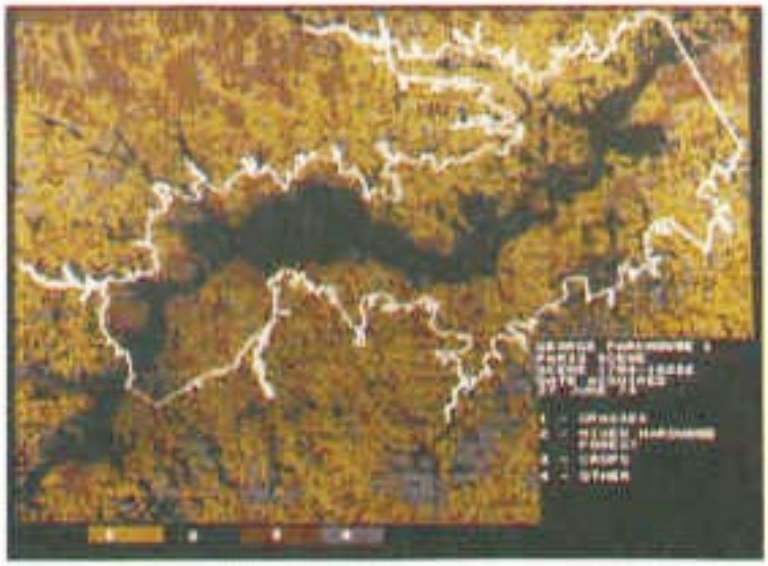

Plate 48. Vegetation cover maps of the George Parkhouse I Reservoir site.

Plate 49. Cropland in rice production at the George Parkhouse I Reservoir site.

GEORGE PARKHOUSE II RESERVOIR

Location: North Sulphur River in Lamar and Delta Counties; dam site at RM 5.5

Normal Pool Elevation: 401 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	1,865	.71	1,324	Minimum 25% Moderate 50% Maximum 100%	675 145 290	18,157	9,131	4,566
Grasses (5)	4,120	.53	2,184	Minimum 25% Moderate 50% Maximum 100%	118 235 470	18,508	9,294	4,647
Crops (4)	3,057	.18	550	Minimum 25% Moderate 50% Maximum 100%	205 410 820	2,683	1,341	671
Other	1,976							
Total	11,018			Minimum 25% Moderate 50% Maximum 100%		39,328	19,766	9,884

TPWD Listed Species:

Endangered Species

- ***Eagle, Bald[F]
- *Crane, Whooping[E]
- *Tern, Least, Interior[E]
- **Woodpecker, Red-cockaded[F]
- ***Snake, Pine, Louisiana
- ***Paddlefish

Threatened Species

- **Kite, Swallow-tailed, American
- **Falcon, Peregrine, Arctic[T]
- **Sparrow, Bachman's
- *Ibis, White-faced
- *Stork, Wood
- ***Lizard, Horned, Texas
- ***Rattlesnake, Timber
- *Turtle, Snapping, Alligator
- ***Blue Sucker

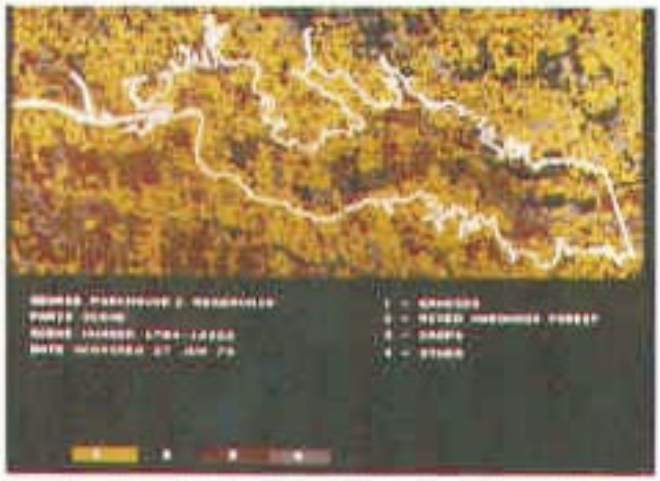

Plate 62. Vegetation cover map of the George Parkhouse II Reservoir site.

Plate 63. Cropland at the George Parkhouse II Reservoir site.

GOLIAD RESERVOIR

location: San Antonio River in Goliad and Karnes Counties, dam site approximately 5 miles west of Goliad.

Normal Pool Elevation: 207 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Grasses (4)	9,988	.33	3,296	Minimum 25%	.168	19,679		
				Moderate 50%	.335		9,839	
				Maximum 100%	.670			4,919
Mesquite-Granjeno Brush/Woods (5)	12,990	.59	7,664	Minimum 25%	.103	74,408		
				Moderate 50%	.205		37,385	
				Maximum 100%	.410			18,693
Mixed Riparian Forest (2)	2,541	.79	2,007	Minimum 25%	.053	37,868		
				Moderate 50%	.105		18,119	
				Maximum 100%	.210			9,557
Crops (4)	3,469	.21	728	Minimum 25%	.198	3,677		
				Moderate 50%	.395		1,843	
				Maximum 100%	.790			922
Other	3,014							
Total	32,002			Minimum 25%		135,572		
				Moderate 50%			68,181	
				Maximum 100%				34,091

TPWD Listed Species:

Endangered Species

*Jaguarundi[F]
*Ocelot[F]
***Eagle, Bald[F]
***Prairie-chicken, Greater, Attwater's[F]
***Crane, Whooping[F]
*Newt, Black-spotted
*Siren, Lesser, Rio Grande

Threatened Species

***Hawk, White-tailed
***Ibis, White-faced
**Kite, Swallow-tailed, American
**Stork, Wood
**Falcon, Peregrine, Arctic[T]
*Egret, Reddish
*Warbler, Golden-cheeked
***Tortoise, Texas
***Lizard, Horned, Texas
**Rattlesnake, Timber
*Snake, Indigo, Texas
*Snake, Scarlet, Texas
***Frog, Sheep

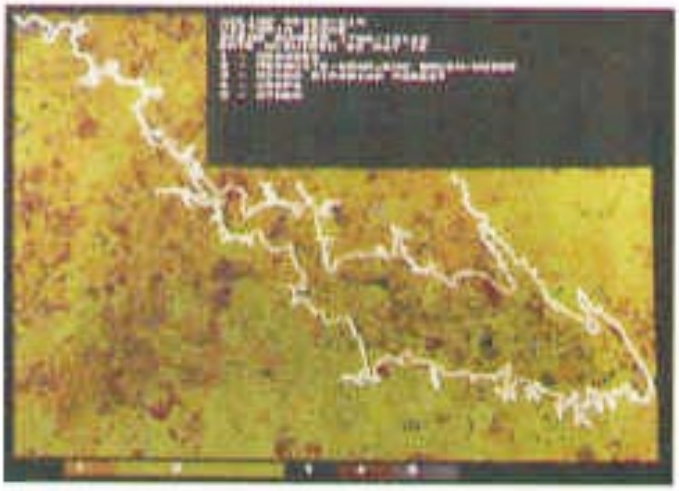

Plate 60. Vegetation cover map of the Goliad Reservoir site.

Plate 61. Riparian forest at the Goliad Reservoir site.

JUSTICEBURG RESERVOIR

Location: South Fork of Double Mountain Fork Brazos River in Garza and Kent Counties; dam site near the Garza - Kent County line.

Normal Pool Elevation: 2,220 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost[1]	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)
Grasses (3)	684	.40	194	Minimum 25%	.150	1,293
				Moderate 50%	.300	647
				Maximum 100%	.600	323
Mesquite-Lotebush Shrub (3)	396	.41	162	Minimum 25%	.148	1,095
				Moderate 50%	.295	549
				Maximum 100%	.590	275
Mesquite-Juniper Brush (3)	1,411	.58	818	Minimum 25%	.105	7,790
				Moderate 50%	.210	3,895
				Maximum 100%	.420	1,948
Mixed Riparian Woods (2)	26	.66	17	Minimum 25%	.085	200
				Moderate 50%	.170	100
				Maximum 100%	.340	50
Other	567					
Total	3,084			Minimum 25%		10,378
				Moderate 50%		5,491
				Maximum 100%		2,596

[1] Revised according to acreages provided by permit applicant's consultant. Mixed Riparian Woods were not delineated by Landsat imagery.

TPWD Listed Species:

Endangered Species

*Eagle, Bald[3]

Threatened Species

*Ibis, White Faced
*Falcon, Peregrine, Artic[3]
***Lizard, Horned, Texas

TNHP Data Base Listings:

Palo Duro Mouse (*Peromyscus comanche*)
Individual species located 6 miles east of Justiceburg in close proximity to proposed project; imperiled globally and within Texas, very rare, and vulnerable to extirpation; 6-20 estimated occurrences; no confirmation of any protected species.

Smalleye Shiner (*Notropis buccula*)
Proposed project site within range of species although no observations have been confirmed; occurs only in Texas; very rare and local throughout range; 21-100 estimated occurrences; threatened throughout range; no confirmation of any protected species.

Texas Poppy-Mallow (*Callirhoe scabriuscula*)
May occur within project vicinity on Tivoli sands; imperiled globally and in Texas; very rare and vulnerable to extinction; 6-20 estimated occurrences.

Plate 12. Vegetation cover map of the Justiceburg Reservoir site.

Plate 13. Mesquite-juniper brushland at the Justiceburg Reservoir site.

LAKE CREEK RESERVOIR

(San Jacinto Project)

Location Lake Creek in Montgomery County; dam site approximately 5 miles southwest of Conroe.

Normal Pool Elevation 182 feet msl
Type of Field Evaluation HEP (FWS 1980b)
Date of Field Evaluation 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Bottomland Hardwood Forest (2)	2,300	60	1,320	Minimum 25%	100	15,200		
				Moderate 50%	200		6,600	
				Maximum 100%	400			3,300
Oak-Hickory-Pine Forest (3)	1,403	55	772	Minimum 25%	113	6,832		
				Moderate 50%	225		3,431	
				Maximum 100%	450			1,715
Pine Forest (3)	5,499	53	2,914	Minimum 25%	118	24,695		
				Moderate 50%	235		12,400	
				Maximum 100%	470			6,200
Shrubland (3)	937	63	571	Minimum 25%	093	6,140		
				Moderate 50%	185		3,086	
				Maximum 100%	370			1,543
Grasses (3)	895	09	618	Minimum 25%	078	7,923		
				Moderate 50%	155		3,987	
				Maximum 100%	310			1,994
Total	10,934			Minimum 25%		58,790		
				Moderate 50%			29,504	
				Maximum 100%				14,752

TPWD Listed Species:

Endangered Species

- *Bear, Black
- ***Eagle, Bald[F]
- ***Woodpecker, Red-cockaded[F]
- *Tern, Least, Interior[F]
- *Snake, Pine, Louisiana
- ***Paddlefish

Threatened Species

- ***Egret, Reddish
- ***Sparrow, Bachman's
- **Kite, Swallow-tailed, American
- **Stork, Wood
- **Falcon, Peregrine, Arctic[F]
- **Ibis, White-faced
- **Lizard, Horned, Texas
- **Rattlesnake, Timber
- **Turtle, Snapping, Alligator
- ***Creek Chubsucker

*Plate 42. The bullfrog (**Rana catesbeiana**) is a common resident of wetlands within the Lake Creek Reservoir site.*

TNHP Data Base Listing:

Heller's Marble-seed (*Onosmodium helleri*)

Occurs within general vicinity of proposed reservoir; found only in Texas and is considered rare with 6-20 estimated occurrences; specific protection of species occurring in at least one location.

LIBERTY HILL RESERVOIR

Location: Mud Creek and Holly Creek in Bowie County; dam site at RM 9.0 on Mud Creek.

Normal Pool Elevation: 346 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1984

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)
Grasses (4)	1,979	.39	752	Minimum 25%	.155	4,852
				Moderate 50%	.510	2,426
				Maximum 100%	.520	1,213
Pine-Hardwood Forest (3)	1,305	.42	548	Minimum 25%	.145	3,779
				Moderate 50%	.290	1,890
				Maximum 100%	.580	945
Hardwood-Pine Forest (3)	1,713	.58	994	Minimum 25%	.105	9,467
				Moderate 50%	.210	4,735
				Maximum 100%	.420	2,367
Mixed Bottomland Hardwood Forest (2)	1,857	.79	1,435	Minimum 25%	.053	27,075
				Moderate 50%	.105	15,667
				Maximum 100%	.210	6,833
Other	318					
Total	7,132			Minimum 25%		45,175
				Moderate 50%		22,710
				Maximum 100%		11,358

TPWD Listed Species:

Endangered Species

*Bear, Black
***Eagle, Bald[8]
***Tern, Least, Interior[8]
***Woodpecker, Red-cockaded[8]
***Paddlefish
**Shovelnose Sturgeon
(Scaphirhynchus platorynchus)

Threatened Species

***Kite, Swallow-tailed, American
***Stork, Wood
***Sparrow, Bachman's
*Falcon, Peregrine, Arctic[7]
***Lizard, Horned, Texas
***Rattlesnake, Timber
*Snake, Scarlet, Northern
***Creek Chubsucker
***Blackside Darter
**Blue Sucker

Plate 39. Vegetation cover map of the Liberty Hill Reservoir site.

Plate 40. Hardwood-pine forest of Liberty Hill Reservoir site.

Plate 41. Pine-hardwood forest of Liberty Hill Reservoir site.

LINDENAU RESERVOIR

Location: Sandies Creek in DeWitt and Gonzales Counties; dam site approximately 5 miles northwest of Cuero

Normal Pool Elevation: 250.1 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1984

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mesquite-Granjeno Brush (3)	6,964	.45	2,729	Minimum 25%	.138	19,775		
				Moderate 50%	.275		9,924	
				Maximum 100%	.550			4,962
Mixed Riparian Forest (2)	3,054	.84	2,565	Minimum 25%	.040	64,125		
				Moderate 50%	.080		32,063	
				Maximum 100%	.160			16,031
Grasses (4)	19,668	.33	6,490	Minimum 25%	.168	38,631		
				Moderate 50%	.335		19,373	
				Maximum 100%	.670			9,687
Mesquite-Granjeno-Live Oak Parks (3)	7,871	.60	4,723	Minimum 25%	.100	47,230		
				Moderate 50%	.200		23,615	
				Maximum 100%	.400			11,808
Post Oak-Live Oak-Mesquite Woods (3)	7,465	.59	4,404	Minimum 25%	.103	42,757		
				Moderate 50%	.205		21,483	
				Maximum 100%	.410			10,741
Other	5,198							
Total	49,320			Minimum 25%		212,518		
				Moderate 50%			106,458	
				Maximum 100%				53,229

TPWD Listed Species:

Endangered Species

- *Tern, Least, Interior[E]
- ***Prairie-chicken, Greater, Attwater's[E]
- **Eagle, Bald[E]
- **Crane, Whooping[E]
- *Newt, Black-spotted
- *Siren, Lesser, Rio Grande

Threatened Species

- **Ibis, White-faced
- **Kite, Swallow-tailed, American
- ***Egret, Reddish
- *Hawk, White-tailed
- *Stork, Wood
- *Warbler, Golden-cheeked
- **Falcon, Peregrine, Arctic[T]
- **Tortoise, Texas
- ***Lizard, Horned, Texas
- ***Rattlesnake, Timber
- **Frog, Sheep
- *Blue Sucker

Plate 26. Vegetation cover map of the Lindenau Reservoir site.

Plate 27. Spring flowers within a grassland at the Lindenau Reservoir site.

LITTLE CYPRESS RESERVOIR

Location: Little Cypress Creek in Harrison County; dam site at RM 19.7.[1]

Normal Pool Elevation: 230 feet msl
Type of Field Evaluation: HEP (FWS 1985c)
Date of Field Evaluation: 1985

Cover Type/ Resource Category ()	Acres Lost[2]
Bottomland Hardwood Forest (2)	7,359
Hardwood Pine Forest (3)	2,512
Hardwood Pine Cutover Brush/ Woods (3)	1,075
Grasses (3)	2,507
Other	513
Total	13,966

[1]Dam site alternative preferred by Little Cypress Utility District, 1987.
[2]Revised according to acreages provided by permit applicant's consultant.

NOTE:

Detailed studies indicated full compensation for terrestrial losses would have required acquisition and subsequent intensive management of 17,413 acres including 12,227 acres of bottomland hardwood forests. On September 8, 1988, the Texas Water Commission issued a Permit to Appropriate State Water (No. 5098). Special conditions of this permit will require the permittee to acquire 12,000 acres of land including 10,000 acres of bottomland hardwood forests with quality at least equivalent or greater than bottomland hardwoods inundated by the reservoir. Further, the mitigation lands shall be maintained in perpetuity and managed to preserve and enhance wildlife resources and shall be accessible for public recreation including hunting and fishing.

TPWD Listed Species:

Endangered Species

*Bear, Black
***Eagle, Bald[3]
***Woodpecker, Red-cockaded[3]
**Snake, Pine, Louisiana
***Paddlefish
*Shovelnose Sturgeon

Threatened Species

***Bat, Big-eared, Rafinesque's
***Kite, Swallow-tailed, American
***Stork, Wood
***Sparrow, Bachman's
*Ibis, White-faced
*Falcon, Peregrine, Arctic[3]
***Lizard, Horned, Texas
***Turtle, Snapping, Alligator
***Snake, Scarlet, Northern
**Rattlesnake, Timber
***Bluehead Shiner
***Creek Chubsucker
***Blackside Darter
*Blue Sucker

*Plate 46. The river otter (**Lutra canadensis**) inhabits wetlands associated with bottomland hardwoods as typified by the Little Cypress Reservoir site.*

TNHP Data Base Listings:

Texas Trillium (*Trillium texanum*)
Located within general vicinity of proposed reservoir; found only in Texas; imperiled, very rare, vulnerable to extirpation; 21-100 estimated occurrences; no confirmation of any protected plants.

Barberry-leaved Hawthorn (*Crataegus berberifolia*)
Located within general vicinity of proposed reservoir; found only in Texas; critically imperiled, extremely rare, very vulnerable to extirpation; 5 or fewer estimated occurrences.

Water Oak-Sweetgum Series
Adjacent to Little Cypress Bayou, progressing west approximately 8 miles from US Hwy 59 bridge; known as "Little Cypress Bayou" and identified as Priority 2 preservation site by FWS (1984a).

LOCKHART RESERVOIR

Location: Plum Creek and Hun Creek in Caldwell County, dam site approximately 2 miles north of Lockhart.

Normal Pool Elevation: 477.0 feet msl.
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Crops (4)	270	.22	59	Minimum 25%	.195	303		
				Moderate 50%	.390		151	
				Maximum 100%	.780			76
Mixed Riparian Forest (2)	233	.74	172	Minimum 25%	.065	2,646		
				Moderate 50%	.130		1,323	
				Maximum 100%	.260			662
Grasses (4)	361	.31	112	Minimum 25%	.173	647		
				Moderate 50%	.345		325	
				Maximum 100%	.690			162
Live Oak-Mesquite Parks (5)	925	.60	555	Minimum 25%	.100	5,550		
				Moderate 50%	.200		2,775	
				Maximum 100%	.400			1,388
Other	196							
Total	1,985			Minimum 25%		9,146		
				Moderate 50%			4,574	
				Maximum 100%				2,288

TPWD Listed Species:

Endangered Species

- **Eagle, Bald[1]
- **Crane, Whooping[1]
- *Tern, Least, Interior[1]
- *Vireo, Black-capped[1]
- *San Marcos Gambusia[1]
- *Fountain Darter[1]

Threatened Species

- **Ibis, White faced
- **Kite, Swallow tailed, American
- **Stork, Wood
- **Falcon, Peregrine, Artic[1]
- *Hawk, Zone tailed
- *Warbler, Golden-cheeked
- ***Rattlesnake, Timber
- **Lizard, Horned, Texas
- ***Blue Sucker

Plate 43. Vegetation cover map of the Lockhart Reservoir site.

Plate 44. Cropland at the Lockhart Reservoir site.

MARVIN NICHOLS I RESERVOIR

Location: Sulphur River in Franklin, Titus, Morris, Bowie and Red River Counties; dam site approximately 17 miles northeast of Mount Pleasant.

Normal Pool Elevation: 312 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	30,041	.81	24,333	Minimum 25% Moderate 50% Maximum 100%	.048 .095 .190	506,936	256,157	128,868
Mixed Post Oak Forest (3)	15,469	.63	9,745	Minimum 25% Moderate 50% Maximum 100%	.093 .185 .370	104,785	52,676	26,338
Grasses (4)	12,723	.42	5,344	Minimum 25% Moderate 50% Maximum 100%	.145 .290 .580	36,855	18,428	9,214
Other	8,288							
Total	66,521			Minimum 25% Moderate 50% Maximum 100%		648,578	327,241	165,620

TPWD Listed Species:

Endangered Species

*Bear, Black
*Curlew, Eskimo[1]
***Eagle, Bald[2]
***Woodpecker, Red-cockaded[2]
***Tern, Least, Interior[3]
*Snake, Pine, Louisiana
***Paddlefish
*Shovelnose sturgeon

Threatened Species

*Bat, Big-eared, Rafinesque's
***Kite, Swallow-tailed, American
***Stork, Wood
***Sparrow, Bachman's
*Ibis, White-faced
*Falcon, Peregrine, Arctic[1]
***Lizard, Horned, Texas
*Turtle, Snapping, Alligator
***Rattlesnake, Timber
*Snake, Scarlet, Northern
***Creek Chubsucker
***Blackside Darter
**Bluehead Shiner
**Blue Sucker

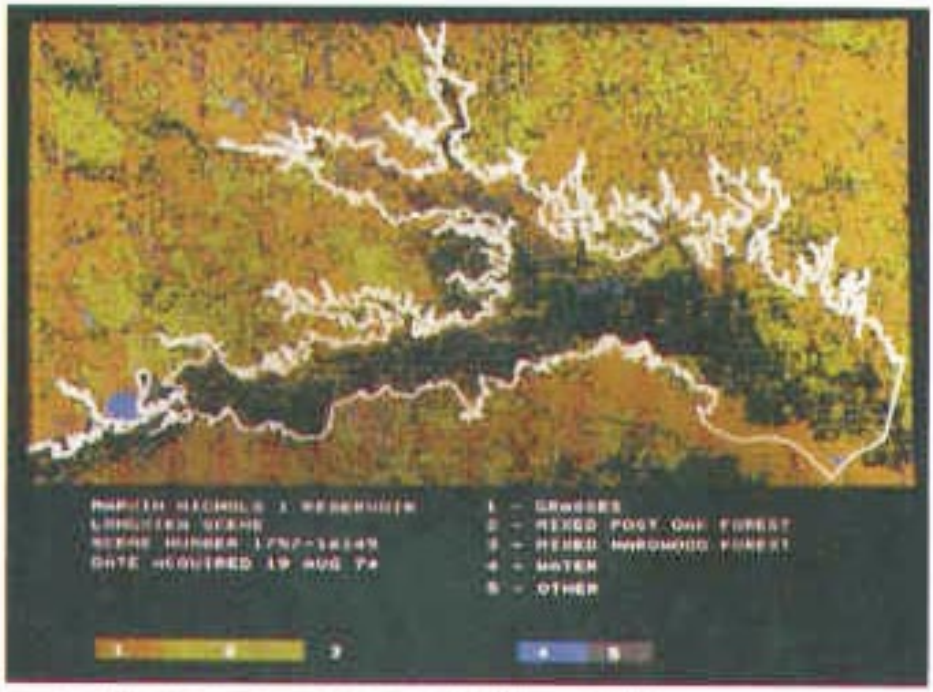

Plate 71 Vegetation cover map of the Marvin Nichols I Reservoir site.

TNHP Data Base Listing:

Houston Meadow-rue

Close proximity to Little Mustang Creek arm of proposed reservoir; occurs only in Texas; critically imperiled; extremely rare and very vulnerable to extirpation; 5 or fewer estimated occurrences; no confirmation of any protected plants.

Special Note: Proposed reservoir impacts two hardwood bottoms known as "Sulphur River West" and "Cuthand Creek", identified respectively as Priority 1 and Priority 5 preservation sites by FWS (1984a).

MILLICAN RESERVOIR

location Navasota River in Brazos, Grimes, and Madison Counties; Pancher Creek dam site approximately 15 miles east of Bryan

Normal Pool Elevation 265 feet msl
Type of Field Evaluation HEP (FWS 1982b)
Date of Field Evaluation 1982

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Upland Woods (3)	7,240	.39	2,824	Minimum 25%	155	18,458		
				Moderate 50%	305		9,259	
				Maximum 100%	610			4,630
Grasses/Parks (3)	29,410	.33	9,575	Minimum 25%	168	55,804		
				Moderate 50%	335		27,985	
				Maximum 100%	670			13,993
Mixed Bottomland Hardwood Forest (2)	26,750	.63	16,840	Minimum 25%	093	181,075		
				Moderate 50%	185		91,027	
				Maximum 100%	370			45,514
Emergent Wetland (2)	490	.58	284	Minimum 25%	105	2,705		
				Moderate 50%	210		1,352	
				Maximum 100%	420			676
Other	540							
Total	63,410			Minimum 25%		258,042		
				Moderate 50%			129,623	
				Maximum 100%				64,813

TPWD Listed Species:

Endangered Species

- ***Eagle, Bald[F]
- **Crane, Whooping[E]
- *Tern, Least, Interior[E]
- *Woodpecker, Red-cockaded[E]
- *Snake, Pine, Louisiana
- ***Navasota Ladies'-tresses[T]
- *Paddlefish

Threatened Species

- ***Hawk, White-tailed
- ***Falcon, Peregrine, Arctic[T]
- **Ibis, White-faced
- ***Stork, Wood
- **Sparrow, Bachman's
- *Kite, Swallow-tailed, American
- ***Lizard, Horned, Texas
- ***Rattlesnake, Timber
- ***Blue Sucker
- *Creek Chubsucker

*Plate 34. The fox squirrel (**Sciurus niger**) is a common resident of the mixed bottomland hardwood forest at the Millican Reservoir site.*

TNHP Data Base Listings:

Navasota Ladies'-tresses

A total of 56 occurrences reported within vicinity of proposed reservoir; found only in Texas, imperiled, very rare and vulnerable to extirpation; 21-100 estimated occurrences; no confirmation of any protected plants.

Houston Meadow-rue *(Thalictrum texanum)*

A total of 4 occurrences reported within vicinity of proposed reservoir; found only in Texas, critically imperiled, extremely rare and very vulnerable to extirpation; 5 or fewer estimated occurrences; no confirmation of any protected plants.

Smallhead Pipewort *(Eriocaulon koernickianum)*

Occurrence reported in general vicinity of proposed reservoir; critically imperiled in Texas, extremely rare and very vulnerable to extirpation; 5 or fewer estimated occurrences; no confirmation of any protected plants.

Branched Gayfeather *(Liatris cymosa)*

Six occurrences reported within vicinity of proposed reservoir; found only in Texas, imperiled, very rare, and vulnerable to extirpation; 6-20 estimated occurrences; no confirmation of any protected plants.

Water Oak - Sweetgum Series

Adjacent to Sand Creek both upstream and downstream of US Hwy 190 bridge; known as "Sand Creek" and identified as Priority 2 preservation site by FWS (1984a).

Overcup Oak *(Quercus lyrata)* Series

Located within Navasota River floodplain to include the area from SH 6 bridge north to 8 miles north of SH 21 bridge; known as the "Navasota River Bottoms" and identified as Priority 2 preservation site by the FWS (1984a).

PALO DURO RESERVOIR

Location: Palo Duro Creek in Hansford County; dam site at RM 34.7.

Normal Pool Elevation: 2887.2 feet msl.
Type of Field Evaluation: HEP (FWS 1982a)
Date of Field Evaluation: 1979

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Riparian Woods (2)	562	.50	181	Minimum 25%	.125	1,448		
				Moderate 50%	.250		724	
				Maximum 100%	.500			562
Juniper Brush (5)	165	.63	104	Minimum 25%	.093	1,118		
				Moderate 50%	.185		562	
				Maximum 100%	.370			281
Grasses/Shrub (4)	1,387	.53	735	Minimum 25%	.118	6,229		
				Moderate 50%	.235		3,128	
				Maximum 100%	.470			1,564
Other	208							
Total	2,122			Minimum 25%		8,795		
				Moderate 50%			4,414	
				Maximum 100%				2,207

TPWD Listed Species:

Endangered Species

*Ferret, Black-footed[P]
(Mustela nigripes)
**Eagle, Bald[P]
*Tern, Least, Interior[E]

Threatened Species

*Ibis, White-faced
*Falcon, Peregrine, Arctic[T]
***Lizard, Horned, Texas

Plate 30. View of riparian zone at the Palo Duro Reservoir site.

PALUXY RESERVOIR

Location: Paluxy River in Hood and Somervell Counties; dam site approximately 5 miles west of Glen Rose.

Normal Pool Elevation: 781 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1984

Cover Type/ Resource Category( )	Acres Lost[1]	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Crops/Grasses (4)	2,572	.32	823	Minimum 25%	.170	4,841		
				Moderate 50%	.340		2,421	
				Maximum 100%	.680			1,210
Oak-Mesquite-Juniper Parks (3)	230	.40	92	Minimum 25%	.150	613		
				Moderate 50%	.300		307	
				Maximum 100%	.600			153
Mixed Riparian Forest (2)	566	.66	374	Minimum 25%	.085	4,400		
				Moderate 50%	.170		2,200	
				Maximum 100%	.340			1,100
Oak-Mesquite-Juniper Woods (3)	395	.49	194	Minimum 25%	.128	1,516		
				Moderate 50%	.255		761	
				Maximum 100%	.510			380
Other	85							
Total	3,848			Minimum 25%		11,570		
				Moderate 50%			5,689	
				Maximum 100%				2,843

[1] Revised according to acreages provided by permit applicant's consultant.

TPWD Listed Species:

Endangered Species

***Eagle, Bald[3]
**Crane, Whooping[3]
**Vireo, Black-capped[3]
*Tern, Least, Interior[3]

Threatened Species

***Warbler, Golden-cheeked
**Falcon, Peregrine, Arctic[3]
**Ibis, White-faced
*Kite, Swallow-tailed, American
*Stork, Wood
***Lizard, Horned, Texas
***Snake, Water, Brazos (*Nerodia harteri harteri*)
*Rattlesnake, Timber

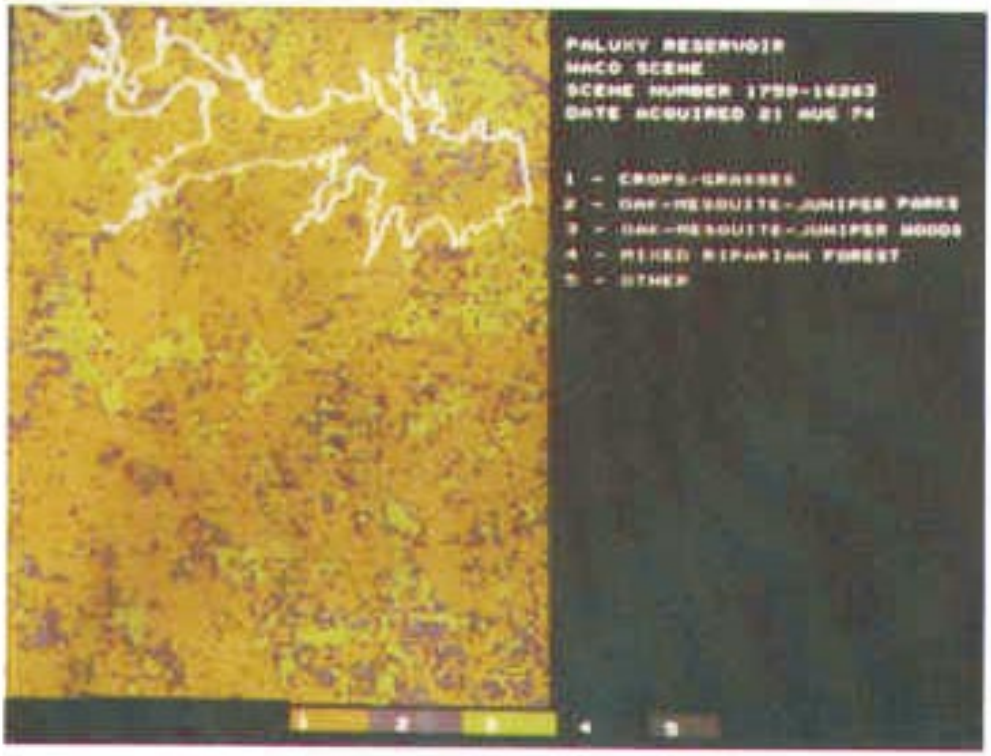

Plate 11 Vegetation cover map of the Paluxy Reservoir site.

POST RESERVOIR

Location: North Fork, Double Mountain Fork, Brazos River in Garza County; dam site approximately 5 miles northeast of Post.

Normal Pool Elevation: 2,430 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mesquite Shrub/ Grasses (5)	1,693	.40	677	Minimum 25%	150	4,513		
				Moderate 50%	300		2,257	
				Maximum 100%	600			1,128
Salt Cedar/Willow Brush (5)	370	.50	185	Minimum 25%	125	1,480		
				Moderate 50%	350		740	
				Maximum 100%	500			370
Total	2,063			Minimum 25%		5,993		
				Moderate 50%			2,997	
				Maximum 100%				1,498

TPWD Listed Species:

Endangered Species

Eagle, Bald

Threatened Species

Falcon, Peregrine, Arctic
**Lizard, Horned, Texas

Plate 24. Shrubland within the Post Reservoir site.

TNHP Data Base Listings:

Texas Poppy Mallow

May occur within project vicinity on Devil sands; imperiled globally and in Texas; very rare and vulnerable to extinction; 6-20 estimated occurrences.

PRAIRIE CREEK RESERVOIR

Location: Prairie Creek in Smith and Gregg Counties; dam site at FM 2267 crossing.

Normal Pool Elevation: 320 feet msl
Type of Field Evaluation: WHAP (PWS 1984b)
Date of Field Evaluation: 1984

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Hardwood-Pine Forest (3)	1,026	59	605	Minimum 25%	103	5,874		
				Moderate 50%	205		2,951	
				Maximum 100%	410			1,476
Pine Forest (3)	144	44	63	Minimum 25%	140	450		
				Moderate 50%	280		225	
				Maximum 100%	560			113
Grasses (3)	942	31	292	Minimum 25%	175	1,688		
				Moderate 50%	345		846	
				Maximum 100%	690			423
Bottomland Hardwood Forest (2)	305	76	232	Minimum 25%	060	3,867		
				Moderate 50%	120		1,933	
				Maximum 100%	240			967
Other	83							
Total	2,500			Minimum 25%		11,879		
				Moderate 50%			5,955	
				Maximum 100%				2,979

TPWD Listed Species:

Endangered Species

*Bear, Black
***Eagle, Bald[F]
***Woodpecker, Red-cockaded[F]
**Snake, Pine, Louisiana
**Paddlefish

Threatened Species

*Bat, Big-eared, Rafinesque's
***Ibis, White-faced
***Falcon, Peregrine, Arctic[F]
***Sparrow, Bachman's
**Kite, Swallow-tailed, American
**Stork, Wood
***Turtle, Snapping, Alligator
***Snake, Scarlet, Northern
**Lizard, Horned, Texas
**Rattlesnake, Timber
***Creek Chubsucker
*Blackside Darter

*Plate 35. The mockingbird (**Mimus polyglottos**) commonly occurs near the margins of grasslands at the Prairie Creek Reservoir site.*

RETAMAL RESERVOIR

Location: Rio Grande River in Hidalgo County; dam site at RM 132.5.

Normal Pool Elevation: 75.0 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost
Mixed Riparian Woods (1)	258
Total	258

Note: Due to the Resource Category 1 designation, adverse impacts to the mixed riparian woods must be avoided under FWS mitigation policy goals. As a result compensation requirements were not calculated for this cover type.

TPWD Listed Species:

Endangered Species

- ***Jaguarundi (*Felis yagouaroundi*)[1]
- ***Ocelot (*Felis pardalis*)[1]
- **Coati
- ***Eagle, Bald[1]
- ***Vireo, Black capped[1]
- *Pelican, Brown[1]
- *Falcon, Aplomado (*Falco femoralis*)
- ***Racer, Speckled (*Drymobius margaritiferus*)
- ***Snake, Cat-eyed, Northern (*Leptodeira s. septentrionalis*)
- ***Frog, White lipped (*Leptodactylus fragilis*)
- ***Siren, Black-spotted (*Notophthalmus meridionalis*)
- ***Siren, Lesser, Rio Grande (*Siren intermedia texana*)
- *Phantom Shiner (*Notropis orca*)

Threatened Species

- ***Rat, Rice, Coues (*Oryzomys couesi*)
- *Bat, Yellow, Southern (*Lasiurus ega*)
- ***Egret, Reddish
- ***Hawk, Black, Common (*Buteogallus anthracinus*)
- ***Hawk, Gray (*Buteo nitidus*)
- ***Hawk, White-tailed (*Buteo albicaudatus*)
- ***Hawk, Zone-tailed
- ***Ibis, White-faced
- ***Kite, Swallow-tailed, American
- ***Owl, Pygmy, Ferruginous (*Glaucidium brasilianum*)
- ***Stork, Wood
- ***Falcon, Peregrine, Arctic[1]
- ***Becard, Rose-throated (*Pachyramphus aglaiae*)
- ***Parula, Tropical (*Parula pitiayumi*)
- ***Plover, Piping[1]
- ***Tyrannulet, Beardless, Northern (*Camptostoma imberbe*)
- **Sparrow, Baxter's (*Ammodramus baxteri*)
- *Warbler, Golden-cheeked
- ***Tortoise, Texas
- ***Lizard, Collared, Reticulate (*Crotaphytus reticulatus*)
- ***Lizard, Horned, Texas
- ***Snake, Black-striped (*Coniophanes imperialis imperialis*)
- ***Snake, Indigo, Texas
- **Snake, Scarlet, Texas (*Cemophora coccinea lineri*)
- ***Treefrog, Mexican (*Smilisca baudinii*)
- ***Frog, Sheep (*Hypopachus variolosus*)
- *Toad, Burrowing, Mexican (*Rhinophrynus dorsalis*)
- ***Goby, River (*Awaous tajasica*)

TNHP Data Base Listing:

Montezuma Bald Cypress (*Taxodium mucronatum*)
Individual plant species located 0.25 miles east of Santa Ana NWR near Rio Grande River, imperiled within Texas, very rare, and vulnerable to extirpation; 6-20 estimated occurrences; no confirmation of any protected plants. (See Addendum [p. 59] for additional listings.)

Photo 8: Rio Grande River in vicinity of the Retamal Reservoir site.

Photo 9: Riparian woodland tracked on Santa Ana National Wildlife Refuge at Retamal Reservoir site.

RINGGOLD RESERVOIR

Location: Wichita River in Clay County; dam site near confluence with Red River.

Normal Pool Elevation: 852 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Riparian Forest (2)	4,782	.73	5,491	Minimum 25% Moderate 50% Maximum 100%	.068 .135 .270	51,338	25,859	12,930
Grasses/Mesquite Shrub (3)	8,362	.48	4,014	Minimum 25% Moderate 50% Maximum 100%	.130 .260 .520	30,877	15,438	7,719
Mesquite Brush (3)	2,912	.47	1,369	Minimum 25% Moderate 50% Maximum 100%	.133 .265 .530	10,293	5,166	2,583
Other	1,775							
Total	17,829			Minimum 25% Moderate 50% Maximum 100%		92,508	46,463	23,232

TPWD Listed Species:

Endangered Species

- ***Crane, Whooping[8]
- *Eagle, Bald[8]
- *Tern, Least, Interior[8]

Threatened Species

- ***Rat, Kangaroo, Texas
- **Ibis, White-faced
- *Kite, Swallow-tailed, American
- *Stork, Wood
- *Falcon, Peregrine, Arctic[7]
- ***Lizard, Horned, Texas
- *Rattlesnake, Timber

Plate 51. Vegetation cover map of the Ringgold Reservoir site.

Plate 52. Riparian forest at the Ringgold Reservoir site.

RIO GRANDE CHANNEL DAM A RESERVOIR

Location: Rio Grande River in Cameron County; dam site at RM 43.1.

Normal Pool Elevation: 21.5 feet msl
Type of Field Evaluation: WTAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost
Mixed Riparian Woods (1)	422
Total	422

Note: Due to the Resource Category 1 designation, adverse impacts to the mixed riparian woods must be avoided under FWS mitigation policy goals. As a result compensation requirements were not calculated for this cover type.

TPWD Listed Species:

Endangered Species

***Jaguarundi[1]
***Ocelot[1]
***Coati
***Pelican, Brown[1]
***Eagle, Bald[1]
***Falcon, Aplomado
***Vireo, Black capped[1]
**Tern, Least, Interior[1]
*Curlew, Eskimo[1]
***Racer, Speckled
***Ridley, Atlantic[1]
***Loggerhead[1]
***Snake, Cat-eyed, Northern
***Frog, White lipped
***Newt, Black spotted
***Siren, Lesser, Rio Grande
***Goby, Bladefin
(*Gobionellus atripinnis*)
*Phantom Shiner

Threatened Species

***Bat, Yellow, Southern
***Rat, Rice, Coues'
***Egret, Reddish
***Hawk, Black , Common
***Hawk, Gray
***Hawk, White tailed
***Hawk, Zone tailed
***Ibis, White faced
***Kite, Swallow tailed, American
***Owl, Pygmy , Ferruginous
***Stork, Wood
***Warbler, Golden cheeked
***Falcon, Peregrine, Arctic[1]
***Becard, Rose throated
***Parula, Tropical
***Plover, Piping[1]
***Sparrow, Botteri's
***Tern, Sooty (*Sterna fuscata*)
***Tyrannulet, Beardless , Northern
***Tortoise, Texas
***Lizard, Horned, Texas
***Snake, Black striped
***Snake, Indigo, Texas
**Turtle, Green, Atlantic[1]
**Snake, Scarlet, Texas
*Lizard, Collared, Reticulate
***Treefrog, Mexican
***Frog, Sheep
***Goby, River
***Opossum Pipefish
(*Oostethus brachyurus*)

*Plate 10. Sabal Palm (**Sabal sp.**) in areas of Rio Grande Channel Dam A*

TNHP Data Base Listing:

Montezuma Bald Cypress
Individual plant species located along levee near Rio Grande River within close proximity of project; imperiled within Texas, very rare; 6-20 estimated occurrences; no confirmation of any protected plants. (See Addendum [p. 59] for additional listings.)

ROCKLAND RESERVOIR

Location: Neches River in Angelina, Trinity, Polk, Tyler and Jasper Counties; dam site approximately 3 miles west of Rockland.

Normal Pool Elevation: 165 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)	
Mixed Bottomland Hardwood Forest (2)	27,362	.81	22,147	Minimum 25% Moderate 50% Maximum 100%	.048 .095 .190	461,396	233,126 116,563
Mixed Hardwood-Pine Forest (3)	50,855	.60	30,500	Minimum 25% Moderate 50% Maximum 100%	.100 .200 .400	305,000	152,500 76,250
Other	21,349						
Total	99,524			Minimum 25% Moderate 50% Maximum 100%		766,396	385,626 192,813

TPWD Listed Species:

Endangered Species

*Bear, Black
***Eagle, Bald[5]
***Woodpecker, Red-cockaded[5]
*Tern, Least, Interior[6]
***Snake, Pine, Louisiana
***Paddlefish

Threatened Species

***Bat, Big-eared, Rafinesque's
***Stork, Wood
***Sparrow, Bachman's
**Ibis, White-faced
***Kite, Swallow-tailed, American
*Egret, Reddish
**Falcon, Peregrine, Arctic[7]
***Rattlesnake, Timber
***Snake, Scarlet, Northern
**Lizard, Horned, Texas
***Turtle, Snapping, Alligator
***Blue Sucker
***Creek Chubsucker

Plate 50 Vegetation cover map of the Rockland Reservoir site.

TNHP Data Base Listings:

Red cockaded Woodpecker
Ten colonies located outside but within immediate vicinity of proposed reservoir, imperiled globally and in Texas; very rare; vulnerable to extirpation; greater than 100 estimated occurrences; protected in at least one area.

Slender Gay feather (*Liatris tenuis*)
Three individual species located outside but within immediate vicinity of proposed reservoir; imperiled globally and in Texas; very rare; vulnerable to extirpation; 6-20 estimated occurrences; no confirmation of any protected plants.

Dwarf Post Oak (*Quercus hypoleuca*)
Two individual species located; one inside and one outside proposed reservoir area; imperiled globally and in Texas; very rare; vulnerable to extirpation; 6-20 estimated occurrences; no confirmation of any protected plants.

Floodplain Hardwood Forest
Reservoir site contains the bottomland hardwood site known as the "Middle Neches River" and identified as Priority 1 preservation area by FWS (1984a); also impacted are three other Priority 2 sites known as "Neches River South", "Piney Creek" and "Russell Creek". (See Addendum [p. 59] for additional listing.)

Plate 51 Bottomland hardwood forest at the Rockland Reservoir site.

SHAW'S BEND RESERVOIR

(Colorado Coastal Plains Project)

Location: Colorado River in Fayette and Colorado Counties, dam site approximately 5 miles northwest of Columbus

Normal Pool Elevation: 220 feet msl
Type of Field Evaluation: HEP (King 1986)
Date of Field Evaluation: 1983

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	4,697	.71	3,335	Minimum 25%	.075	45,085		
				Moderate 50%	.145		23,000	
				Maximum 100%	.290			11,500
Oak-Yaupon Woods (3)	184	.38	70	Minimum 25%	.155	452		
				Moderate 50%	.310		226	
				Maximum 100%	.620			113
Live Oak-Post Oak Parks (3)	1,170	.56	655	Minimum 25%	.110	5,955		
				Moderate 50%	.220		2,977	
				Maximum 100%	.440			1,489
Grasses (Native) (3)	485	.52	155	Minimum 25%	.170	912		
				Moderate 50%	.340		456	
				Maximum 100%	.680			228
Grasses (Tame) (4)	5,106	.46	1,428	Minimum 25%	.135	10,585		
				Moderate 50%	.270		5,293	
				Maximum 100%	.540			2,646
Crops (4)	2,838	.41	1,164	Minimum 25%	.148	7,865		
				Moderate 50%	.295		3,946	
				Maximum 100%	.590			1,973
Mesquite-Huisache Brush (3)	86	.38	33	Minimum 25%	.155	213		
				Moderate 50%	.310		106	
				Maximum 100%	.620			53
Other	347							
Total	12,913			Minimum 25%		71,667		
				Moderate 50%			36,004	
				Maximum 100%				18,002

TPWD Listed Species:

Endangered Species

- *Tern, Least, Interior[6]
- ***Eagle, Bald[3]
- ***Prairie-chicken, Greater, Attwater's[3]
- ***Crane, Whooping[2]
- **Snake, Green, Western Smooth
- ***Toad, Houston[6]

Threatened Species

- ***Egret, Reddish
- ***Hawk, White-tailed
- ***Ibis, White-faced
- ***Stork, Wood
- ***Falcon, Perrygrine, Arctic[3]
- ***Kite, Swallow-tailed, American
- ***Rattlesnake, Timber
- ***Lizard, Horned, Texas
- *Blue Sucker

Plate 58. Bottomland hardwood forest at the Shaw's Bend Reservoir site.

SOUTH BEND RESERVOIR

Location: Brazos River, Clear Fork of Brazos River in Young and Stephens Counties; dam site approximately 8 miles southwest of Graham.

Normal Pool Elevation: 1,090 feet msl.
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Riparian Forest (2)	2,354	.77	1,813	Minimum 25% Moderate 50% Maximum 100%	.058 .115 .230	31,259	15,765	7,883
Post Oak-Live Oak-Mesquite Parks (3)	4,086	.56	2,735	Minimum 25% Moderate 50% Maximum 100%	.110 .220 .440	24,845	12,423	6,211
Mesquite Shrubs/ Grasses (5)	12,657	.40	5,063	Minimum 25% Moderate 50% Maximum 100%	.150 .300 .600	33,753	16,877	8,438
Crops (4)	2,991	.22	658	Minimum 25% Moderate 50% Maximum 100%	.195 .390 .780	5,374	1,687	844
Other	6,787							
Total	29,669			Minimum 25% Moderate 50% Maximum 100%		95,231	46,752	23,376

TPWD Listed Species:

Endangered Species

- ***Crane, Whooping[7]
- **Eagle, Bald[3]
- *Curlew, Eskimo[7]
- *Tern, Least, Interior[6]
- *Vireo, Black-capped[3]

Threatened Species

- *Rat, Kangaroo, Texas (*Dipodomys elator*)
- ***Kite, Swallow-tailed, American
- **Falcon, Peregrine, Arctic[3]
- *Ibis, White-faced
- ***Warbler, Golden-cheeked
- ***Lizard, Horned, Texas
- ***Snake, Water, Brazos

See Addendum (p. 59) for additional listings.

Plate 28. Vegetation cover map of the South Bend Reservoir site.

Plate 29. Mesquite shrub/grasslands in the South Bend Reservoir site.

SOUTH FORK RESERVOIR

Location: San Gabriel River in Williamson County; dam site approximately 2 miles west of Georgetown.

Normal Pool Elevation: 808 feet msl
Type of Field Evaluation: HEP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Deciduous Forest/ Live Oak Parks (3)	220	.45	99	Minimum 25%	138	737		
				Moderate 50%	275		360	
				Maximum 100%	550			180
Evergreen Shrub (3) (Cedar-Hardwood)	140	.52	73	Minimum 25%	120	608		
				Moderate 50%	240		304	
				Maximum 100%	480			152
Mixed Riparian Forest (2)	460	.65	299	Minimum 25%	1888	3,598		
				Moderate 50%	175		1,709	
				Maximum 100%	350			854
Grassland (3)	510	.28	81	Minimum 25%	185	438		
				Moderate 50%	370		219	
				Maximum 100%	740			109
Total	1,130			Minimum 25%		5,161		
				Moderate 50%			2,592	
				Maximum 100%				1,295

TPWD Listed Species:

Endangered Species

- ***Eagle, Bald[1]
- ***Crane, Whooping[1]
- **Vireo, Black capped[1]
- *Tern, Least, Interior[1]
- *Salamander, Blind, Barton

Threatened Species

- ***Kite, Swallow tailed, American
- ***Stork, Wood
- ***Warbler, Golden cheeked
- **Ibis, White faced
- **Falcon, Peregrine, Arctic[1]
- ***Lizard, Horned, Texas
- ***Rattlesnake, Timber

*Plate 25. The bobwhite quail (**Colinus virginianus**) is a common resident of the South Fork Reservoir site.*

STACY RESERVOIR

(Under Construction)

Location: Colorado River in Coleman, Concho & Runnels Counties;
dam site at RM 615.1

Normal Pool Elevation: 1551.5 feet msl
Type of Field Evaluation: HEP (FWS 1986a)
Date of Field Evaluation: 1985

Note: This reservoir is currently under construction. Mitigation requirements included in the Federal permit (Section 404) issued by the Corps of Engineers are summarized below in lieu of projected compensation requirements.

Cover Type/ Resource Category( )	Acres Lost
Riparian Corridor (2)	270
Rangeland (3)	15,016
Cropland (4)	3,863
Total	19,149

A Federal permit authorized by Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) was granted to the Colorado River Municipal Water District (CRMWD) by the Ft. Worth District, U.S. Army Corps of Engineers on April 8, 1987, to construct Stacy Dam and Reservoir. Pertinent special conditions of the permit included the following:

1) Ten alternative measures identified by the FWS Biological Opinion dated December 19, 1986 to mitigate adverse impacts to the Concho Water Snake will be implemented.
2) Additional lands identified by TPWD and FWS comprising approximately 5,990 acres or other lands equivalent in habitat value must be provided in perpetuity for development and management to mitigate for project-induced impacts to terrestrial wildlife resources.
3) A management plan for land offered for wildlife mitigation must be submitted to the COE for approval in consultation with FWS and TPWD.
4) Costs associated with initial development, and annual operation and maintenance shall be the responsibility of CRMWD.

TPWD Listed Species:

Endangered Species

- ***Tern, Least, Interior[4]
- ***Eagle, Bald[1]
- **Vireo, Black-capped[3]
- *Crane, Whooping[1]
- ***Snake, Water, Concho (*Nerodia harteri paucimaculata*)[1]
- ***Texas Poppy-Mallow (*Callirhoe scabriuscula*)[1]

Threatened Species

- **Ibis, White-faced
- ***Stork, Wood
- **Hawk, Zone-tailed
- **Falcon, Peregrine, Arctic[1]
- ***Lizard, Horned, Texas
- *Warbler, Golden-cheeked

*Plate 4: The Texas horned lizard (**Phrynosoma cornutum**), listed by TPWD as a threatened species, occupies habitat typically represented by this reservoir site.*

TNHP Data Base Listing:

Concho water snake locally common within proposed reservoir site along Colorado and Concho Rivers, although listed as critically imperiled; occurs only in Texas, is extremely rare and very vulnerable to extirpation.

SWEETWATER CREEK RESERVOIR

Location: Sweetwater Creek in Wheeler County; dam site approximately 8 miles east of Wheeler.

Normal Pool Elevation: 2,525 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Grasses/Sandsage-Shin Oak Brush (2)	1,536	55	834	Minimum 25%	118	6,898		
				Moderate 50%	235		3,469	
				Maximum 100%	470			1,732
Cottonwood-Hackberry Riparian Forest (2)	349	74	258	Minimum 25%	065	3,969		
				Moderate 50%	130		1,985	
				Maximum 100%	260			992
Crops (4)	635	19	121	Minimum 25%	205	596		
				Moderate 50%	405		299	
				Maximum 100%	810			149
Total	2,520			Minimum 25%		11,463		
				Moderate 50%			5,748	
				Maximum 100%				2,873

TPWD Listed Species:

Endangered Species

*Ferret, Black-footed[E]
**Eagle, Bald[E]
*Tern, Least, Interior[E]

Threatened Species

**Ibis, White-faced
*Falcon, Peregrine, Arctic[T]
***Lizard, Horned, Texas

Plate 21. Native prairie grassland at the Sweetwater Creek Reservoir site.

TNHP Data Base Listings:

Bottomland Tallgrass Communities

Occurs in at least 5 locations within proposed reservoir site; communities are imperiled in Texas; very rare; vulnerable to extirpation with only 6-20 estimated occurrences.

Lesser Prairie Chicken (*Tympanuchus pallidicinctus*)

Habitat- Located on Goodin Creek just upstream of the confluence with Sweetwater Creek; plant community is rare in Texas, exhibiting greater than 20 estimated occurrences.

Plate 22. Riparian forest at the Sweetwater Creek Reservoir site.

TEHUACANA RESERVOIR

Location: Tehuacana Creek in Freestone County, dam site approximately 16 miles north of Fairfield.

Normal Pool Elevation: 535 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	6,093	79	5,524	Minimum 25% Moderate 50% Maximum 100%	.053 .105 .210	104,226	52,610	26,305
Mixed Post Oak Forest (3)	5,491	.65	3,569	Minimum 25% Moderate 50% Maximum 100%	.088 .175 .350	40,557	20,594	10,197
Other	2,320							
Total	14,804			Minimum 25% Moderate 50% Maximum 100%		144,783	73,004	36,502

TPWD Listed Species:

Endangered Species

***Eagle, Bald[F]
**Crane, Whooping[F]
*Paddlefish

Threatened Species

**Kite, Swallow-tailed, American
**Stork, Wood
**Falcon, Peregrine, Arctic[F]
**Sparrow, Bachman's
*Ibis, White-faced
***Lizard, Horned, Texas
***Rattlesnake, Timber

Plate 46. Vegetation cover map of the Tehuacana Reservoir site.

Plate 47. Tehuacana Creek and bottomland hardwood forest.

TENNESSEE COLONY RESERVOIR

Location: Trinity River in Anderson, Henderson, Navarro, and Freestone Counties; dam site approximately 22 miles west of Palestine.

Normal Pool Elevation: 275 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	54,767	.75	26,075	Minimum 25% Moderate 50% Maximum 100%	.063 .125 .250	413,889	208,660	104,500
Post Oak-Water Oak-Elm Forest (5)	19,145	.64	12,252	Minimum 25% Moderate 50% Maximum 100%	.090 .180 .360	136,155	68,067	34,033
Grasses (4)	9,600	.49	4,704	Minimum 25% Moderate 50% Maximum 100%	.128 .255 .510	36,750	18,447	9,224
Other	21,545							
Total	85,053			Minimum 25% Moderate 50% Maximum 100%		586,772	295,114	147,557

TPWD Listed Species:

Endangered Species

*Bear, Black
*Curlew, Eskimo[2]
***Eagle, Bald[1]
***Crane, Whooping[1]
*Woodpecker, Red-cockaded[1]
*Vireo, Black capped[1]
*Snake, Pine, Louisiana
**Paddlefish

Threatened Species

**Ibis, White faced
***Kite, Swallow tailed, American
**Stork, Wood
***Falcon, Peregrine, Arctic[2]
***Sparrow, Bachman's
***Lizard, Horned, Texas
***Turtle, Snapping, Alligator
***Rattlesnake, Timber
***Snake, Scarlet, Northern

THNP Data Base Listing:

Upland Forest with some bottomlands. Located within area adjacent to Trinity River between Saline Branch Creek and Catfish Creek; known as "Boone Fields" and identified as Priority 5 preservation site by FWS (1984a).

Special Note 1: Proposed reservoir will impact additional hardwood bottom known as "Tehuacana Creek", also identified as a Priority 5 preservation site by FWS (1984a).

Special Note 2: Approximately 17,500 acres of bottomland occurring within the proposed reservoir site comprises Richland Creek Wildlife Management Area, TPWD, acquired as mitigation for wildlife losses associated with the construction of Richland-Chambers Dam and Reservoir.

Plate 68 Vegetation cover map of the Tennessee Colony Reservoir site

Plate 69 Upland post oak-water oak-elm forest on the Tennessee Colony Reservoir area

Plate 70 Bottomland hardwoods at the Tennessee Colony Reservoir site

UPPER GUADALUPE RESERVOIR

Location: Tributary of Guadalupe River in Kerr County; dam site approximately 2 miles southwest of Kerrville.

Normal Pool Elevation: 1,808 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Oak-Juniper Woods (3)	37	.50	19	Minimum 25%	125	152		
				Moderate 50%	250		76	
				Maximum 100%	500			38
Ashe Juniper Woods (5)	79	.49	39	Minimum 25%	128	305		
				Moderate 50%	255		153	
				Maximum 100%	510			76
Other	2							
Total	118			Minimum 25%		457		
				Moderate 50%			229	
				Maximum 100%				114

TPWD Listed Species:

Endangered Species

- ***Coati (*Nasua nasua*)
- *Bear, Black (*Ursus americanus*)
- ***Eagle, Bald[1]
- ***Vireo, Black-capped (*Vireo atricapillus*)[1]
- *Crane, Whooping[1]
- ***Tobusch Fishhook Cactus (*Ancistrocactus tobuschii*)[1]
- ***Texas Snowbells (*Styrax texana*)

Threatened Species

- ***Hawk, Zone-tailed (*Buteo albonotatus*)
- ***Kite, Swallow-tailed, American
- ***Stork, Wood
- ***Warbler, Golden-cheeked (*Dendroica chrysoparia*)
- ***Falcon, Peregrine, Arctic[1]
- *Ibis, White-faced
- ***Lizard, Horned, Texas

Plate 1. Oak-juniper woodlands at the Upper Guadalupe Reservoir site.

TNHP Data Base Listing:

Big Red Sage (*Salvia penstemonoides*)

Potentially occurring within project vicinity; imperiled globally and within Texas; extremely rare and very vulnerable to extirpation; 5 or fewer estimated occurrences.

TNHP Data Base Listing:

Big Red Sage (*Salvia penstemonoides*)

Potentially occurring within project vicinity; imperiled globally and within Texas; extremely rare and very vulnerable to extirpation; 5 or fewer estimated occurrences.

WALLISVILLE RESERVOIR

Location: Trinity River in Liberty and Chambers Counties; dam site just south of IH 10 bridge crossing on the Trinity River.

Normal Pool Elevation: 4 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1986

Note: Construction of this reservoir has been partially undertaken although a federal court injunction initiated in 1973 stopped further work. The original proposed size of the reservoir was reduced in 1981 from approximately 19,760 surface acres to 5,778 acres. The injunction was upheld in 1986 on grounds that project planning was not in concert with Federal environmental statutes. This injunction was then dissolved by a higher court in 1987, but construction had not been resumed at the time of this report.

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Mixed Bottomland Hardwood Forest (2)	931	.76	708	Minimum 25% Moderate 50% Maximum 100%	.060 .120 .240	11,800	5,900	2,950
Swamp (2)	1,712	.74	1,267	Minimum 25% Moderate 50% Maximum 100%	.065 .130 .260	19,492	9,746	4,873
Water	1,748							
Other	1,387							
Total	5,778			Minimum 25% Moderate 50% Maximum 100%		31,292	15,646	7,823

TPWD Listed Species:

Endangered Species

- *Bear, Black
- *Wolf, Red (*Canis rufus*)[F]
- ***Pelican, Brown (*Pelecanus occidentalis*)[F]
- ***Eagle, Bald[T]
- ***Woodpecker, Red-cockaded (*Picoides borealis*)[F]
- **Prairie-chicken, Greater, Attwater's (*Tympanuchus cupido attwateri*)[F]
- **Tern, Least, Interior[T]
- ***Snake, Green, Western Smooth (*Opheodrys vernalis blanchardi*)
- *Snake, Pine, Louisiana
- *Toad, Houston (*Bufo houstonensis*)[F]
- **Ridley, Atlantic (*Lepidochelys kempi*)[F]
- **Loggerhead (*Caretta caretta*)[T]
- ***Paddlefish

Threatened Species

- *Bat, Big-eared, Rafinesque's (*Plecotus rafinesquii*)
- ***Egret, Reddish
- ***Ibis, White-faced
- ***Kite, Swallow-tailed, American
- ***Stork, Wood
- ***Falcon, Peregrine, Arctic[T]
- ***Plover, Piping (*Charadrius melodus*)[T]
- ***Sparrow, Bachman's
- ***Lizard, Horned, Texas
- **Turtle, Green, Atlantic (*Chelonia mydas mydas*)[T]
- ***Rattlesnake, Timber
- **Snake, Scarlet, Northern
- ***Turtle, Snapping, Alligator
- *Creek Chubsucker

Plate 6. Vegetation cover map of the Wallisville Reservoir site.

Plate 7. Cypress swamp in the Wallisville Reservoir site.

Special Note: Proposed reservoir will directly impact portions of a bottomland hardwood forest area known as "Demijohn Lake", identified as a Priority I preservation site by the FWS (1984a).

WECHES RESERVOIR

Location: Neches River in Anderson, Cherokee and Houston Counties; dam site approximately 2 miles below SH 21 crossing.

Normal Pool Elevation: 282 feet msl
Type of Field Evaluation: WHAP
Date of Field Evaluation: 1985

Cover Type/ Resource Category( )	Acres Lost	HQ/HSI	Habitat Units Lost	Management Option	Potential HQ Gain	Compensation Requirements (Acres)		
Grasses (5)	4,804	.55	2,546	Minimum 25% Moderate 50% Maximum 100%	.118 .235 .470	21,576	10,834	5,417
Mixed Bottomland Hardwood Forest (2)	17,956	.85	14,903	Minimum 25% Moderate 50% Maximum 100%	.043 .085 .170	346,981	175,329	87,665
Mixed Pine-Hardwood Forest (5)	21,005	.66	13,863	Minimum 25% Moderate 50% Maximum 100%	.085 .170 .340	163,094	81,547	40,774
Other	5,888							
Total	47,653			Minimum 25% Moderate 50% Maximum 100%		531,251	267,710	133,856

TPWD Listed Species:

Endangered Species

*Bear, Black
*Crane, Whooping[F]
*Tern, Least, Interior[F]
***Woodpecker, Red-cockaded[F]
***Eagle, Bald[F]
***Snake, Pine, Louisiana
**Paddlefish

Threatened Species

*Bat, Big-eared, Rafinesque's
**Ibis, White-faced
**Falcon, Peregrine, Arctic[T]
**Sparrow, Bachman's
**Kite, Swallow-tailed, American
**Stork, Wood
***Lizard, Horned, Texas
***Turtle, Snapping, Alligator
***Rattlesnake, Timber
**Snake, Scarlet, Northern
***Creek Chubsucker

Plate 52. Vegetation cover map of the Weches Reservoir site.

TNHP Data Base Listing:

Floodplain Hardwood Forest

Plant community is located along the west side of Neches River from confluence with Brushy Creek to confluence with Stills Creek, north of US Hwy 84 crossing; known as "Neches River North" and identified as Priority 1 preservation site by FWS (1984a).

Special Note: Reservoir also impacts another bottomland hardwood site known as the "Middle Neches River" and identified as a Priority 1 preservation area by FWS (1984a).

Plate 53. Flooded bottomland hardwoods in the fall at the Weches Reservoir site.